Chapter 10
Where Learning Meets Creativity: The Promise of Guided Play

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Abstract As the United States and other countries consider "educational reform," the discussion appears to be primarily about fostering basic skills and content knowledge. Our contention is that this approach is not sufficient. Instead, we argue that for twenty-first century success, we must also foster creativity to prepare today's children to excel and solve tomorrow's problems. In this chapter, we offer a thought experiment on how our educational system could achieve these dual goals. We propose that the answer might come from a clearer definition of what creativity actually is and from our attempts to infuse creativity into our classrooms through a pedagogical approach that we call "guided play."

10.1 Introduction

Forty students – ages 6–15 – form a circle on the wooden plank floor of the Brightworks School in San Francisco. This morning was like every other – the teacher stood up in front of the community holding an object in his right hand. He placed a wok in the center of the circle and proclaimed, "This is NOT a wok." Members of the community then volunteered their alternative possibilities: "a hat," one young boy announced as he placed the wok on his head. "Or maybe a sled," another added as she postured her body in the center of the wok holding tightly onto the sides of the pan.

Brightworks contrasts sharply with our image of traditional schools that dot the American landscape. Traditional schools are generally in weathered 1950s buildings with rectangular classrooms that perfectly house the desks lined up in rows,

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commanded by the large "teacher's" space in front of the blackboard (that has sometimes turned digital white). The agenda written out on the board at the front of the class dictates how the children will spend their day – 8–9 for reading; 9–9:45 for math; etc. Often missing are recess, art, social studies and even science. Teachers are poised to deliver content; students, like empty vessels, are intended to fill their heads and learn.

Herein lies the creative contradiction in modern education. Education is supposed to prepare students as thinkers and citizens who succeed in the world of tomorrow. Leaders in the workplace tell us that the global marketplace, in which today's students will operate, requires creative thinking rather than simple regurgitation of factoids that can easily be looked up on a hand-held device. The *Wall Street Journal* (Mantell, 2012), for example, cites flexibility as a must-have job skill. Flexible thinkers are creative innovators who put information together in new ways and transform that disparate knowledge into new, never-dreamed-of-before solutions. The *Harvard Business Review* (Groysberg, 2014) suggests that some of the skills top executives need are "team- and relationship-building" as well as "communication and presentation;" both require creativity in messaging and delivery. Accordingly, in a new book on research-based principles for raising successful children, Golinkoff and Hirsh-Pasek (2016) offer creativity as one of the "6 Cs," or core competencies, that children will need to succeed in the twenty-first century.

Brian Eno (2015), who believes that we are all creative artists in the way that we transform and ritualize "simple" activities such as eating and dressing, has noted how creativity is increasingly critical for us to adapt to the changes we now face:

> We're going to be in a world of ultrafast change. It's really accelerating at the moment and will continue to. … I think we're going to be even more full-time artists than we are now. And I don't just mean the professionals like me, I mean everybody, is going to have to be constantly involved in this activity … of being able to resynchronise with each other, to connect things together, to be able to make adventurous mind games about different futures, to be able to understand things (BBC Music John Peel Lecture).

Robert Sternberg (2009), Professor of Human Development at Cornell University, past President of the American Psychological Association, and an expert on intelligence and creativity puts it succinctly, "… citizens of the world need creativity to form a vision of where they want to go and to cope with change in the environment…" (p. 10). And Sternberg believes that creativity can be fostered. In their book, *How to Develop Student Creativity*, Sternberg and Williams (1996), posit 25 ways to develop creative thinking, many of which are embedded in the fabric of progressive schools like Brightworks.

Traditional schools do *anything but* inspire flexible thinking. Indeed, recent evidence suggests that the laser focus on academic skills like reading and math has left creativity and flexible thinking out of daily lesson plans. And children are feeling the consequences. A headline story of a 2010 edition of *Newsweek* suggests that we are suffering from a "Creativity Crisis" (Bronson & Merryman, 2010). The authors highlight findings from Kim (2011), who examined longitudinal data including 300,000 scores on the classic Torrance Test of Creative Thinking and found that children's scores have been steadily decreasing over the last two decades. Using the

"gold standard" of creativity testing, today's children are simply less creative than they were in 1980! That is, the average child today would do not do well in the Brightworks morning activity of finding alternative uses for a wok, because their education is largely about filling in a blank on a test.

