

# THE BENEFITS OF PLAYFUL LEARNING

## KEY INSIGHTS FROM RESEARCH AND ANALYSIS OF PLAYFUL LEARNING LANDSCAPES

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# The benefits of Playful Learning: Key insights from research and analysis of Playful Learning Landscapes

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# Introduction

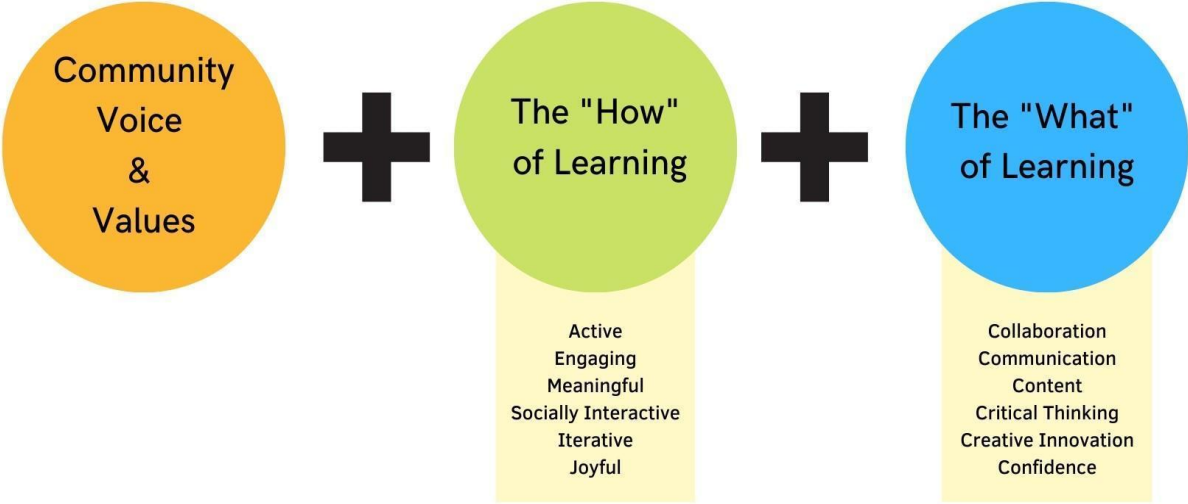
Since the COVID-19 pandemic disrupted in-person learning, fears about children's learning loss remain a primary concern for parents, teachers, and policymakers. These concerns, combined with longstanding issues of inequity regarding children's access to learning opportunities have sparked widespread discussion about how to reimagine education. While much focus has been on the classroom, children spend 80 percent of their waking time outside of school. Playful Learning Landscapes (PLL) capitalizes on the "other 80 percent" by infusing everyday spaces with engaging learning opportunities that are fun and interactive while reaching children and families most affected by the pandemic.

Playful Learning Landscapes (PLL) uses discoveries from scientific research regarding *how* people learn best to inform the design of public spaces, including sidewalks, libraries, school yards, parks, and beyond. PLL installations range from games painted on sidewalks, to signage placed in grocery stores, to large physical designs integrated into bus stops. They are designed to foster [actively engaged, meaningful, socially interactive, iterative, and joyful experiences](#) for children and families. As a [placemaking activity](#), PLL projects typically involve the community in their design, implementation, and evaluation processes—utilizing a [participatory design approach](#) that honors community values, ideas, and input. This ensures that the installations are accessible to all and that historically marginalized populations are centered in ownership of the designs. In this brief, we present findings from a rigorous analysis, providing evidence of the effectiveness of PLLs to date by synthesizing evaluations across a variety of PLL projects. The analysis examines data from 12 PLL projects in five locations to determine impacts on caregiver-child interaction and caregiver behavior and child behavior individually. The analysis also identifies moderating factors influencing effectiveness, such as the type of PLL and the extent of community involvement. Determining the factors that lead to increased effectiveness can help maximize impact and inform the implementation of PLLs. Thus, we close with a discussion of what this analysis tells us about how local leaders can promote PLL uptake and integration in their communities and how they can create beautiful playful learning environments that build more child-friendly cities.

