



EFFECTIVENESS OF STORYTELLING AND GAMEPLAY TO IGNITE LEARNING

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“Playing games is a universal and timeless aspect of human interaction, serving as a means for entertainment, social connection, and education globally.”

Historically, games have been integral to cultural practices and knowledge transmission. In addition, it has been long held that storytelling is an essential part of learning and passing on knowledge. Today, the combination of gameplay and storytelling is increasingly recognized in education and developmental psychology as having positive learning outcomes.

Studies on the relationship between board game play and early learning demonstrate the power of games as a context for practicing essential skills in core academic domains, such as literacy and mathematics. Other work reveals the impact of playing board games on developing various thinking skills, such as planning, making predictions, and logical reasoning. Socioemotional competencies also develop during gameplay as children are challenged to regulate their emotions, take others' perspectives, make moral decisions, and communicate in ways that support positive interactions. These skills foster empathy, communication, and problem-solving abilities, crucial for thriving in diverse and interconnected global communities.



This white paper is a comprehensive review of scholarly research, providing evidence of the myriad ways the combination of playing board games and storytelling supports children's development and learning. It places specific emphasis on the critical importance of game design in facilitating learning through play. In particular, it highlights the research base that supports the use of storytelling as a powerful learning tool that helps children focus on and make sense of experiences. Harnessing the power of story by integrating characters and plotlines into gameplay is an innovative and evidence-based approach.

The paper also delves into the crucial role of educators in engaging families in children's gameplay and their reactions to stories and characters. By facilitating communication and cooperation through board games, educators simplify complex concepts and embed learning in the gameplay. Interaction with others (family or peers at home or in the classroom) during gameplay and sharing stories is a meaningful educational and social-emotional opportunity during which children build a foundation for healthy, supportive relationships.

The paper's summary demonstrates how all three research areas are incorporated into developing and implementing Story Time Learning™ programs, specifically Story Time Chess™.



“Harnessing the power of story by integrating characters and plotlines into gameplay is an innovative and evidence-based approach.”

THE IMPACT OF GAMEPLAY ON LEARNING

“Contemporary scholars in education and developmental psychology have become increasingly interested in how games support children's learning.”



Playing games is a fundamental aspect of children's social interactions (Attia, 2016). In their youth, our ancestors played with stones, sticks, and other natural items as they sought to connect with one another, entertain themselves, learn and uphold cultural values, and gain understanding and knowledge (Donovan, 2017). Archeological evidence shows that across the globe, children and adults alike engaged in strategy games, role-playing games, athletic competitions, and games of chance. Anthropologists reveal that cultures past and present use games to develop and practice skills that reinforce cultural values and transmit cultural knowledge (Watson, 2019). The same holds true today. Gameplay, whether in the form of sports, playground games, board and card games, or most recently, digital strategy and simulation games, remains a central context for human interaction and lies at the rare intersection of education, entertainment, and development of a range of capacities helpful in developing and maintaining healthy relationships.

Contemporary scholars in education and developmental psychology have become increasingly interested in how games support children's learning. In contrast to traditional didactic learning environments, in which direct instruction dominates, games engage learners through active participation and intrinsic motivation.

"Even casual cognitively stimulating activities that do not directly focus on active teaching may benefit children's educational outcomes" (Conica et al., 2023).

This study suggests that informal home numeracy and literacy activities such as playing board games and card games, having access to books, and shared reading during toddlerhood may contribute to children's school performance during preschool and early childhood. Home learning activities that are associated with fun and do not actively focus on teaching can positively influence children's skills across literacy and numeracy domains of development.

"Board games are spaces for mathematical learning, for social interactions, computational thinking, and for engaging in multiple practices. Board games also enable learning of various content, and can motivate players to learn more about a topic," (Bayeck, 2020).



Research on what and how children learn as they engage in activities that blur the boundaries between education and entertainment underscores the importance of incorporating game playing into home and school environments. These findings can also inform the design of game-based experiences by identifying ways to support engagement, enjoyment, and learning.