The challenge plaguing educators is to preserve a strong education that offers children content in many areas, but that is also responsive to the demands of a twenty-first century economy. As Sir Ken Robinson (2006) broadcast in his popular TED talk, "Do Schools Kill Creativity?":

> My contention is that creativity now is as important in education as literacy, and we should treat it with the same status…. Our education system is predicated on the idea of academic ability. … which has really come to dominate our view of intelligence….And the consequence is that many highly-talented, brilliant, creative people think they're not, because the thing they were good at at school wasn't valued, or was actually stigmatized. And I think we can't afford to go on that way. (approximately 2:20 into video file)

Reconciling this apparent contradiction between school practices and the needs of the twenty-first century global workforce is one of the greatest challenges in education. However, many who are proposing "educational reform" are not talking about promoting creativity but about fostering basic skills. Our contention is that this approach is not sufficient. We are motivated to consider how to foster creativity in students of this next generation. In this chapter, we offer a thought experiment to address this question. We propose that the answer might come from a clearer definition of what creativity actually is and from our attempts to infuse creativity into our classrooms through a pedagogical approach that we call "guided play" – an approach that is at least partially endorsed in progressive schools like Brightworks.

10.2 Creativity Is…

Education is like a large cargo ship that moves slowly even when amidst winds of change. Adding creative innovation and flexible thinking is important in educating our children. Yet, even the widely used preschool curricula called *The Creative Curriculum* offers only a few call-outs to creativity as an outcome – nested within the "Cognitive" objectives for development and learning (Teaching Strategies, 2013). Part of the problem stems from the academic community itself that has been slow to offer a clear and coherent definition of creativity. And without a clear definition, it is difficult to offer psychometrically strong measures to chart progress in the creative domain. In other words, in these days of accountability, if something cannot be measured, it is often considered unimportant. A recent piece published by the National Endowment for the Arts (2015) reviewed findings from the Santa Fe Conference entitled *How Creativity Works in the Brain*. It offers this statement in its executive summary:

> … cognitive psychologist Mark Runko, of the University of Georgia, summarized 30-year trends in the field of psychology-based creativity research. It rapidly became clear to working group members that no single generalizable theory of creativity has yet emerged (p. 10).

Creativity is a complex and multifaceted construct that does not lend itself to easy translation in a classroom. If scientists themselves are unsure of what creativity is and have no way to gauge progress in this area, many worry that it will be difficult to design curricula with creativity as a stated outcome.

Most of the studies that do exist – at least with respect to children – define creativity as a synonym for *divergent thinking* – our ability to produce a variety of answers to open-ended questions (Dietrich & Kanso, 2010 for a review; Guilford, 1950, 1967; Jung, Mead, Carrasco, & Flores, 2013). The focus on divergent thinking as the bedrock of creativity came from early and outstanding work by psychometrician J.P. Guilford (1967) who described divergent thinking (and hence creativity) as, "[the] generation of information from given information, where emphasis is upon variety and quantity of output from the same source, likely to involve transfer." (p. 213). This focus on quantity became the oft-cited reliance on *fluency* as a measure of creative expression. The descriptor *variety* is meant to refer to diversity or divergence from a single source, often measured as *originality* of responses. Thus, the quintessential *unusual uses* task[1] (Wilson, Guilford, & Christensen, 1953) became the pillar upon which modern creativity research was born. In that task, participants state as many different uses as they can for a common object like a brick. A creative person is defined as one who can generate many responses (i.e., be "fluent"), many of which are unusual or clever (i.e., "original").