# What is Playful Learning?

A [three-part equation](#) guides Playful Learning Landscapes development: engagement with community members to distill core values, combined with [the science of both “how” children learn and “what” skills \(the “6Cs”\) they need to learn to succeed in the 21st century](#) (see the figure below). When community values accompany guided playful learning and the 6Cs, the science-infused designs result in cultural inclusivity. PLLs take an equity approach and focus on enhancing learning for all children, especially those living in under-resourced areas where children may have fewer toys that are traditionally thought to advance school readiness. This formula has been refined over more than a decade of engagement, implementation, and research on playful learning.

**Figure 1.** The three-part equation of Playful Learning Landscapes



*Source: Temple Infant and Child Lab*

Frequent, sustained, and [-quality caregiver-child interactions are vital to children’s development](#) because they predict later cognitive, social, and academic outcomes. Educational interventions in everyday spaces, such as signage in everyday contexts, is an effective way to promote high-quantity interactions between caregivers and children. With this in mind, the PLL initiative has three primary aims. First, PLL works to (1) **increase caregiver-child interactions**, including conversational turns (back-and-forth exchanges) and non-verbal engagement (eye contact, pointing); in some cases, it focuses on increasing caregiver-child talk in specific content areas such as science, technology, engineering, and math (STEM) and literacy (see below for descriptions of each language type). As a result of increased caregiver-child interactions, PLLs can affect the beliefs and/or skills of the children and caregivers involved by (2) **promoting children’s skills**, including collaboration, communication, content, critical thinking, creative innovation, and confidence, and (3) **shaping beliefs about play and learning** in

community stakeholders (parents, teachers, community members). Children's skill development in these areas, and caregivers' endorsement of 21st-century skills, are critical to succeeding in school, and ultimately, in the workforce. We further elaborate on PLL's measurement approach and goals in our PLL metric framework.

## PLL in practice

There exists a broad range of PLL efforts in the U.S. and around the world. The current study spans 12 projects in Philadelphia, Pennsylvania; Duncan Village, Buffalo City Municipality, South Africa; Tulsa, Oklahoma; Chicago, Illinois; and Brooklyn, New York. While all PLLs share the goals of promoting children's development, they differ in a few key ways. For example, the PLLs in this study ranged from signage or small activities to long-term physical installations. Community participation ranged from none to extensive. And locations included bus stops, libraries, children's museums, supermarkets, corner stores, food pantries, and public streets. Further, some of these projects were case studies designed to see if the project could be implemented and others were scientific studies with observational data and a control condition.

For [Supermarket Speak](#), a PLL adapted for use in Tulsa, Chicago, Brooklyn, Philadelphia, and the Buffalo City Municipality, researchers installed signs in the dairy and produce aisles of supermarkets (or a food pantry) in middle and low-income areas that encouraged caregivers to engage their children about the foods they saw as they shopped. Signs offered examples of general questions caregivers could ask, such as "Where does milk come from?" and "Can you find other kinds of apples?"

**Figure 2.** A sign placed in a grocery store as part of Supermarket Speak



Source: Saxum

In [Urban Thinkscape](#), located near a bus stop in Philadelphia, a set of activities was designed to further STEM, literacy, and executive functioning skills. Designed by Itai Palti, the project features four designs: stories (wooden decking with embedded story icons designed to support narrative skills), hidden figures (a metal sculpture with hidden images to support spatial skills), jumping feet (an executive function fostering hopscotch game), and a puzzle wall (a series of four puzzles aimed at building spatial skills that in turn support mathematical development). As children experience Urban Thinkscape, they practice executive function skills including inhibition and memory, make observations about shapes they notice in the shadows, and build stories using icons along the walkway.

