Teacher RePlay and Children ReAct: pilot testing a formative toolkit to support playful learning in the classroom

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Playful learning has seen a resurgence of interest in the past decade, particularly in contexts where play is not traditionally part of a teacher's repertoire. Teachers interested in exploring the integration of play in their classrooms need formative tools and resources that help them to reflect and assess their own practice and their ability to create a playful learning experience for their students. This study presents the results of two rounds of pilot testing in three countries for Teacher RePlay, a new open-source toolkit designed to support teachers interested in reflecting on and deepening their learning through play practice. The toolkit includes the main Teacher RePlay observation protocol for teachers, as well as Children ReAct, a complementary protocol for a photo-elicited focus group discussion with children, intended to directly assess children's experiences and reflections on learning through play. Upon observation, teachers receive customized coaching suggestions and tips designed to strengthen their learning through play practice. Initial results from the piloting indicate that the toolkit holds strong potential for teachers interested in better understanding and deepening their playful learning practice. This paper discusses the development, validation, successes, and challenges of the Teacher RePlay toolkit, and identifies future directions for its use.

KEYWORDS

playful learning, characteristics of play, play facilitation, learning through play, formative tools, teacher professional development, educational technology, photo elicitation

Introduction

Children learn new skills, grow their knowledge, and experience the world through play and experimentation. The past decade has seen a growing interest in play and playful pedagogy for children of all ages, and numerous efforts are underway seeking to create stimulating,

playful learning environments for children (e.g., Zosh et al., 2017; Parker and Thomsen, 2019). In contexts where play is not traditionally part of the school experience, this interest has generated an acute need to support educators interested in playful learning, both through professional development opportunities and practical, hands-on tools that they can use in the classroom.

This paper presents Teacher RePlay – a toolkit developed and pilot-tested in Bangladesh, Colombia, and Uganda with the goal of helping teachers better understand children's playful learning experiences and reflect on ways that their practice can enhance and deepen the learning through play experiences for children. Designed to be applied in early learning centers and primary grade classrooms, with educators working with children 3–12 years of age, Teacher RePlay gives educators an observation protocol for their classroom, alongside a guided discussion with children to obtain firsthand perspectives on children's learning through play experiences. This bimodal structure – with a teacher's perspective enriched by children's voices – provides for a unique user experience on the part of the teacher, and in the words of many pilot participants, strengthens the connection between teachers and their students. Teacher RePlay was developed and pilot-tested in three languages and two formats (digital application and paper).

This paper is structured as follows. We first present the literature underpinning Teacher RePlay, as well as the conceptual framework for its structure. We then describe the structural elements of the tool, and the ways it is intended to be used by educators. This description is followed by the methodology and approach we used during the pilot tests in three countries. Next, we offer a brief description of the results of the pilot tests and user surveys. The paper closes with a discussion of the potential applications for the toolkit and an agenda for further research.

Background and rationale: why do teachers need a formative tool for playful learning?

Implementing play-based pedagogies requires teachers to be confident in their ability to create and extend instances of play that are conducive to students' learning. Moreover, they must be comfortable with moments in which they must share control of the classroom with children during playful activities. Yet, research from around the world has found that many teachers see play and learning as dichotomous. Early childhood educators in Colombia, for instance, report appreciating the value of play for children's development, but find it difficult to conceive how activities where they cannot explicitly incorporate reading and math content could be conducive to learning (Durán and Pulido, 2018). Similarly, in Bangladesh, teachers in kindergarten and primary school see play and academic learning as separate concepts, with some considering extended periods of play without any adult stimulation as dull or boring in children's eyes (Cross and Islam, 2021). Studies in kindergarten classrooms in Canada and Scotland found that some teachers see play as related exclusively to children's social development, while others see it as linked to the development of both social and academic skills (Martlew et al., 2011; Fesseha and Pyle, 2016).

Critically, effectively integrating play into learning requires skillful facilitation on the part of the teacher, particularly when it comes to sharing control of the classroom, which has emerged as a concern for teachers who face mandated standards-based curricula linked with school accountability (Pyle et al., 2018). Even in higher-resource education systems, such as Canada, teachers face uncertainty about how to implement guided play properly and see it as less structured and more difficult to plan than direct instruction (Pyle et al., 2018). In Bangladesh, teacher interviews revealed that they tend only to implement teacher-directed and direct instruction activities because it gives them more control to cover learning areas mandated by the curriculum (Chowdhury and Rivalland, 2016).

As such, to embrace play as a core element of teaching and break out of the false dichotomy between learning and play, teachers need tools and resources that reframe play as a continuum of facilitation and allow them to examine and reflect on their students' experiences in their classroom (Pyle and Danniels, 2017). When a teacher chooses a teacher-directed play activity for their classroom, and they are interested in observing to what extent their students are engaged, for example, it may be helpful to have a tool that outlines a more easily observable set of behaviors they can look for in their students. In particular, formative tools that provide teachers with greater ownership over the level and depth of learning through play, while demystifying play facilitation and providing instant feedback and coaching support, can be especially helpful in motivating teachers to begin to incorporate play in their practice. In other words, as teachers begin to see more clearly the way that playful learning affects children's experiences in their classrooms – as we can hypothesize a formative tool helping them to do – they may be more willing to embrace playful pedagogies, as well as share them with others.

Learning through play experience framework

The Learning Through Play Experience Framework (LEF), the conceptual core of Teacher RePlay, overlays two dimensions of playful pedagogy: (1) the continuum of teacher facilitation and child agency in play (Bergen, 1988; Pyle and Danniels, 2017; Zosh et al., 2018), ranging from free play to teacher-directed play; and (2) the five characteristics of play [see description below, Zosh et al., 2017]. At each intersection of a facilitation style and characteristic of play, teachers are offered a set of behavioral manifestations that children may exhibit during the course of a playful learning activity (Figure 1). These behavioral descriptors are subsequently broken out into 3–6 behavioral items, which teachers may observe and children may discuss in conversations about their learning through play experience.