The following sections review current research on the benefits of game playing in advancing children's learning. The primary focus is how young children between the ages of three and eight learn through playing board and card games. Work in this area highlights two broad areas of impact: (1) gaining content knowledge in core academic domains and (2) developing cognitive and socioemotional skills that support learning. Socioemotional skills provide a solid foundation for being a lifelong learner, such as the willingness to explore concepts beyond the surface level and engage in discourse with people who do not align with an existing way of seeing a situation.

PLAYING GAMES SUPPORTS LEARNING IN CORE ACADEMIC DOMAINS



Mathematical Thinking



Language and Literacy

Mathematical Thinking

A robust body of research demonstrates that playing games can enhance children's math learning in fundamental areas, such as numeracy and calculation skills, spatial reasoning, sorting, and patterning. Notably, much of this evidence highlights the specific impact of board games. For example, Ramani and Siegler (2008) report that the more board games a child can name, the better their performance in four key math areas. Children who frequently play card and video games exhibit better math understanding than those with little to no game-playing experience, but they do not perform as well as children who regularly play board games.

A recent systematic review of 19 studies revealed clear and converging evidence that playing board games is linked to benefits in various early math skills (Balladares et al., 2023). These findings underscore the educational value of playing board games for early math learning. Further, this review also found that playing board games increases children's interest in math; this is important because attitudes and ability go hand in hand with each reinforcing the other (Fisher et al., 2012).

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The ability of board games to promote math learning largely depends on their design. For example, typical board games often require players to spin a dial, flip a card, or roll dice and then move a token to a designated space. Children benefit when movement formats allow them to practice number recognition and learn the concepts of one-to-one correspondence, stable numerical order, and magnitude. For example, young children's counting skills improved after playing board games that involved traditional number dice. In contrast, counting skills did not improve for children who played games that used other movement techniques (Gasteiger & Moeller, 2021). Children also make more significant gains in numeracy understanding when board games are laid out in a linear versus circular design (Siegler & Ramani, 2009) and when game formats encourage children to "count on" progressively, as seen in Chutes and Ladders™ rather than start over at one on each turn (Laski & Siegler, 2014). Children also benefit from games that can help them grow with the players by allowing them to stay engaged while they develop more advanced skills and understandings. For example, researchers have observed that children adapt their Monopoly™ playing strategies to align with their math skills, such as by paying the exact money owed versus overpaying and calculating change (Guberman & Rahm, 1998).

The value of game playing to support math learning is not limited to board games. In today's world, much of children's game-related experience is digital, and the marketplace of educational apps for young children is teeming with products that claim to offer fun math learning experiences. Unfortunately, much of what is available is "chocolate-covered broccoli"—a metaphor used in education to describe efforts to disguise learning opportunities with a superficial layer of entertainment, such as rewarding players for popping virtual bubbles that have the correct answers to math problems. Within these practice-based apps, math learning is often the goal and not a tool used to reach a goal, as is more typical in physical board games. Two recent systematic reviews of existing studies found that digital apps can promote basic math skills and that well-designed apps that sequence learning challenges and provide explanatory feedback are most effective (Outhwaite et al., 2023a&b).

Although research supports the power of well-designed board and digital games to enhance early math learning, there are many productive directions for future game development and concurrent research. In a recent interview, Balladeres (2023) predicts that "An interesting space for the development of intervention and assessment of board games should open up in the next few years, given the complexity of games and the need to design more and better games for educational purposes" (U.S. World and News Report).

Language and Literacy

Studies show that playing games benefits young children's language development and early literacy skills. During gameplay, children are immersed in environments that foster language development as they engage with others in conversation, turn-taking, and active listening (Poss and Bugaj et al., 2020). Children also have opportunities to expand their vocabularies and learn new syntactic structures (Hohenstein, 2013). Whether discussing progress and setbacks in Candyland™, negotiating payments in Monopoly™, debating moves in chess, or expressing curiosity about word choices and meanings in Scrabble™, children are actively utilizing and expanding their vocabulary. When children who know how to play a game describe it to new players, they gain pragmatic discourse skills as they explain the rules and take the perspective of the learner (Sorsana et al., 2013).