**Figure 3.** The variety of STEM and literacy-infused installations at Urban Thinkscape



*Source: Sahar Coston-Hardy Photography*

At the [Free Library Play and Learn Spaces](#), Playbrary, a project that took place at three branches of the Free Library of Philadelphia, children explore an experiential, literacy-immersed library. Designed by [Studio Ludo](#) with input from the community, installations include a climbing wall on which children can create words by following paths up the wall's surface. Seating is transformed into large movable tangram-type pieces and a stage, complete with magnetic words, inviting children to create stories on the wall and complete story-related activities through sociodramatic play.

**Figure 4.** The experiential Play and Learn Libraries



*Source: Halkin Mason*



# Evaluating PLL effectiveness

Taking into account the wide variety of installations across many projects, our review methodology offers a way to quantify and summarize key results across the PLL projects. The analysis also provides insight into moderating factors influencing effectiveness, such as the type of PLL and the extent of community involvement.

## Data and measures

We drew selected studies from the body of literature on Playful Learning Landscapes that focused on three specific outcomes. To make meaningful comparisons across all studies, projects needed to have collected observational data capturing caregiver and/or child language use and interactions. Playful Learning Landscape studies that did not include these specific outcomes were not included. To draw from as many eligible studies as possible to maximize power, as well as to alleviate publication bias, unpublished studies were also included where appropriate. To achieve as broad an understanding as possible, we included studies with similar designs—for example, multiple evaluations of supermarket signage were included to capture effects across various geographic locations.

This method resulted in 12 studies included in the analysis that each captured data about caregiver behaviors, child behaviors, and caregiver-child interactions. Behaviors included laughing, pointing, physical activity, or following the caregiver or child's focus. For caregiver-child interactions, researchers assessed language across three categories: STEM language, literacy-related language, and approaches to learning language. *STEM language* involves measurement language, patterning language, numerical language (e.g., numbers, fractions, sorting), and spatial language (e.g., big, small, tall, short). *Literacy-related language* addressed concepts including spelling out words, identifying letter sounds, and installation-related vocabulary. *Approaches to learning language* addressed reasoning, predictions, observations, and planning. For example, predictions include responses to “what shape comes next in this pattern?” Lastly, a general language category was included to capture any language outcomes that did not fall into the above categories, such as talking about supermarket products or daily activities.

## Results: The benefits of PLL

Results of this analysis indicate that PLL installations yield three primary outcomes: In comparison to either control sites or pre-installation at future PLL sites, the projects studied had large effects on caregiver behavior, large effects on caregiver-child interaction, and medium effects on child behavior. The larger the effect size, the more powerful and practically significant the finding. (Table 1 provides specific examples of these effects from the studied installations.) These findings provide an encouraging indication of how PLL benefits children and families and should encourage policymakers and practitioners to consider how PLL could be integrated into the public realm as part of larger efforts to support child development.