Today, the two most common verbal divergent thinking tests used with children are the verbal Torrance Test (Torrance, 1966) and the Wallach and Kogan (1965) test. Both stem from, but extend beyond, the unusual uses task. The Torrance Test (see Kim, 2006 for a review) is a battery of tasks that asks children to create unusual uses for objects, to name ways a toy can be improved, and that prompts children to ask, and answer, questions about a picture that serves only as a support. The Wallach and Kogan task similarly requires children to name as many instances in response to a prompt as they can (e.g., things that are round) along with an unusual uses task, and a similarities task in which children identify the similarities between two items. Of the available tests, Plucker (1999) argues that the Torrance Test, "appear to be the best cognitive predictor of creative achievement over which we can have an appreciable educational impact (p. 111)." One could argue that the opening exercise at the Brightworks school offered a textbook case of divergent thinking and was, in many ways, a scaled-up version of the Torrance Test.

In their book, *Becoming brilliant: What science tells us about raising successful children*, Golinkoff and Hirsh-Pasek (2016) agree with Sternberg and Williams (1996) and suggest that children can be taught to be more creative. They begin by outlining, in broad strokes, a scientific consensus view of the development of creativity through 4-levels. The first step for children (or adults) is to engage in *experimentation*. This experimentation and exploration is not in the service of a goal or to solve a problem. It is simply exploration of the space – be it the tools used in building or the paints used to splash color on a canvas. What can paints do? How can they be used? In this fundamental step of creativity, we experiment to see what hap-

[1] Also known as the alternative uses task, or simply the uses task.

pens. Novice creators are not constrained with preconceived notions of how things work. Children are free to pretend that the yogurt lid really is a stethoscope – or a cookie cutter – or a wheel.

In the second level, children transition to *means-end creativity*. This is not creativity merely for exploration's sake. Rather, this kind of creativity results from our attempts to solve a problem. Much like infants who creatively figure out a way to escape from the crib, children flex their creative muscles with the hope that they can solve the problem in front of them. At first, they constrain their responses to a range of possible solutions they have witnessed before – as when an infant is lifted over the sides of the crib. But by Level 2, children are intentionally engaging in creative production for extended periods of time, directing it toward a goal they can identify – even if onlookers cannot. We can think of Level 2 as using the same means (materials) to create diverse ends and also as using different means (blocks, paint, clay) in new ways. When infants attempt to squeeze through the crib bars – even if they are unsuccessful – they are exploring new means to achieve their ends.

At the next level, children develop their own *voice* and add their own personal expression to their creative accomplishments. Here, they use tools more purposely to express an outcome. From a child creating a round house out of a square building set or a poet creating a new genre of sonnets, a key step on the trajectory of creativity is achieved when children begin to blend what they know to fit the problem space. At the second level, children writing a book report merely recount what they read in the book. Here, at level three, they begin to develop a thesis that blends what they read with what they know to give their own view and interpretation to the report. Crucially, children (or adults) must have existing conceptual knowledge to arrive at this level. Someone without basic understanding of physics cannot create a new equation nor can a child without knowledge of the topic in the book write a new ending.

In the last level, *vision*, we see that children and adults build upon their existing knowledge and solve a problem in a brand new way. Revolutionary thinkers do not merely write a paper within a standard book report format. They develop the new and improved format that allows them to more fully express the thematic content of the book as they see it. Notably, a major requirement of this step is that thinkers not just create something new, but that they envision an entirely new solution. They do not merely complete the puzzle from old parts, but literally create new pieces. It is not so much about a slight improvement on an existing product or idea, but the generation of a brand new product or idea. And this final step in the trajectory is not limited to adults. Artist and educator Beau Lotto asked 8–10-year olds to come up with a question of their choosing and they creatively asked whether bumblebees could think like humans. These students (along with Lotto and their head teacher) developed an empirical question (can bees use colors and patterns to recognize whether a flower will be nourishing or not?) and a method to test this question (complete with a color-coded puzzle beehive). Their results were published in the journal *Biology Letters* (Blackawton et al., 2011). Indeed, today's children can reach this visionary level.