“During gameplay, children are immersed in environments that foster language development as they engage with others in conversation, turn-taking, and active listening (Poss and Bugaj et al., 2020).”

Other Academic Domains

Investigations of how gameplay can support learning in other academic domains (e.g., science and social studies) show a positive impact on interest and content knowledge. However, the majority of research in this area focuses on games designed for use in classrooms to engage older students in learning specific concepts, such as cell biology and evolution (for a review, see Hashim et al., 2023).

Essentially, gameplay allows for engagement in the scientific process and gives children practice with this in the context of the game's rules and the supportive relationships with adults/peers involved in the game with them. In recent years, however, the commercial marketplace of young children's games has become flooded with STEM-themed board, card, and digital games. Research on the impact of playing such games in informal learning settings has yet to catch up to the development of these games and leaves gaps in our understanding of how young children might benefit.



PLAYING GAMES HELPS CHILDREN GAIN CORE COGNITIVE AND SOCIOEMOTIONAL SKILLS



Critical Thinking



Executive Function



Socioemotional Skills

Critical Thinking

Games create opportunities to foster critical thinking skills by requiring players to analyze situations, anticipate outcomes, and strategize accordingly. Children engage in creative problem-solving as they adapt to changing circumstances and devise innovative strategies to achieve their objectives. For example, children use deductive reasoning skills when playing Clue (Neller et al., 2006) and practice strategic planning when playing mancala (Gobet et al., 2004). Research on the extent to which children gain critical thinking skills during gameplay indicates that, for young children, playing cooperative games (e.g., Hoot Owl Hoot, Robot Turtles) yields more positive learning outcomes than playing competitive games. When players work together, they are more likely to explain their thinking, evaluate others' thinking, and modify their strategies based on new evidence (Domberg et al., 2016; Köymen & Tomasello, 2018).

In contrast, when children play competitive games, they typically only explain their thinking when encouraged to do so by adults (Reid, 2002). Talking aloud about thinking provides adults with opportunities to help scaffold children's reasoning skills, such as by discussing the consequences of moving one way versus another. Encouraging children to discuss their strategies supports their developing metacognition, which is linked to agency over their learning and academic achievement (Marulis et al., 2020).

Executive Functions

Executive functions (E.F.) refer to a variety of cognitive processes that involve flexible thinking, working memory, and inhibitory control. Gameplay offers a versatile environment for practicing these mental skills. For example, games that emphasize turn-taking and resource management give players practice in regulating their behavior. Gashaj et al. (2021) found that children who play more board games perform better on E.F. tasks measuring inhibitory control; this finding was not demonstrated for puzzles or exergames. In another example, strategy games like Go and chess require planning and cognitive flexibility as players adapt their approach based on their opponent's moves. Such games have been positively linked to developing E.F. skills (Kim et al., 2014; Moya-Higueras et al., 2023). A critical feature of games that may enhance executive functioning is the immediate feedback they provide, enabling players to learn from their actions and improve their performance over time. Real-time feedback loops are crucial for young children's learning as they allow them to immediately see the consequences of their actions (Yanaoka & Saito, 2020; Zhang et al., 2024).





Socioemotional Skills

Playing games often involves interacting with others, which can help enhance social awareness, teamwork, and sportsmanship (Hassinger-Das et al., 2017). Although young children prefer to play board games in which players are all on the same team working together, both cooperative and competitive gameplay positively impact the development of social skills (Erikson et al., 2021). The most important social skill in gameplay is self-regulation (controlling one's behavior). This skill is practiced during the natural highs and lows of gameplay as children learn to wait their turn, take time to think about their next move, cope with losses, and manage excitement over positive outcomes (Anzman-Frasca et al., 2020). Although both cooperative and competitive games encourage emotion regulation, children playing competitive games are less likely to successfully manage their emotions and consequently engage in more negative behaviors (Bay-Hinitz & Wilson, 2005).