**Table 1.** Playful Learning Landscapes Overviews

Project	Description	Key findings
Urban Thinkscape	The project featured four designs: Stories (wooden decking with embedded story icons designed to support narrative skills), Hidden Figures (a metal sculpture with hidden images to support spatial skills), Jumping Feet (an executive function fostering hopscotch game), and Puzzle Wall (a series of four puzzles aimed at building spatial skills).	Caregivers and children interacted more with each other and the space itself and had more conversations at Urban Thinkscape than they did before the designs were installed and they talked and interacted either the same or a greater amount than families at a control site playground in the same general area.
Free Library Play-and-Learn Spaces	The project took place at 3 branches of the Free Library of Philadelphia. Installations included a climbing wall on which children could create words by following paths up the wall's surface. Seating was transformed into large movable "Tangram"-type pieces and a stage, complete with magnetic words, invited children to create stories on the wall and complete story-related activities through sociodramatic play.	More children attended library programs after the installation of the Play-and-Learn spaces than before. Children and families also spent more time in the children's library space when there was a Play-and-Learn area available. Caregivers and children used more literacy-related and spatial talk at the Play-and-Learn spaces versus at non-Play-and-Learn libraries as well as demonstrated more positive affect, more physical interaction with the space, and less use of smartphones and tablets.
Parkopolis	Parkopolis featured a lifesized board game comprised of a set of research-based activities that explicitly targeted STEM skills—traditionally taught in school—in a playful and informal setting, which was compared to another exhibit in the same museum.	Findings suggest that families are willing to engage in a game that targets STEM learning goals during their leisure time, and both caregivers and children will use relevant language and interact with an overall positive valence. The percentage increase in STEM language use during Parkopolis versus the control condition suggests potentially powerful implications for promoting STEM language between young children and their families through game-based activities in everyday settings.
United for Brownsville Learning Landscapes	Signs featured general language, mathematics, and healthy eating-focused prompts.	Results indicated no significant differences in caregiver-child interaction when the signs were up versus when there were no signs present. However, not all the caregivers read the signs—only 12% did. When caregivers and children did read and interact with the signs, there were large, statistically-significant effects, with caregivers and children interacting and talking more than those who did not interact with the signs.
Play Streets - 2018	The Play Captains program featured local teenagers leading playful learning activities for children on city streets (Play Streets) in under-resourced neighborhoods that were closed to vehicular traffic by Philadelphia's Parks and Recreation department which was compared to Play Captains interacting with children at local libraries.	Results found that overall interaction and language use were greater at the libraries, but that children were more creative and physically active when on the Play Streets.
Play Streets - 2021	The Play Captains program featured local teenagers leading playful learning activities for children on city streets (Play Streets) in under-resourced	Results suggested that overall child language and interaction was higher for Play Streets with Play Captains than at the control Play Streets sites.

	neighborhoods that were closed to vehicular traffic, which was compared to Play Street sites without Play Captains.	
Supermarket Speak	Signs were installed in the dairy and produce aisles of supermarkets in middle and low income areas that offered examples of general questions caregivers could ask their children while they shopped, such as “Where does milk come from?” and “Can you find other kinds of apples?”	The signs made no difference in supermarkets in better resourced neighborhoods, but in stores in under-resourced areas, caregivers and children interacted 33% more when the signs were posted than when they were not.
Sifunda Ngokuthetha (We Learn by Talking Together)	English signs encouraging caregiver-child interaction and conversation were installed at the entrance of the store and near four specific products: spinach, apples, yogurt, and bread.	There was a significant increase in caregiver-child interaction when signs were up versus down.
Tulsa Supermarket Talk	The project replicated the Supermarket Speak study with both English and Spanish language signs.	Across two waves of data collection, results suggested that there were no significant differences in caregiver-child interaction when the signs were up versus when they were down. The authors suggested that one major factor affecting these findings was that only 25% of families saw the signs when they were displayed.
Grocery Story Math Talk	The project featured store signage designed to specifically foster math-related talk, such as “How many eggs are in a carton?” and “Guess how many slices of bread are in a loaf.”	Significantly more caregiver-child groups talked about math-related topics in the math talk condition than in either general language or baseline conditions.
Talk It Up	The project replicated the Supermarket Speak study with both general language and math-focused signs.	Results showed no significant differences in caregiver or child behavior and interaction when the signs were up versus when no signs were in place. However, only 42% of caregivers read the signs. As such, the researchers investigated the differences between groups who read the signs and those who did not. Results found that when caregivers and children read and interacted with the signage, they demonstrated greater levels of interaction and language use than those who did not read the signs.
Food Pantry Talk	The project featured both academic and non-academic content signs in both English and Spanish.	Comparing no signs to when the signs (academic and non-academic) were present, families engaged in significantly greater amounts of conversation and interaction when the signs were up.