A glance at the range of behavior that sits under the umbrella of creativity allows us to quickly see that limiting the definition of creativity to divergent thinking will ultimately constrain our efforts to nurture creativity as an outcome in our schools. To be fair, a number of recent works examine the construct with respect to the way people provide solutions to ill-defined problems – problems that do not have pre-specified solutions; for example how might we design a new coffee cup (Chrysikou & Weisberg, 2005) or a new sport (Ward, 2008). At Brightworks, the opening exercise permitted the children to look at the world in an original way. But in their smaller "working groups", students in the program were also busy creating new conceptions of fashion and designing new types of planters that could be made in their fully equipped shop.

Progressive schools ask how creativity can be infused throughout the school day. And even if they focus more squarely on divergent thinking, this would surely be an advance over the white-walled, lecture-based environments that often inspire little or no creative thinking. Lest the pendulum swing too far, though, the challenge is really to honor creativity while offering a rich curricular approach to learning content and learning-to-learn skills such as maintaining focus and attention.

Yet the drive for teaching for creativity and content is not just found in the United States. A great irony is that China wants to encourage creativity just as the United States has returned to nineteenth century educational methods and encouraged memorization for high stakes tests. In fact, Betty Preus (2007), a professor of education at The College of Saint Scholastica in Minnesota, quotes a visiting professor from China as saying, "It is interesting that something we learn from you is just what you want to change." China wants to de-emphasize rote learning because they recognize they are creating passive, unmotivated students who are interested only in passing tests. They now want to emphasize creativity (Zhao, 2009).

Next, we discuss the type of pedagogy that encourages the deep learning of content and possibly encourages creative thinking as well. For young children, we refer to this pedagogical technique as "playful learning" but it is really a metaphor for engaged learning in which children actively participate (Fisher, Hirsh-Pasek, Golinkoff, Singer, & Berk, 2010; Hirsh-Pasek, Golinkoff, Berk, & Singer, 2009; Weisberg, Hirsh-Pasek, & Golinkoff, 2013). Others too have made similar suggestions, specifically with respect to the cultivation of creativity.

10.3 A Promising Approach: Playful Learning as a Blend of Creativity and Content Learning

Russ and Wallace (2013) suggest that one way to bundle creativity and core content is through playful learning. They first ask us to consider how play might foster creativity:

> Both pretend play and creativity are multidimensional, and there are many similarities between the processes that occur in both of them (Russ, 1993, 2004, 2014). Creativity

> researchers, beginning with Guilford in 1950, have identified cognitive abilities as especially important for creativity, and many of these also characterize pretend play – divergent thinking, broad associative skill, insight, cognitive flexibility, and perspective taking. (p. 137).

There is scattered research to suggest that play is indeed related to increases in creativity, though the research is admittedly thin. Howard-Jones, Taylor, and Sutton (2002) presented 6–7-year-old children with either a 'free play' task in which they played with salt dough for 25 min or a task in which they were directly instructed to copy text from the board. Then, children were tasked with creating a collage of a creature using tissue paper. Those children who were given the opportunity to engage in free play created more imaginative creatures (as judged by an expert independent panel) and used more colors than those in the direct-instruction context. Whether the direct instruction decreased creativity or the free play increased creativity is an open question and one ripe for investigation. However, a possible clue comes from a recent study with college students. Moreau and Engeset (2016) found that students given a LEGO kit with a well-defined goal later performed worse on items from the Torrance Test of Creativity compared to those given LEGOS with no defined goal (e.g., free form play with LEGOS) and a control group that was not exposed to the LEGOS. Stressing that there is a 'right' answer seems to prevent students from thinking flexibly and creatively – even on a subsequent unrelated task.

Given the state of the art, it is no wonder that Russ and Wallace (2013), despite their enthusiasm for a strong bond between creativity and play, caution, "A real dilemma is exactly what to recommend to teachers and child-care workers about facilitating play and creativity in the classroom. We do not have a well-validated protocol to facilitate play in the classroom that also increases creative thinking" (p. 146). Clearly more high quality data is needed to secure this link.