Play facilitation spectrum

The Teacher RePlay (and Children ReAct, as a submodule) is grounded in the conceptualization of playful learning as a continuum of teacher facilitation, allowing teachers to see multiple ways that play can be introduced based on learning goal, classroom constraints, and their own facilitation skills (Pyle and Danniels, 2017). On a given day, teachers may choose to introduce an activity where they fully direct and manage the playful aspects, setting out the rules and steps for children to follow.

LEARNING THROUGH PLAY EXPERIENCE FRAMEWORK
LEGO Foundation Play and Learning in Children's Eyes (PALICE) Project

PLAY FACILITATION SPECTRUM			TEACHER FACILITATION	JOYFUL	ACTIVELY ENGAGING	ITERATIVE	MEANINGFUL	SOCIALLY INTERACTIVE
	FREE PLAY high child agency, limited or no adult involvement	Foundation	Provision of space, time, and materials	Children happily interact with materials or with others.	Children move quickly from activity to activity, with no clear links between activities.	Children's play is repetitive, with the same ideas being done over and over.	Children's play is based in the here-and-now.	Children share space and materials with others without collaborating on ideas.
		Extension	Observing children's interest, knowledge, and skills and using that to inform the design of the playful experience	Children's interaction is marked by shared excitement, surprise, and intrinsic motivation.	Children are engaged in the play experience, resisting distraction, and staying on-task.	Children are evolving their play, based on their own ideas or ideas of others.	Children's play connects with other ideas from other lessons, the outside world, or their own lives.	Children interact with peers, building off of each other's ideas, using perspective-taking, and sharing knowledge and ideas (social negotiation).
	GUIDED PLAY high child agency, teacher scaffolded or supported	Foundation	Educators design the play activity based on curriculum standards. Educators initiate the play experience and ask skill-based questions in the context of play.	Children happily interact with each other, the educator and the play experience.	Children engage with the material and activity in the manner that is expected, required and presented and are easily redirected to stay on task.	Children's thinking is limited to obvious next steps and solutions.	Children's play connects with what is in front of them and their previous play narratives.	Children follow directions and demonstrate expected or modeled interactions.
		Extension	Educators design a high-quality play experience based on children's needs and observed interests. Educators initiate observe, ask open-ended questions, build off of the play experience in the moment to extend learning, while children direct the play experience.	Children's interaction is marked by shared excitement, surprise, and intrinsic motivation.	Children are contributing to the design, process, and ideas of the playful experience and exhibit self-sustained attention.	Children have the opportunity to shift and change the play experience while engaging with the learning goal.	Children's play takes inspiration from previous experiences, new ideas, others' ideas, and personal meaning.	Children's interactions are central to the play experience and become the center of learning.
	TEACHER DIRECTED PLAY lower child agency, teacher controlled	Foundation	Educators design the play activity based on curriculum standards. Educators ask planned questions and facilitate as intended.	Children happily interact with the playful activity.	Children are engaging with the play experience and learning goal and are easily redirected to stay on task.	Children's thinking is limited to what was presented by the teacher.	Children's play is done as modeled and does not reflect previous knowledge or use new ideas.	Children's social interactions are limited to the rules of the activity.
		Extension	Educators thoughtfully design the play activity also based on student needs, interests, and knowledge. Educators ask questions and support and build on knowledge as needed.	Children's interaction is marked by excitement, surprise, and intrinsic motivation.	Children are engaging with the play experience and learning goal, and engagement transfers from teacher to child.	Children build off of their own or other's ideas, trying out new solutions and ideas.	Children's play integrates with other academic skills, concepts, and strategies.	Children share their own perspectives, collaborate and perspective-take.

FIGURE 1
PALICE learning through play experience framework.

In this scenario, they would orient themselves toward the *teacher-directed play* portion of Teacher RePlay, which includes items that account for the relatively limited agency children may exhibit during the activity. For another activity, the teacher may decide to set basic expectations and learning goals, and allow children to have agency as they engage in playful activities in service of those learning goals (e.g., rotating learning centers, or selecting their materials and forms of play), only occasionally checking in on their progress. This scenario would lend itself to the *guided play* protocol of Teacher RePlay. Finally, the teacher may allow children full agency and choice in their play activity, creating a *free play* experience for the whole or part of their learning period. The framework and structure underpinning Teacher RePlay asks teachers to set an intention for their facilitation style, as the first step in setting up their Learning through Play (LtP) formative observation and reflection. Once the teacher facilitation level is selected, teachers can proceed by choosing the characteristics of play to observe for their Learning through Play activity.

Characteristics of play

The second dimension of the framework underlying the Teacher RePlay toolkit is the Five Characteristics of Learning through Play (Hirsh-Pasek et al., 2015; Zosh et al., 2017, 2018), which posit that when learners are joyful (experiencing positive emotions), active (minds-on), engaged (not distracted), learning meaningful content (connects to the larger world, their previous understanding, and potentially their passion), and socially interactive, learning is maximized. Critically, these characteristics are thought to support holistic learning that includes cognitive, social, emotional, physical, and creative skills (Zosh et al., 2017, 2022). This literature argues that play naturally leverages the characteristics that lead to learning, and that guided play, especially, is effective because it engages these characteristics during a purposefully designed activity with a specified learning goal (Zosh et al., 2018). Importantly, these characteristics are not in a present/absent concrete state, but may be more or less evident depending on the play facilitation level in the classroom, and the extent of child agency within a learning through play activity. By viewing these characteristics as having a range of manifestations, teachers can facilitate in a variety of ways - for example, ways that are suitable for their context, the lesson at hand, the children's age and educational needs, and their own strengths.