Source: Authors

**Table 2:** Playful Learning Landscapes Key Characteristics

*Note: Green represents physical installations and blue represents signage/activities. The more saturated the color, the more community involvement.*

Project	Location	Setting	Control Group	Participant Details	SES	Type of PLL	Community Involvement	Outcome Measures
Urban Thinkscape	Philadelphia, PA, USA	Bus stop	Playground in relative proximity to Urban Thinkscape in the West Philadelphia Promise Zone	280 participants; Average child age = 5.5	Median household income levels \$20,000-\$25,000 at both experimental and control site	Physical installation	Community input on site selection, installation design, and community members led data collection	Caregiver behavior; child behavior; caregiver-child interaction
Free Library Play-and-Learn Spaces	Philadelphia, PA, USA	Library	Non-Play-and-Learn library site located next to a recreation center in an area of the city with a median household income of \$33,000, considerably below the city average of \$40,000	155 participants; Average child age = 5.5	Median household income of \$23,000 (Library A), \$25,000 (Library B), and \$56,000 (Library C)	Physical installation	Community input on installation design	Caregiver behavior; child behavior; caregiver-child interaction
Parkopolis	Philadelphia, PA, USA	Children's museum	Control exhibit at the museum involving launching rockets without adult scaffolding	562 participants; Average child age = 4.5	Detailed demographic characteristics were not available; participants were families and children who visited the museum, likely attracting families that have the resources to pay the price of admission	Physical installation	No community involvement in design or data collection	Caregiver behavior; child behavior; caregiver-child interaction
United for Brownsville	Brooklyn, NY, USA	Supermarket	Pre-signage installation data was collected at	85 participants;	Median neighborhood household income level \$38,285	Signage/activity	Community input on signage and	Caregiver behavior; child

Learning Landscapes			the grocery stores which later installed the signage	Average child age = 7			community members led data collection	behavior; caregiver-child interaction
Play Streets - 2018	Philadelphia, PA, USA	Street	Public library in the same neighborhood as the Play Streets	36 participants; Average child age = 6	Median neighborhood household income level \$24,000	Signage/activity	Play Captains led data collection	Play Captain behavior; child behavior; Play Captain-child interaction
Play Streets - 2021	Philadelphia, PA, USA	Street	Play Streets without Play Captain facilitation	514 participants; Average child age: Unknown	No specific SES data were provided (Play Streets took place in low income areas)	Signage/activity	No community involvement in design or data collection	Child behavior
Supermarket Speak	Philadelphia, PA, USA	Supermarket	Three supermarkets of varying SES levels acted as comparison groups to each other.	71 participants; Average child age = 4.1	Three supermarkets of varying SES levels, determined by the median household incomes of the populations served and percentage of residents living below the poverty level within and in the surrounding zipcodes. Median household incomes were \$22,000 (Supermarket A), \$70,000 (Supermarket B) and \$44,000 (Supermarket C).	Signage/activity	No community involvement in design or data collection	Caregiver-child interaction
Sifunda Ngokuthetha (We Learn by Talking Together)	Duncan Village, Buffalo City Municipality, ZA	Supermarket	Pre-signage installation data was collected at the grocery store which later	133 participants; Average child age = 4.7	58.8% of the population lives below the poverty line in the municipality	Signage/activity	No community involvement in design or	Caregiver-child interaction

			installed the signage				data collection	
Tulsa Supermarket Talk	Tulsa, OK, USA	Supermarket	Pre-signage installation data was collected at the grocery stores which later installed the signage	620 participants; Average child age = Unknown	Median household income levels between \$37,395-\$47,038 across store locations	Signage/activity	No community involvement in design or data collection	Caregiver behavior; child behavior; caregiver-child interaction
Grocery Story Math Talk	Philadelphia, PA, USA	Supermarket	Pre-signage installation data was collected at the grocery stores which later installed the signage. Data were also collected from a general signage condition to compare against the math signage.	179 participants; Average child age = 3.5	No SES data were provided	Signage/activity	No community involvement in design or data collection	Caregiver-child interaction
Talk It Up	Philadelphia, PA, USA	Supermarket, Barbershop	Pre-signage installation data was collected at the locations which later installed the signage	67 participants; Average child age = 7	Median household income levels between \$23,382-\$81,042 across locations	Signage/activity	No community involvement in design or data collection	Caregiver behavior; child behavior; caregiver-child interaction
Food Pantry Talk	Chicago, IL, USA	Food pantry	Pre-signage installation data was collected at the food pantry which later installed the signage	212 participants; Average child age = 6	No specific SES data were provided (all participants were food insecure)	Signage/activity	No community involvement in design or data collection	Caregiver-child interaction