But perhaps we should take a step back to ask what we mean by play and why we might expect a link to creativity. In alignment with the literature, Weisberg, Zosh, Hirsh-Pasek, and Golinkoff (2013) outline three main characteristics of play that separate it from other activities:

> First, play has no specific purpose, and it is not linked to survival. Second, playful activities are often exaggerated—a pretend action often takes longer or involves a wider range of motion than a similar real action. Finally, play is joyful and voluntary (p. 41).

Using play invites children to think, to consider, and to make decisions for themselves within a joyful, voluntary context. Creativity is more likely to be nurtured during play than when children are told what to do. During play, children think for themselves, create new worlds, and experiment with how things might be. Hirsh-Pasek et al. (2009) provide a further refinement of the term "play." They discuss the merits of playful learning – a whole-child approach that stimulates children's academic, socio-emotional, and cognitive development (Fisher et al., 2010; Hirsh-Pasek & Golinkoff, 2011; Resnick, 2003; Weisberg et al., 2013; Weisberg, Kittredge, Hirsh-Pasek, Golinkoff, & Klahr, 2015). However, they propose that playful learning is an umbrella term that encompasses two separate types of play: *free play* and

guided play. Free play is inherently voluntary, non-goal directed, controlled by the child, and often contains an element of make-believe. Some theorists argue that free play is sufficient for furthering a child's education (Gray, 2013). *Guided play*, on the other hand, is led by the child and is designed to be fun and flexible, but has the ultimate goal of building a child's skillset or knowledge. Weisberg and colleagues (2013) define guided play as an activity that:

> …incorporates adult-scaffolded learning objectives but remains child-directed. In guided play, adults initiate the learning process, constrain the learning goals, and are responsible for maintaining focus on these goals even as the child guides his or her own discovery. This latter point is critical. While adults might initiate the play sequence, children direct their own learning within the play context. Thus, guided play is *child-directed* and can take a number of paths within a play setting (p. 105).

Thus, guided play is likely to have two effects. First, it is likely to facilitate learning as children become agents, playing a role in directing their own learning experience. Second, once children are encouraged to take an active role in their own learning, guided play is expected to foster innovative thinking and creativity. We next evaluate whether these two hypotheses appear to be true. There is more evidence for the value of guided play for children's learning than there is for whether guided play spurs creativity. Yet we argue that guided play is likely to be a springboard for creativity and a better bet for a classroom pedagogy if both content and creativity are the end goal.

10.4 The Value of Guided Play for Children's Learning

In their meta-analysis of 164 studies, Alfieri, Brooks, Aldrich, and Tenenbaum (2011) examined a range of pedagogies with respect to their potency for child learning. They found that when one compared direct instruction to free play, direct instruction was a more effective pedagogical method. However, when compared to guided play, direct instruction was not optimal. Guided play, or what Alfieri and colleagues (2011) called 'assisted discovery,' trumped other pedagogical approaches for content and social learning. This finding has emerged in a number of reviews and studies (Fisher, Hirsh-Pasek, Newcombe & Golinkoff, 2013; Hirsh-Pasek et al., 2009; Zosh, Hirsh-Pasek, & Golinkoff, 2015). As described below, guided play has been found to support learning across diverse domains, such as mathematics, spatial learning, language and literacy, and emotion regulation.

Take, for example, a now-classic guided play study in mathematics. Ramani and Siegler (2008) asked whether using playful learning techniques in an intervention with preschool children could help them to develop a linear representation of number along a mental number line. They developed a game for children to play using numbers as the places on the game board. With as little as an hour's worth of game play, low-income children showed improvement in five different areas of mathematical thinking. This effect held even 9 weeks later. Crucially, the effect in mathematical thinking did not come merely because a game was played. When the numbers

were replaced with colors on the game board, no mathematical benefit accrued. Thus, this study showed that children can learn new skills in a guided play situation in which the adult has clear learning goals in mind (see Hirsh-Pasek, Zosh et al., 2015 for a similar argument with educational apps).