In Teacher RePlay, the characteristics of play are interlaid with the teacher facilitation styles to offer teachers a way of visualizing and setting expectations of children's experiences at every point of intersection. These behavioral descriptors form the foundation of the

Teacher RePlay behavioral items that provide teachers with specific ways of observing and registering children's responses and reactions during the learning through play activity. The framework also helps guide a post-activity discussion with children, eliciting their responses and reflections on the activity, thereby allowing the teacher to check their own observation with the feedback they receive from their students.
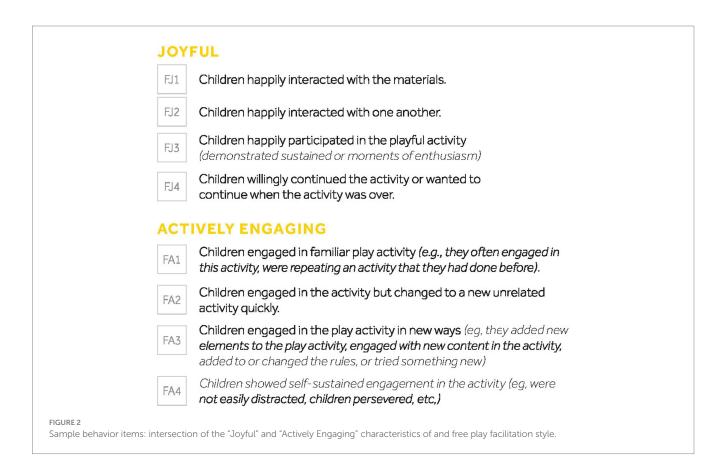
Teacher RePlay behavioral items

Within the Learning through Play Experience Framework, the continuum of play facilitation – teacher-directed, guided play, and free play – helps teachers identify the different manifestation of each of the five characteristics of play at different levels of teacher facilitation. These behavioral manifestations are then unpacked in a set of behaviors and reactions that teachers can observe in their students. The Teacher RePlay observation form provides three to six behaviors per intersection of teacher facilitation and characteristic of play (see Figure 2), for a total of 70 behavioral items, including 23 under free and teacher-directed play each, and 24 under guided play. By limiting the number of characteristics to observe for in a given session (rather than asking them to broadly observe for playful learning or overwhelming them with long lists of behavioral indicators), the tool is designed to help scaffold teachers' understanding of how these characteristics may manifest in their classrooms, provide targeted coaching tips to support engagement with that characteristic, and develop a deeper understanding of playful learning as a pedagogical approach.

The initial set of items for the prototype of the toolkit were developed by the research team and later iterated in Bangladesh, Colombia and Uganda, to reflect the context and local understandings, through workshops with 10–15 educators at each pilot site, purposefully selected due to their prior experience with learning through play. During the contextualization workshops, educators examined the appropriateness of the items for their environments, and proposed revisions to strengthen comprehension and relevance to most classroom settings in their country and in their language (English, Spanish, and Bengali for the two pilots).

Coaching Tips

One of the key features of Teacher RePlay, is the presence of Coaching Tips, or tailored suggestions for deepening the teacher's practice of learning through play. For each behavioral item, the team developed a corresponding Coaching Tip to provide concrete feedback on how to implement and/or improve the implementation of that approach (e.g., "If children are not engaging in the activity, consider asking open-ended questions and inviting them to share their thoughts and ideas. By inviting them to interact with the materials and participate in the playful activity, you will help them to naturally want to engage with the learning activity"). When educators are already implementing an approach in an advanced manner, the coaching tips provide concrete support for educators to continue to build on their skills in this area (e.g., "Make sure that the play activity has multiple

JOYFUL

FJ1 Children happily interacted with the materials.

FJ2 Children happily interacted with one another.

FJ3 Children happily participated in the playful activity *(demonstrated sustained or moments of enthusiasm)*

FJ4 Children willingly continued the activity or wanted to continue when the activity was over.

ACTIVELY ENGAGING

FA1 Children engaged in familiar play activity *(e.g., they often engaged in this activity, were repeating an activity that they had done before).*

FA2 Children engaged in the activity but changed to a new unrelated activity quickly.

FA3 Children engaged in the play activity in new ways *(eg, they added new elements to the play activity, engaged with new content in the activity, added to or changed the rules, or tried something new)*

FA4 *Children showed self-sustained engagement in the activity (eg, were* **not easily distracted, children persevered, etc,)**

FIGURE 2
Sample behavior items: intersection of the "Joyful" and "Actively Engaging" characteristics of and free play facilitation style.

possible solutions. By using open-ended activities and asking open-ended questions, you create space for children's ideas"). Regardless of the educators' comfort and experience with learning through play, the coaching tips were created to support teachers to foster the desired aspect of the children's experience in their classroom. Teacher RePlay offers a total of 70 Coaching Tips, corresponding to the number of items in the Teacher RePlay observation form.

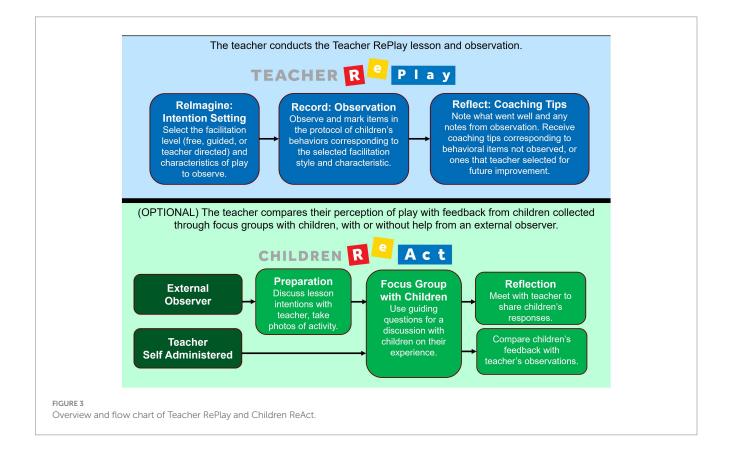## Children ReAct: integrating children's voices