Source: Authors

# Key factors influencing PLL effectiveness

Aside from providing evidence on how PLL benefits families and children, the studies included in this analysis also help illuminate the PLL characteristics that most affect these outcomes—findings that could be useful in guiding future efforts. The studies reveal that two key factors have the most influence on how, and the extent to which, PLLs influenced caregiver and child behavior and interactions: the type of playful learning landscape installation or activity, and the extent and type of community involvement in the efforts.

## Type of PLL

The first factor compared the three long-term PLLs, which included installing physical components such as play structures and other materials, with the eight that featured more temporary signage or pop-up playful activities.

**Figure 5.** Children playing a life-size board game activity at Parkopolis



*Source: Sahar Coston-Hardy*

The difference in caregiver-child interaction between PLLs and comparison observations was large for PLL projects using signage or pop-up playful learning activities (such as Supermarket Speak and Playstreets). Specific impacts included increased conversational turns (back and forth exchanges), children and caregivers' bids for attention, question asking, and mutual eye contact. By contrast, the three PLLs featuring physical installations (Urban Thinkscape, Parkopolis, Free Library Play-and-Learn Spaces) demonstrated small to medium-sized effects on caregiver behavior, child behavior, and/or caregiver-child interaction compared to control sites or pre-PLL installation. These

findings are noteworthy given the control groups varied across the studies. In Parkopolis, the control and experimental groups were both museum-goers who had the resources, time, and disposition to visit a children's museum. By contrast, in Urban Thinkscape, the control group was a nearby playground with a median household income between \$20,000-\$25,000 in West Philadelphia. In both cases, effects on caregiver and child behavior were found—suggesting the effectiveness of PLLs in both low- and middle-SES communities.

This analysis provides intriguing initial data regarding the cost-benefit analysis of the type of PLL projects that produce the greatest effect for the least funds. These results suggest the potential for creating and testing additional pop-up and signage PLLs, since they are the lowest cost and easiest to implement projects, yet still have the potential for large effects on caregiver-child interactions. It could also be the case that maximizing convenience for community members by incorporating signage in spaces they frequent in everyday routines is the most effective means of reaching them. Six of the eight short-term installations worked within spaces of high priority for adults—places to buy food—by enhancing visits to the food pantry, grocery store, and corner stores the community members frequented. While the bus stops included were also high frequency, by contrast, two of the three long-term installations were in spaces that are already seen as child-friendly destinations and may be considered special trips, such as children's museums and libraries. Reaching parents where they spend time, while they are doing what they need to for their families, may be less burdensome than an intentional child-directed outing.

## **Community involvement**

Our analysis also looked across the studies at the presence (or absence) of community involvement during PLL implementation. These studies examined PLL activities that incorporated community involvement by hosting community focus groups or listening sessions, engaging community member data collectors, and/or involving community members in the design of analysis plans. Four of the PLLs—Urban Thinkscape, [Free Library Play-and-Learn Spaces](#), [Playstreets - 2018](#), and [United for Brownsville Learning Landscapes](#) (supermarket signage)—were identified as incorporating community involvement, which was classified into one of three categories: no involvement, moderate involvement, and extensive involvement.

PLLs featuring moderate to high levels of community involvement demonstrated large effects on caregiver-child interactions compared to control sites or pre-PLL installation, while the magnitude of effects was smaller for PLLs with limited to no community involvement. This suggests that the role of local communities from start to finish is critical for the success of PLL projects. When communities have a voice in the development, installation, and evaluation process, they likely have a great sense of ownership of the project. Recognizing this, PLL projects have featured increasing amounts of community involvement since the inception of the movement.