Guided play has also proven effective in learning geometric concepts. Fisher and colleagues (2013) compared children's learning about geometric shapes in three conditions: In guided play, an adult helped children "figure out the secrets of the shapes," that is, what makes a triangle a triangle. The adult helped the child to count the sides of the shapes, for example, after the child noticed that this might be a key feature. In didactic instruction, an adult showed the child the shapes' secrets while the child watched and listened. Finally, in free play, children were allowed to play with the shapes however they wished. The children in the free play condition, who were unconstrained in their task, did well below chance in identifying which shapes were "real." Children who learned via guided play were not only 20 % better than children in the didactic instruction condition, but were over 35 % better at identifying *non-typical* shapes they had not previously been shown. For example, children agreed that a lopsided triangle was a "real" triangle even if the point was not on the top. This latter finding suggests that guided play encouraged children to truly incorporate what the "secrets" of the shapes were. Their active role in discovering these secrets may have been the key in their better performance. Impressively, those who learned in guided play also showed increased retention of geometric concepts a week later.

The development of language and literacy offers a third area in which guided play has been put to the test (Weisberg et al., 2013; Zosh, Reed, Golinkoff, & Hirsh-Pasek, 2014 for a review). At-risk children who received direct vocabulary instruction coupled with guided play showed more vocabulary growth than children who received only direct instruction for the same amount of time (Han, Moore, Vukelich, & Buell, 2010). Guided play also outperformed free play in a large-scale intervention-based study: Preschoolers in Head Start who heard vocabulary in a book and then engaged in guided play learned more words than children who engaged in free play after book-reading (Dickinson, Hirsh-Pasek, Golinkoff, Nicolopoulou, & Collins, 2013).

Finally, research into intervention to foster social regulation or executive function also supports a playful learning approach. In their now-classic Tools of the Mind program, Bodrova and Leong (2001) suggest that when children play particular games throughout the school day, they develop the kind of regulation and impulse control behaviors that predict school outcomes in language, literacy, and mathematics (Diamond, Barnett, Thomas & Munro, 2007; Blair & Raver, 2014). In pretend play for example, children tell their teacher what their theme will be and who will play what part. Thus, the value of playful learning and in particular, guided play, is not restricted to academic outcomes, but also to social growth and to learning to learn behaviors that correlate with other markers of child success.

It is important to note that our endorsement of guided play does not come at the expense of direct instruction. Quite the contrary. There are domains and contexts in which direct instruction is as good as or sometimes even better in achieving out-

comes than is guided play. In the language and literacy studies reported above, for example, vocabulary was learned equally well in "play" where the teacher played director, and in guided play where children led. Both types of play trumped vocabulary learning in free play. When the adult has a learning goal in mind – here vocabulary learning – it is imperative to narrow the child's search space for possible meanings of a word. Both guided and directed play achieve that end. Klahr and Nigam (2004) also champion the idea that direct instruction might be the only way to convey information in some domains, like some aspects of scientific learning. Though they embrace many traits of guided play, this research finds that third and fourth graders learn how to narrow down a hypothesis better when they are directed towards the critical experiment than when they are lost at sea with a more discovery-based pedagogy.

Bonawitz and colleagues (2011) suggest, however, that even in these cases, direct instruction can be a 'double-edged sword': While it can give the learner information in an immediate context, it actually serves to decrease the learner's drive for exploration and further discovery. Their studies presented children with a novel toy that had a number of functions. When the experimenters instructed the children about one of those four functions, the child indeed learned that function, providing evidence that direction instruction or modeling can work. However, children who were instructed about that function were also less likely to discover the other non-demonstrated functions. In stark contrast, children who simply got the exact same object to explore on their own engaged in active exploration and uncovered significantly more of these hidden functions (Bonawitz et al., 2011).

In sum, direct instruction – the currency of today's educational landscape – has proven somewhat effective in transmitting information from teacher to student. But research suggests that guided play offers an equally and possibly more effective pedagogy. It invites children to master material in an atmosphere that inspires a more positive approach to learning. If guided play holds the promise of sparking creative thinking and provides a pedagogical solution to content learning, then it might take us a long way towards reaching the twin goals of fostering creativity while also supporting content learning.