The Children ReAct module of the Teacher RePlay toolkit offers a qualitative data collection method to gather children's perspectives and feelings—those aspects that cannot be directly observed—about the LtP activity implemented by the teacher in the classroom. It triangulates the learning from the teacher's observation, embedding children's voices and lived experiences into the teacher's understanding of the LtP activity. The module draws on photo elicitation to get children to share their perspectives: an observer takes photos of children during the LtP activity, and draws on 2–3 photos to guide a short focus group discussion with children. As they lead the discussion, the interviewer marks the behaviors or responses evoked by the children, using a protocol organized by characteristic of play and teacher facilitation style. The children's reactions and reflections then form the basis for a debriefing conversation between the observer and the teacher, providing feedback and validation to the teacher's own observation.
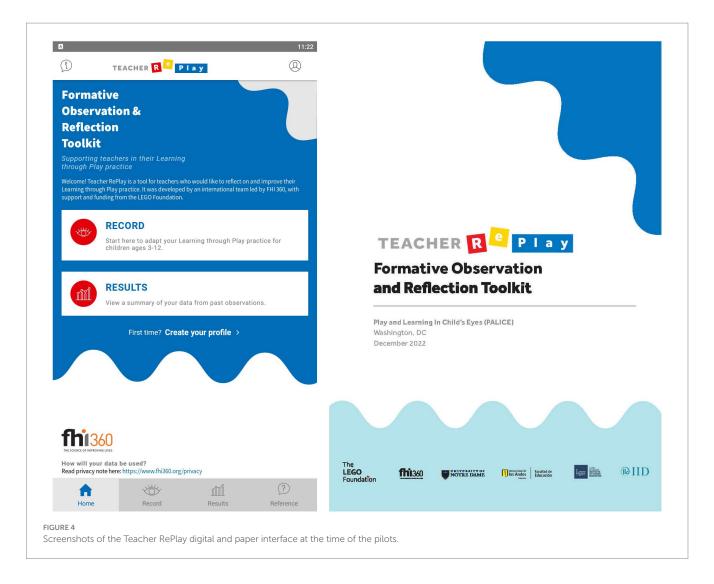
User experience design – structure and sequence of Teacher RePlay and Children ReAct

Figure 3 provides an overview of all the components of Teacher RePlay, and the sequence of steps that users are asked to follow.

As a first step, teachers are asked to set an intention (labeled "ReImagine"), asking the teacher to mark the date, type of activity, number of children present and number of children observed, as they prepare to start the LtP activity. Teachers are also asked to set a learning goal for the types of skills the activity is intended to focus on, choosing among cognitive, social, creative, emotional, and physical skills (Zosh et al., 2022). Once the intention is set and the activity commences, the teachers move to the main part of the protocol ("Record"), which offers the behavioral items for the chosen facilitation style and characteristic of play. While in principle teachers are able to observe behaviors for all five characteristics of play during the same activity, in training they are encouraged to focus on no more than two at a time. Following the observation, users are invited to complete the reflection section, noting what went well and not so well, and any notes for the future. Based on this, and on noting what items were marked not observed, users are offered the Coaching Tips corresponding to the omitted behaviors, suggesting activities that might help elicit better responses from children next time around.

The Children ReAct is an optional component, requiring a separate time set up for a focus group with children to learn about their experiences during the lesson. While Children ReAct protocol is a separate paper tool, the Teacher RePlay forms allow for entering of the feedback emerging from children into the Reflection section, for teacher's future reference Figure 4.

FIGURE 3
Overview and flow chart of Teacher RePlay and Children ReAct.

FIGURE 4
Screenshots of the Teacher RePlay digital and paper interface at the time of the pilots.

Differences between the paper and digital Teacher RePlay

While the toolkit is equivalent between the two modalities, there were some differences due to the medium of the tool: paper or digital.[1] In the paper version, all behavioral items are laid out on one sheet, grouped by characteristic of play. At the top of each observation form is a short intention setting section. Each of the behavioral items in the observation protocol are assigned an alphanumeric code, making it possible to note the codes in the reflection section (back of the toolkit) and find the appropriate coaching tips at the back of the document. The back section of the observation protocol provides space for reflection and a separate section for noting the feedback from the Children ReAct module.

The digital Teacher RePlay app was designed as a sequence of screens: (1) Reimagine, (2) Record, (3) Reflect, and (4) Children ReAct intake form. As part of the Reflect section, the app asked teachers to select: (a) behaviors they are proud of; and (b) behaviors

they would like to focus on eliciting. This latter step resulted in automatic feedback with coaching tips appearing on the screen, with advice geared toward improving their practice with specific emphasis on items of interest. Each teacher could view the aggregate of their observations in a "My Data" screen, including the number of their observations disaggregated by learning goal, facilitation style and characteristic, what items were observed or missed, and the latest set of coaching tips they received.

Learning environment: pilot testing

Country context

The development of the toolkit was informed by data and insights from three countries: Bangladesh, Colombia and Uganda, purposefully selected to represent different geographic regions and education systems. The countries' education systems differ in their general level of experience with the concept of playful learning, teacher preparation and training, and availability of classroom and school level learning resources, and it was important for the research team to create a formative toolkit that could work in a range of environments. Prior to embarking on the pilots, we conducted rapid ethnographic

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1   The digital Teacher RePlay app was discontinued by the LEGO Foundation after the pilot due to data management concerns.

assessments in each country to ground-truth our knowledge of the context and inform subsequent item development (see D'Sa et al., 2022). Of the three countries, Colombia was found to be one where the importance of play is most prominent in the education system, defined as a central guiding activity at least in early childhood education alongside art, literature and exploration of the environment [(Ministerio de Educación Nacional, 2014), as cited in D'Sa et al. (2022)]. In Bangladesh and Uganda, play is still seen as largely a leisure time activity, although the new national curriculum in Bangladesh, to be implemented by 2025, seeks to create a student-friendly and joyful learning environment for students [Gillies et al. (2017), as cited in D'Sa et al. (2022)]. This manifest itself in workshops and trainings with teachers in each country, pointing to a greater need for foundational and conceptual grounding in playful learning in Bangladesh and Uganda than in Colombia. Class sizes also varied substantially within countries, reaching up to 40–50 students in Bangladesh and up to 80 students in primary classrooms in Uganda, which posed additional challenges for teachers in these settings. In all three countries, pilot testing was done within both regular government schools and schools run or supported by non-governmental organizations. For more information on the country context, see D'Sa et al. (2022).