“The most important social skill in gameplay is self-regulation (controlling one's behavior). This skill is practiced during the natural highs and lows of gameplay as children learn to wait their turn, take time to think about their next move, cope with losses, and manage excitement over positive outcomes (Anzman-Frasca et al., 2020).”

A review of several research studies on gameplay concluded that board games could be an effective tool in supporting positive mental health and fostering effective interpersonal interactions (Noda et al., 2019). Many children today are experiencing anxiety in building relationships, coping with mistakes or failure, and accepting the consequences of behavior. Games provide:

- A structured yet playful setting for children to practice adapting to different situations.
- Taking others' perspectives.
- Respecting the actions and decisions of others.

These are valuable skills across all social settings as they promote empathy, patience, and effective communication (Peppler et al., 2013). Therefore, including board games in children's everyday experiences positively impacts children's development of social competence and the promotion of self-compassion through gameplay, differentiating this skill from self-esteem and self-judgment.



THE IMPACT OF STORIES ON LEARNING



“Through the journeys of fictional characters, children learn valuable lessons they can apply to their own experiences.”

Storytelling is a powerful tool for making sense of experiences, promoting a shared understanding of the world, shaping identities, and contributing to enthusiasm for learning. The power of narrative stems from its ability to structure information in ways that become memorable, interrelated, and personally meaningful (Bruner, 1990; Norris et al., 2005). Through the narratives found in stories, children broaden their understandings as they encounter diverse perspectives, cultures, and approaches to solving problems. Characters within stories may become role models, guiding young minds through moral and strategic challenges. By identifying with characters, children navigate complex emotions and develop empathy, learning to appreciate different viewpoints and understand the consequences of their actions (Du & Hao, 2018). Through the journeys of fictional characters, children learn valuable lessons they can apply to their own experiences.