10.5 Why Might Guided Play Promote Creativity?

Although both types of playful learning are valuable, the research we have reviewed suggests that when an adult has a curricular goal in mind, guided play is more effective for learning than free play. We further contend that guided play has an additional advantage: Although the research needs to be done, guided play may open children to more creative possibilities than free play. A recent paper by Weisberg and colleagues (Weisberg, Hirsh-Pasek, Golinkoff, & McCandliss, 2014) asks why guided play could harbor such a promising approach for education. They suggest that guided play helps children set a *mise en place*, or a prepared mindset, for learning and possibly for nurturing creativity. In other words, during guided play,

children actively explore and discover new conceptual understanding with the help of adults who scaffold and support but do not lead the experience. It stokes what Galinsky (2010) called the "fire in the child's eyes." In so doing, it offers children stewardship of their own learning with adults playing the supporting role of scaffolding their exploration.

Just as a chef who is given a bountiful pantry with high-quality ingredients can create a wonderful meal, guided play happens when adults provide a high quality experience while giving children opportunities to create their own understanding. Adults still play an essential role. In guided play, adults narrow the list of "ingredients" to make high quality learning possible. Adults support learning by constraining the possibilities so that children can discover what is important. A child in free play is like a novice chef who is overwhelmed or ill-equipped to make the correct choices when confronted by so many supermarket aisles and cuts of meat. Adults not only prepare the choice of potential ingredients, but also stand by to gently support the young chef as she explores how the ingredients work together – constantly observing and expanding her purview. In this way the child grows from novice explorer towards seasoned expert.

Guided play – or engaged learning in which the child has a strong role – might foster that seasoned expert for a number of reasons, allowing for the learning of content and the nurturance of creativity. One reason is that as the *mise en place*, or prepared mindset, is established, children are given the opportunity to participate and think in new ways. Their task is not to collect the ingredients but to create something new with what is in front of them. Another potential advantage is that guided play seems to lead to greater understanding of the newly learned content. If children form a deeper representation of the content, such as a better understanding of the properties of geometric forms (Fisher et al., 2013), they are then in a position to manipulate it and use it for new ends. Knowing, for example, that squares and rectangles can be divided into triangles may lead children to create more imaginative geometric puzzles.

One example of how guided play may promote creativity comes from a yearlong study of a play-based intervention designed to increase creativity in 10–11-year-olds (Garaigordobil, 2006). In the intervention, teachers led students through several different games and activities that incorporated fiction and creation as well as cooperation and communication among students. For example, in one activity students worked in small groups to plan and act out an advertisement for a real or invented product or service. Although the intervention was not designed from a guided play perspective, the activities had many features that align with principles of guided play. First, each play session was led by a teacher – children were not simply given free reign in a classroom. Second, the activities for each play session were structured and guided by the researcher with clear goals in mind, including increasing creativity but also promoting socioemotional development. Finally, once the context was set by the teacher, the children were given the ability to participate in the activity – they were not just told exactly what to do. Garaigordobil (2006) found that children in the intervention showed increased creativity on a subset of Torrance's Test of Creative Thinking tasks (increased originality, as expressed

though verbal creativity and greater graphic–figural creativity) from pre-test at the beginning of the school year to post-test at the end of the school year, relative to a control group of children who did not participate in the intervention. A similar play-based intervention program sharing characteristics with guided play has also shown to be effective with even younger children aged 5–6 years (Garaigordobil & Berrueco, 2011).

Children's activity during guided play clearly encourages children to think. This is not to say that direct instruction or free play does not involve thinking. They do. But because in guided play children are not just receiving information but helping to generate it, children's thinking may be nuanced and deeper. The suggestion that children who learn with a guided play pedagogy are better at transfer, or taking their learning to new places, is important to build on. Encouraging children to think and not just memorize may serve to stoke children's creativity.