Pilot testing process

The pilot testing of the Teacher RePlay toolkit took place in three stages. First, a small group of up to 15 teachers in each of the participating countries was asked to pretest the tools over the course of one week, purposefully administering a chosen teacher facilitation style and characteristic of play. A few participating instructional support staff, who were either peer teachers, head teachers or instructional coaches depending on the pilot country, pretested the Children ReAct guide, including the photo elicitation interview and reflective discussions with teachers. Following the pretest, we conducted two pilot tests in each country, with each pilot lasting approximately four weeks, to overall larger samples of teachers, who were trained and oriented to the toolkit.

Because the toolkit is aimed at supporting teachers who are interested in deepening their playful learning practice, the intention for the pilots was to recruit teachers already well versed in the framework of the five characteristics of play, as well as the play facilitation spectrum. However, this was not always practically possible, as the training in playful learning did not always engage all teachers in a school or was limited to teachers of young children. In each of the countries, we therefore recruited teachers with an interest in playful learning, whether or not they had been previously trained.

We offered both paper and digital app versions of the toolkit in the three countries and provided assistance to teachers in installing the digital app during the training. The majority of teachers in Colombia used the digital version exclusively (78% in pilot 2), while in Uganda, most teachers (70%) used the paper version exclusively due to the lack of access to devices. In Bangladesh, teachers either used paper exclusively (42% in pilot 2) or both digital and paper versions (54%).

During each pilot, participating teachers were asked to administer the toolkit at least once or twice a week, including the Children ReAct module at least once a week. The country research teams followed up

with teachers through What's App groups and site visits, addressing questions and concerns, providing support with the toolkit as needed, and encouraging more active use of the toolkit.

Data collection during and after the pilots

During the pilots, data from the digital app were automatically uploaded to a central server, allowing the team to see, with a disaggregation at the country level, how many observations were being entered every day, and the choices that the teachers made in selecting their learning goals, play facilitation styles, characteristics of play, and the behaviors they were observing in their classrooms, as well as the coaching tips they were provided. For teachers using the paper version of Teacher RePlay, we entered data manually and merged with data from the digital app after each pilot completion. After each pilot round, we administered usability surveys and interviews to participants to assess their experience and identify challenges and potential modifications to the toolkit. The surveys were administered to all participants, and a randomly selected subsample was invited for interviews (Table 1). No personally identifiable information was collected from the pilot participants.

Toolkit adjustments due to pilot testing

Throughout the pilot testing process, and particularly after each round of participant surveys and interviews, we made adjustments to streamline and simplify the user experience with the Teacher RePlay and Children ReAct toolkit. One of the substantive early changes was the introduction of the Children ReAct "self-administered" module, where teachers lead a focus group discussion with their own students, rather than relying on an external observer and facilitator to do it. The self-administered assessment responded to the challenge of finding the external observer in some school settings. This option was rolled out for the second round of piloting.

Other adjustments included wording changes to the items and Coaching Tips to improve clarity, and adding brief descriptions of the facilitation styles on the Teacher RePlay PDF kit. For the digital app, modifications were made to allow more than one user to set up profiles on the same device, and developing the option of saving and sharing individual completed observation forms as PDFs. Other elements of the toolkit, including the items structured by facilitation style and characteristic of play, the Children ReAct module, and Coaching Tips were retained.

TABLE 1 Usability survey respondent sample across countries and pilots.

Usability survey respondents	Bangladesh		Colombia		Uganda	
	Pilot 1	Pilot 2	Pilot 1	Pilot 2	Pilot 1	Pilot 2
Teacher RePlay user survey	132	131	26	115	120	106
Children ReAct module survey	62	72	6	21	42	8
Qualitative interviews	15	15	21	32	18	20

TABLE 2 Pilot participation and sites.

Statistic	Bangladesh		Colombia		Uganda	
	Pilot 1	Pilot 2	Pilot 1	Pilot 2	Pilot 1	Pilot 2
Number of teachers participating, % Female/Male	143 (80% F, 20% M)	142 (72% F, 28% M)	48 (88% F, 12% M)	521 (85% F, 15% M)	174 (79% F, 21% M)	179 (82% F, 18% M)
Pilot site partner	BRAC Bangladesh; Government primary schools	Open call for interested teachers	aieoTU; open call for interested teachers	BRAC Uganda		
Locations	Gaibandha Sadar, Palashbari, Gobindagonj and Shaghata in Gaibandha district	Gaibandha, Rangpur	Bogota	Bogotá, Bucaramanga, Cali, Cartagena, Cúcuta, Florencia, Medellín, and San Vicente del Caguán	Kampala, Luweero, Wakiso	Luweero

Results to date

Over the course of the two pilots, 1,207 teachers participated in the three countries (Table 2 above), generating 6,196 observations. Unless otherwise specified, results are presented aggregated across the two pilots. Of the observations completed, 75% of digital submissions included a Children ReAct module, including 56% administered by a peer educator, and 19% by teachers themselves in their own classrooms. This proportion was substantially higher in Colombia than in the other two countries, with 85% of observations including a Children ReAct module (Figure 5).