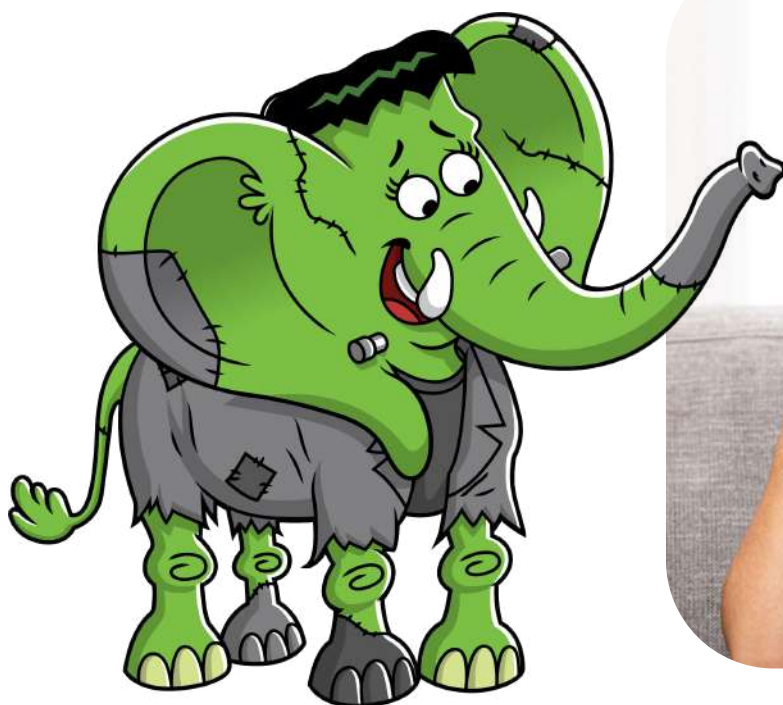


The Role of Fantasy in Learning

Through storytelling, children embark on extraordinary adventures that often blend fantasy and reality. Children encounter magical creatures, enchanted lands, and impossible feats in fantastical realms. However, such stories are often grounded in the relatable reality of emotional experiences, familiar physical principles, and predictable sequences of events. Research on how fantasy in stories impacts learning presents a complex picture. On the positive side, fantasy stories hold a unique power in shaping the learning experiences of young children by transcending the boundaries of reality to ignite imagination and creativity. By engaging children, fantasy supports attention, memory, vocabulary learning, and deep processing of content (Emily et al., 2021; Hopkins & Weisberg, 2021; Hopkins & Willard, 2021; Weisberg, 2015). Researchers also find many social benefits from reading narrative fiction with children (Alatalo & Westlund, 2019). Characters in fantasy tales often face moral quandaries and ethical dilemmas, offering young learners valuable insights into the consequences of their choices. Parents perceive shared reading of engaging stories as an opportunity to connect with their children and "transmit" moral knowledge (Audet et al., 2008). This activity provides an opportunity to discuss the story's content and support children in considering the values and morals at a developmentally appropriate level. It also models that these questions are okay for the child to ask their parent(s) later in life as they encounter real-world experiences that stress their existing morals (e.g., peer pressure to engage in potentially dangerous activities during adolescence).

Some work demonstrates that including fantasy in stories detracts from learning. For example, transferring understandings learned in the context of fantasy to real-world situations can challenge young children (Richert & Smith, 2011). This is particularly evident when the main characters are fantastical and not human (Kotamin & Balci, 2019) and when the fantasy content requires significant cognitive effort to understand (Fisch, 2000). Children learn more when fantasy components of stories are not gratuitous but made relevant to the educational content (Richert & Schlesinger, 2017).

Those designing learning experiences for children can use fictional or fantasy narratives to capture attention and provide scenarios to reflect upon by using characters, settings, and plotlines that mirror real-life dilemmas and triumphs. Whether it is a fable illustrating the virtues of kindness and empathy, a personal anecdote recounting resilience in the face of adversity, or a storyline about a character's quest for knowledge, storytelling is a powerful vehicle for supporting children as they construct understandings of complex concepts and apply them to new situations in the real world.



The Impact of Stories on Learning in Core Academic Domains

Research on young children's learning has examined how stories can be used to support learning across domains (Reese, 2012). Evidence demonstrates that learning through stories contributes to language and literacy skills, math understanding, and approaches to scientific inquiry. When children engage in shared book reading, listen to oral narratives, or watch visual storytelling, they find themselves engaged in learning experiences that extend beyond mere entertainment.

Storytelling acts as a catalyst in the development of literacy by enhancing language comprehension, vocabulary acquisition, and grammar skills (Alatalo et al., 2019). Through exposure to narratives, children acquire vocabulary and grasp the nuances of grammar and syntax in context (Pierce, 2022). For example, in a study of second-grade students, storytelling served as a context within which children practiced "at least four important literacy skills: visualization, cognitive engagement, critical thinking, and story sequencing" (Agosto, 2016). Storytelling also cultivates a love for reading, motivating individuals to engage with written texts independently (Agosto, 2016). By integrating storytelling with learning goals, educators and parents support children in gaining skills that contribute to their progress toward becoming proficient readers and articulate communicators.

Stories also support math and science learning by embedding foundational concepts in meaningful and engaging narratives. Stories are a particularly powerful context for family engagement in children's learning as they are a familiar and comfortable activity across cultures. Several studies of engaging families in conversations about math through stories reveal positive impacts on math achievement and math confidence (Berkowitz et al., 2015; Anderson et al., 2005). In addition, a growing body of research suggests that supporting science learning through stories may be a more effective means to engage children and families in science learning than traditional didactic or expository approaches (Haden et al., 2023; Marcus et al., 2023).

COMBINING GAMEPLAY AND STORYTELLING TO FOSTER LEARNING

An emerging focus on the intersection of these two approaches complements the bodies of work connecting learning with game-playing and storytelling individually (Naul et al., 2020). Findings suggest that when narrative elements are meaningfully integrated into games, they become crucial components in supporting positive learning outcomes such as motivation, interest, content learning, and thinking skills.