10.6 Where Do We Go from Here?

In 2006, a *Time Magazine* article quipped that if Rip van Winkle woke up today only one institution would be familiar – the schools (Wallis & Steptoe, 2006). Everything else in our modern society would be totally novel to him: Business has entered the twenty-first century global economy at warp speed, geographic boundaries are more porous, and many have found their voice in a free market of ideas that travel the world in seconds through blogs, texts and social media posts. Rip never heard of these rapid-fire communication techniques and would likely be overwhelmed. The photographer who is locked into metal case film cartridges is doomed, as is the journalist who pecks out a local story on his Smith Corona. We all needed to adapt to the fast pace of change that demands leadership, creativity and the ability to solve ill-defined problems. The schools – designed for the agrarian society with lined desks in square rooms – are simply not equipping our children for the society of the present, let alone the future. Rip might find solace in the familiar surroundings. For our children these characteristics portend disaster.

Research in the science of learning (e.g., Sawyer, 2014) offers us a glimpse of what is required for developing strong curricula that foster creativity but we are less sure how to get there. There are many reasons why global education seems to be sinking in hundred-year-old quicksand. One is that we often treat educational change by patching what we have done in the past. Putting a bigger set of wheels or a better steering mechanism on a horse and buggy, however, still leaves one with a horse and buggy. The school in its current form is outdated and is not preparing children for their future. Perhaps we need a "green field" experiment that asks – if we were to build a school around the skills children need for the mid-twenty-first century, what would it look like? Golinkoff and Hirsh-Pasek (2016) entertain that very idea in their book. They offer an evidence-grounded way to think about a new model for education.

We simply do not know enough about how to think about creativity and how to nurture it to ensure that the curriculum we build will be evidence-based. In this paper, we offer a thought experiment and invite researchers and educators to think about guided play as a promising avenue towards understanding creativity and how it can be nurtured and measured as an outcome in our schools. The data suggest, but do not secure, that guided play should, theoretically, promote creativity. The current research relies heavily on correlational and observational data, but the weight of the evidence is in favor of this relationship. The data more clearly suggest that children can master content and social regulation in a playful learning environment. Given that children need both content and creative thinking, we suggest that playful learning shines a light on a new area for serious research. It might just be a good bet for resolving the creative contradiction that exists in our schools. Final answer – more research is needed.

Yet, as we ponder the creative contradiction, we close with yet another thought experiment. If you knew that you had a drug that was not well tested, but that looked promising, would you give it to a dying patient? The science suggests that the drug surely will not hurt the patient – there are in fact a number of potential upsides. The patient: our educational system. The drug: playful learning.

If the answer to this question is YES, then we suggest that we put a stake in the ground and define creativity for the moment as divergent thinking and that we find ways to encourage and support divergent thinking in the classroom. We start our days like they do at Brightworks and we study whether such interventions have any short- and long-term effects. We also ask how we might inspire more of a Maker-Mentality (Honey & Kanter, 2013; Maker Faire n.d.) in the schools where class time is actually spent on Rube Goldberg questions like how you build a better mousetrap. Once we establish how to promote divergent thinking, we will then have a foundation upon which we can build to support other types of creativity.

At the same time, our well-thought-out curriculum will not simply be focused on content like reading and writing, reading and writing, and reading and writing, but also on what Golinkoff and Hirsh-Pasek (2016) called the 6 Cs of successful children: collaboration, communication, content, critical thinking, creative innovation and confidence. These skills are based in the science of learning, are malleable, and, crucially, are the skills necessary for twenty-first century success. Our ideal school will guide learners through the development of each of these skills from the basic to the transformative by leveraging the principles of guided play to prepare tomorrow's leaders.

We would start our visionary school at the preschool level and add a grade each year until all children could benefit from an engaging school climate that was creative and content rich. The science to date suggests that this is possible. It will, however, not be done by patching the horse and buggy or by making Rip van Winkle more comfortable. It will be done by bold educational entrepreneurs who invent schools like Brightworks, building on what we know from the science of learning to uncover novel ways to promote creativity as part of a cohesive curriculum.

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