Teachers across the three countries made substantially different choices in applying the toolkit with groups of different sizes: while in Bangladesh and Uganda, the predominant mode was to observe a small group of 2–5 students (76 and 66% respectively), in Colombia most teachers either used it with all students (52% of observations) or with a large group of more than 5 students (17%). This may be explained in part by the variability in class sizes across the three contexts: in Uganda and Bangladesh, observing large classes of often 60+ students is simply not practical.

The duration of the toolkit administration varied substantially across countries. Data from the digital app showed that 34% of observations took under 10 min to complete, while 40% of observations took over 2 h between initial intention setting to completion and submission. This is consistent with our observation of how teachers used the toolkit: during site visits we noticed that some teachers set the toolkit aside during their LtP activity, and finished their observation after their lesson was completed, sometimes hours later (Figure 6).

In each country, teachers used the toolkit with a variety of teacher facilitation styles and characteristics of play, spanning the full range of options across the LEF (Table 3). This is partially by design: during training workshops, we encouraged teachers to try all of the facilitation styles, and different characteristics, selecting up to two characteristics at a time for each LtP activity. As Table 3 shows, guided play appeared to be the most popular option among teachers in Colombia, free play and guided play appeared to be most popular among teachers in Uganda, while Bangladesh observations were equally split across the three styles. Among the characteristics of play, Actively Engaging and Joyful were the most popular choices in Bangladesh. Actively Engaging was the most frequent characteristic of focus for teachers in Uganda,

while in Colombia the preferred characteristics were Actively Engaging and Meaningful (Table 3).

Respondents to the usability survey (n = 630) indicated a range of approaches to the frequency of application of Teacher RePlay. In Bangladesh, nearly all teachers reported using the toolkit three times per week. In Colombia, 19% of respondents (who represent a smaller portion of pilot participants than in the other countries, due to higher nonresponse), indicated that they only used the toolkit once during the entire pilot, and 65% used the tool either once or twice per week. In Uganda, about half of teachers used it once a week, and another 33% twice a week (Table 4).
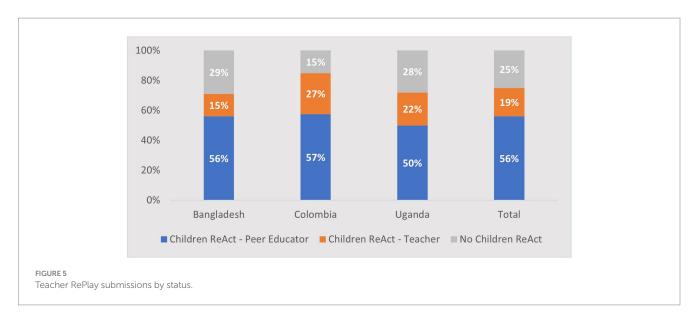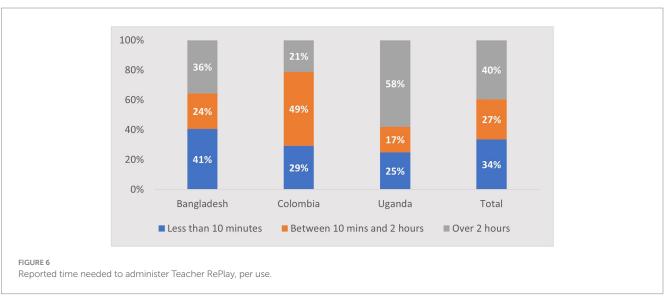
Overall impressions

We invited all participating teachers to complete short usability surveys or interviews following their experience piloting the toolkit in their classroom. In total, 791 educators completed the post-pilot usability surveys, including 263 teachers and 134 administrators in Bangladesh, 141 teachers and 27 administrators in Colombia, and 226 teachers in Uganda (of whom 50 acted as external observers for the Children ReAct module). We also interviewed a subsample of participants in each country (Table 1).

Over 90% of respondent teachers reported that the intuitiveness and the look and feel of the toolkit was "good" or "exceptional" (Table 5). The majority of respondents (83% across all countries) mentioned that it was "very easy" to understand most behavioral items in the Teacher RePlay. Notably, teachers who used the translated Spanish and Bengali versions of the toolkit (in Colombia and Bangladesh, respectively), had fewer comprehension challenges, while this number was 30% in Uganda, which used English – indicating a need for further contextualization and language adaptation.[2]

Nearly all respondents (99%) reported that the use of the toolkit helped improve their teaching "somewhat" or "to a great extent." In

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2 In the final version of the toolkit, we created a Uganda-English language version of the toolkit; however, this version had not been pilot-tested at the time of this paper.

FIGURE 5
Teacher RePlay submissions by status.

FIGURE 6
Reported time needed to administer Teacher RePlay, per use.

qualitative interviews, teachers shared that they found the use of the toolkit motivating and empowering, noticing differences in their own teaching and ways of connecting with their students:

> "… I am now more knowledgeable about designing play activities that would lead to better learning for my students. I also like to think that the use of the tool also made me more observant as a teacher I now know more ways to observe my students' learning." (Teacher, Bangladesh).

> "Every time I teach using the tools it makes me feel I should continue teaching because children are happy and also understand well." (Teacher, Uganda).

> "I was able to innovate more, create more. Not limited to what I normally did in the activity, but to do it in a different way, to see

it from a different concept, in a different way. And to integrate myself as well to play because one also participates." (Teacher Colombia).

This level of satisfaction and acceptance of the Teacher RePlay led some teachers to adopt Teacher RePlay in their practice on a consistent basis, at least as their intention at the time of the post-pilot survey: 27% of respondents in Bangladesh, 33% in Uganda, and 49% of Colombian respondents[3] said they "always" applied feedback from the toolkit when preparing their LtP activities.