Installations from across the portfolio provide various examples of community engagement that have been effective. For example, during site selection, community members can provide important insights on the places of highest potential impact. The



site of Urban Thinkscape, formerly a vacant lot (near a bus stop) where Martin Luther King Jr. gave a historic speech, was chosen by the community. Most of the PLLs with signage were determined by local stakeholders through focus groups. In Brownsville, for example, researchers collated community member's suggestions for prompts on the signs. As part of Playstreets in Philadelphia, the Play Captains program had local teenagers leading playful learning activities for children on city streets in under-resourced neighborhoods that were closed to vehicular traffic by the Parks and Recreation Department. And in Playstreets, community members were trained to be data collectors at the site. As these examples show, it is possible to democratize decisions, activities, and the scientific process to achieve maximum impact.

# How these results inform local action

Results from the analysis reveal factors that can lead to increased PLL effectiveness and inform implementation. We close with a discussion of what this analysis tells us about how local leaders can promote PLL uptake and integration in their communities.

**First, leaders can maximize impact through strategic delivery of various types of installations.** It may be that short-term PLL installations are especially effective at enhancing foundational outcomes such as increased caregiver-child interactions. To maximize frequency, piggybacking signage and activities in frequented places like grocery stores or laundromats is a low-cost, easy-to-implement way to enhance everyday routines with rich language. Public sector and community leaders that wish to implement PLL should undertake a cost-benefit analysis of how to best utilize their local assets, and pilot efforts of varying types in varying locations to gauge what works. Any effort should include plans for maintenance and continued community involvement, which will help both sustain PLL installations and allow for continued improvement—and ideally, expansion—over time. Leaders should amplify the voices of community members and cultivate a strong sense of ownership in how to build their own beautiful environments.

**Second, leaders should prioritize authentic co-creation throughout design and implementation.** PLLs are most effective when they are meaningful to the community members; that is, when they see themselves reflected in the designs. Indeed, meaningful designs are one of the five pillars of learning (the science of “how” children learn best). As such, those leading PLL efforts should create a robust process to harness community input on colors, imagery, and other design elements so that they are culturally relevant, appealing, and fun. For example, recent work from Santa Ana, California [points to the effectiveness of culturally situated design](#). Mexican immigrant communities [used grams instead of pounds](#) in their designs because that unit was most familiar to them. In Santa Ana’s culturally situated model, all of the designs are informed by the community’s value of heritage representation and *familismo*—interconnectedness and reciprocity amongst family members. This in turn promotes cultural transmission among intergenerational family members.

Engagement shouldn’t end at the design phase, however. When appropriate, community members (individually, or as part of community organizations) should be engaged in both building PLL installations and in maintaining them over time such that they feel a sense of ownership of the spaces. For example, new PLLs in early child education centers in Philadelphia were suited with interchangeable images to allow teachers to continually modify the installations to suit their student’s learning needs. A PLL called Story Wheel consists of four spinning wheels: characters, settings, conflicts, and resolutions, each with interchangeable, customized images that teachers continually update. As children walk along spinning each wheel, they select one image from each category and then tell their story to their peers. Each time children play with the wheels, they land on different options, creating different combinations in each instance.

# Conclusion

Over the last 15 years, Playful Learning Landscapes have been enacted and evaluated around the globe, leading to a growing body of evidence supporting their effectiveness. The lessons from this analysis can help community organizations, governments, and policymakers make informed decisions about maximizing the potential of spaces for improving children's learning through the installation of PLLs. As PLL efforts continue to expand in scope, scale, and geography, it will be important to evaluate other economic, social, and built environment benefits to families, children, and communities. As stakeholders from neighborhoods around the world integrate playful learning into their city policies, the potential for evolving evaluation efforts grows.

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