Further, in qualitative responses, many teachers indicated that the fact that the toolkit provided feedback in the form of coaching tips made the toolkit valuable and useful for their practice:

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3   Note that the Colombia sample represents about 20% of teachers trained on Teacher RePlay, due to a lower response rate to the post-pilot survey.

TABLE 3 Number of Teacher RePlay observations by play facilitation style and characteristics of play.

Play spectrum	Actively engaging	Iterative	Joyful	Meaningful	Socially interactive	Total
Bangladesh						
Free play	553	158	612	113	106	1,027
Guided play	546	191	516	129	111	957
Teacher directed	582	154	541	149	102	993
Total	1,681	503	1,669	391	319	2,977
Colombia						
Free play	37	15	37	30	29	74
Guided play	136	60	106	136	118	292
Teacher directed	93	44	41	82	42	156
Total	266	119	184	248	189	522
Uganda						
Free play	156	108	183	60	109	560
Guided play	168	58	112	180	106	572
Teacher directed	124	47	83	136	70	425
Total	448	213	378	376	285	1,557
Across all countries						
Free play	755	286	844	208	254	1,656
Guided play	864	315	740	464	343	1,843
Teacher directed	798	246	666	372	216	1,557
Total	2,417	847	2,250	1,044	813	5,056

TABLE 4 Frequency of Teacher RePlay application.

Country	Daily	Three times per week	Twice per week	Once per week	Every two weeks	Once in the past four weeks
Bangladesh		98%	1%		1%	
Colombia	4%	5%	31%	34%	8%	19%
Uganda	2%	9%	33%	48%	5%	4%
Total	1%	47%	19%	24%	3%	5%

"Yes, the moment the app evaluates me or gives me feedback. It makes me remember that there are things that... some objective that I did not meet. That makes you realize that you must strengthen or not overlook things that sometimes we think that the group has already assimilated" (Teacher interview, Colombia).

"When I do not observe some behaviors in the activity, I refer to the coaching tips. I found the coaching tips useful." (Teacher interview, Uganda).

In Bangladesh, teachers paid additional attention to coaching tips related to characteristics of play which they found more difficult to observe. For other characteristics, teachers only needed to see the coaching tips once or twice to benefit from them.

"I did not have to use the coaching tips all that often after consulting it a couple of times in the beginning. However, I found some of the tips given in there to be really helpful, especially the ones given for 'Meaningful' and 'Iterative' characteristics – as I was having trouble observing those characteristics." (Teacher, Bangladesh).

Children ReAct module

Because the Children ReAct module is optional, not all participating teachers used it on a regular basis, although we asked all pilot participants to try it out at least once. Table 6 provides a brief snapshot of the results. Both the teacher self-administered module (where they lead a focus group discussion with their students), and one completed by external observer were piloted. For the teachers and observers who did complete the Children ReAct (those numbers varied across countries), results were generally positive, with nearly all participants agreeing that the process and the feedback received from

TABLE 5 How do teachers rate Teacher RePlay toolkit?.

Country	Intuitiveness				Look and feel			
	Poor	Fair	Good	Exceptional	Poor	Fair	Good	Exceptional
Bangladesh								
App	0%	8%	73%	19%	0%	3%	74%	23%
Paper	0%	11%	73%	16%	0%	5%	77%	18%
Colombia								
App	0%	4%	63%	33%	0%	5%	69%	27%
Paper	0%		64%	36%	0%	5%	64%	32%
Uganda								
App	0%	7%	85%	8%	0%	7%	78%	16%
Paper	0%	17%	76%	7%	0%	12%	69%	18%
Total								
App	0%	6%	74%	20%	0%	5%	74%	22%
Paper	0%	13%	73%	14%	0%	8%	73%	19%

TABLE 6 Reflections on the use of Children ReAct.

	Bangladesh	Colombia	Uganda
Teachers			
n teachers (Responding to user survey)	263	141	226
Teachers who found facilitating FGD with students "Very easy"	62%	43%	36%
Feedback "Extremely" or "Very" helpful	93%	100%	94%
Feedback helped teachers "To a great extent"	56%	82%	62%
External observers			
n observers (Responding to user survey)	134	29	50
Facilitating FGD with students "Very easy"	65%	3%	29%
Finding time with the teacher is at least "Somewhat of a challenge"	74%	14%	23%
Finding time with the children is at least "Somewhat of a challenge"	41%	11%	20%

students was "Extremely" or "Very" helpful, and over half noting that it helped teachers improve their playful learning practice "To a great extent." Among the (substantially smaller number of) external observers who completed the user survey, about half noted *that finding time with the teacher* to administer the module was at least "somewhat of a challenge," and just under half found "somewhat of a challenge" or "a challenge" to find time *to administer the focus group with children.*

Challenges

While most Teacher RePlay pilot participants reported positive experiences with the toolkit, a number of structural challenges emerged. Table 7 summarizes some challenges reported by teachers during Pilot 2.

First, because of the lower level of initial exposure to playful learning, the five characteristics of play and play facilitation levels among pilot participants, many teachers required more training and coaching on the conceptual and practical approaches to integrating play into learning than the toolkit was designed to provide. Across the two pilots, 30% of teachers in Uganda (n = 226) reported that they

found the behavioral items at least "Somewhat difficult," compared to just 12% in Colombia (n = 143) and 8% in Bangladesh (*n* = 226).

Second, as Table 7 highlights, teachers brought up the issue of time and difficulty of fitting the toolkit administration into the school day and their routines. While the observation protocol under Teacher RePlay is meant to take no more than a few minutes, teachers need to take a moment to set their intention and plan for their LtP observation ahead of time. In addition, the administration of the Children ReAct protocol requires either the presence of an external observer (such as a peer educator or a coach) in the classroom and their ability to lead a focus group discussion with children, or the teacher to be able to lead that focus group discussion with children.

> "What is challenging, because I have a class of about 80 learners and most of the time I do it alone, … sometimes learners tend to be so excited and there is a way how young children behave; sometimes learning through play is difficult especially on the side of class control." (Teacher interview, Uganda).

Finally, classroom management, particularly for larger classrooms, came up as a challenge in Uganda, as teachers had to make decisions

TABLE 7 Challenges reported by teachers in Pilot 2.

Challenge	Bangladesh _n_ = 130	Colombia _n_ = 91	Uganda _n_ = 102
Not enough time	79%	37%	33%
Confused about playful learning concepts	21%	8%	9%
Class size/room not appropriate	19%	10%	22%
Students are not ready	9%	1%	4%
Lack of support	8%	2%	3%
Colleagues did not have time (to administer Children ReAct)	12%	8%	35%
Technical challenges with digital app	17%	34%	22%
Completion of the tool is "A little too long" or "Long"	8%	26%	23%

on which learning through play practices to try out, and how many students they could observe. Our visits to classrooms of 80+ students revealed that by focusing their observation on a small group of students, teachers often diverted all attention to that small group of students, leaving others unattended or without clear direction. This is a broader issue of capacity building in classroom management that Teacher RePlay was not intended to address, but this illustrated the importance of this formative toolkit being placed within the context of a structured professional development and coaching program for teachers.

Discussion and proposed use of Teacher RePlay

Our pilots with Teacher RePlay in Bangladesh, Colombia and Uganda showed the potential of this toolkit to support teachers who are interested in playful learning, helping them to deepen their practice and strengthen their understanding of their students. For the majority of teachers who participated in our pilots, this was a positive experience, and most remarked on the aspects that helped them connect with their students and reflect on their own practice in new ways. For many teachers who were newer to play as an element of classroom instruction, the toolkit worked as a lens into a different way of engaging students, and a novel and interesting experience that sparked interest in learning more about play and play-based pedagogies. Especially in Uganda and Bangladesh, the Children ReAct module was positively received, with teachers largely open to the idea of receiving children's feedback on their learning through play activities and having a peer educator in their classroom observing their lessons. The vast majority of teachers in all three countries considered the coaching tips very helpful, and recognized their applicability to their practice, even as they were not always able to integrate them in their practice. The fact that teachers sought more training and ongoing refreshers on the toolkit points to its potential as an ongoing formative toolkit that, if integrated fully into a coaching program, can be beneficial for teachers over a longer term.

The three countries included in the pilots provided a good initial set of contexts that varied enough geographically, resource-wise, and in terms of their familiarity with play-based learning. Across the three countries, Colombia had the most familiarity with learning through play as a concept, possibly creating more pressure

for teachers to integrate play in their lessons, and leading at least some teachers to seek out specific tips and materials on how to implement it in their classrooms, rather than be provided with a tool that helps them reflect on their practice. By contrast, in Bangladesh and Uganda the toolkit provided a window into new possibilities and offered somewhat of a different way of approaching lessons that teachers found valuable.

The challenges outlined in the section above point to the need to situate Teacher RePlay within a broader program of teacher professional development, with scaffolding and support for teachers that have interest but little experience with learning through play. The toolkit may be best used as an extension of a professional development program, rather than a standalone tool that teachers use independent of any capacity strengthening. However, additional piloting and iteration is necessary to establish the optimal use, including frequency of Teacher RePlay, in different country contexts, grade levels, and types of educational environments.

One aspect of Teacher RePlay that would benefit from continuous updating and replenishment is the Coaching Tips. Different iterations of tips and suggestions for specific practices and behaviors may be appropriate in different contexts, and potentially for different education levels and environments. The toolkit allows for that flexibility of contextual elements, and in the future, may incorporate a variety of coaching tips and suggestions tailored to different types of users.

Importantly, while the three initial pilots showed the interest in and potential applications of Teacher RePlay, more work is needed to validate the toolkit as a way of strengthening teacher practice in learning through play. This may include exploratory and observational studies examining how teacher perceptions and approaches to integrating play into their practice are assisted by their use of Teacher RePlay, and subsequently, studies on how the consistent use of Teacher RePlay affects classroom management, student engagement, and ultimately, student learning outcomes.

The initial results of the pilots indicate the potential of Teacher RePlay and Children ReAct for supporting and reinforcing teacher practice in playful learning, and point to the likelihood that with additional support and coaching, these formative protocols provide teachers with an everyday resource tailored to their pedagogical goals. We hope that these results spark adaptation and replication, and that further evidence can be produced to show whether a consistent use of these tools can be truly transformative for children's outcomes.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by FHI 360 Office of International Research Ethics/Protection of Human Subjects Committee, the Bangladesh Medical Research Council, the National Research Ethics Committee Colombia, the Ethics Committee of Universidad de Los Andes Uganda, the Mildmay Uganda Research and Ethics Committee (MUREC) and the Uganda National Council for Science and Technology. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

CO: Conceptualization, Supervision, Funding acquisition, Investigation, Project administration, Writing – original draft, Writing – review & editing. JZ: Conceptualization, Methodology, Supervision, Writing – review & editing. AP: Conceptualization, Methodology, Supervision, Validation, Writing – review & editing. ND'S: Conceptualization, Formal analysis, Methodology, Writing – review & editing. RCG: Formal analysis, Project administration, Visualization, Writing – review & editing. BD: Data curation, Formal analysis, Software, Visualization, Writing – review & editing. MG: Investigation, Project administration, Validation, Writing – review & editing. MA: Data curation, Project administration, Supervision, Validation, Writing – review & editing. CM-C: Formal analysis, Investigation, Project administration, Validation, Writing – review & editing. EE: Investigation, Formal analysis, Project administration, Supervision, Writing – review & editing. GD: Investigation, Project administration, Writing – review & editing. KP: Data curation, Investigation, Project administration, Writing – review & editing. CL: Funding acquisition, Resources, Supervision, Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2024.1342424/full#supplementary-material

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