Naul et al. (2020) review work that highlights four key elements of effectively using a narrative within a game to foster learning and motivation:

- **Distributed narrative:** The story is part of the game distributed throughout the gameplay (Barab et al., 2007).
- **Endogenous fantasy and intrinsic integration:** The story is built within the game and not separate from it as an add-on (Prins et al., 2013).
- **Empathetic characters and virtual agents:** Strong characters children can relate to and choose to be or act like (Rowe et al., 2007).
- **Adaptive and responsive storytelling:** Players' interaction with the game and story impacts the outcomes and actions of others (Lee et al., 2010).



In well-designed games, storytelling intertwines seamlessly with gameplay, forming the backbone of the immersive experience that serves as the foundation for learning. Like skilled writers weaving intricate plots, game developers can build narratives that capture players' attention and imagination and motivate them to engage deeply while providing more opportunities to gain skills.

Further, learning is enhanced when players are not just passive consumers of the narrative and instead actively shape it through their actions and decisions. This interactive element enhances player engagement and fosters a sense of agency as children learn how their choices influence the game and storyline progression, empowering them to actively contribute to their learning process. This allows them to practice and strengthen executive functioning skills in the context of the game's structure and their engagement with others involved in gameplay.

“In well-designed games, storytelling intertwines seamlessly with gameplay, forming the backbone of the immersive experience that serves as the foundation for learning.”

IMPORTANCE OF ENGAGING FAMILIES IN CHILDREN'S LEARNING EXPERIENCES

Family interactions serve as a primary context for young children's learning. Engaging families in game-based activities supports academic achievement, strengthens familial bonds, and promotes positive attitudes toward learning. Research highlights that family gameplay can enhance mental and emotional well-being and improve critical life skills. When games are used to support learning in the classroom, communication between educators and families can have a further impact on at-home experiences.

“Research highlights that family gameplay can enhance mental and emotional well-being and improve critical life skills.”



When families are engaged in supporting their learning, children achieve higher academic performance and demonstrate a greater sense of belonging in school (Epstein, 2020). By advancing opportunities for family connections in early learning, educators and educational product developers can lay a strong foundation for academic success and nurture bonds that support holistic development and lifelong learning.

One of the best ways to connect with families is to engage them as partners in children's learning. However, it is not just about informing; it is about continuous dialogue with parents (caregivers) that strengthens the daily connections with what the children are experiencing in school. This feedback loop, which can highlight children's progress and what they enjoy and offer suggested at-home activities, is essential in parents' involvement in their child's education. Three of the six types of family involvement are woven into this feedback loop: communicating, learning at home, and decision-making (Epstein, 2020).



Communicating



Learning at Home



Decision Making

Communicating

As educators, establishing a robust communication system with parents is not just a task but an integral part of supporting and enhancing student learning outcomes (Mapp, K et al., 2020). By fostering open lines of communication, we can keep parents informed about their child's progress, academic achievements, and areas for growth. This transparency allows parents to actively engage in their child's education, providing essential support and encouragement at home and in the classroom.

Learning at Home

Providing parents with at-home activities connected to school fosters a seamless integration of learning between the classroom and home environments, ultimately enhancing a child's educational journey. Educators empower parents to actively engage in their child's education beyond the school gates by equipping them with activities that complement classroom learning (Lehrl et al., 2020). These activities reinforce concepts taught in class and provide opportunities for practical application and reinforcement of skills.

In the early education context and throughout the initial years of primary education, parents often wonder about things their children do in the educational setting. Aside from reports from teachers or general information shared by children, parents are often left wondering. Engaging in gameplay across both settings allows parents to have a direct and active experience of what and how their children are learning, which can enhance parental motivation to engage fully with the curriculum and partner with educators. Keeping families in the loop through a well-designed communication program and ideas to extend learning at home goes a long way toward supporting a child's development and well-being.

Decision Making

Involving parents in decision-making processes regarding their children's learning profoundly and positively impacts educational outcomes. When involved in decision-making, parents become active partners in their child's education, contributing valuable insights, perspectives, and support (Henderson et al., 2007). This collaborative approach strengthens the parent-teacher relationship and creates a sense of ownership and investment in the educational process.

Families and Gameplay

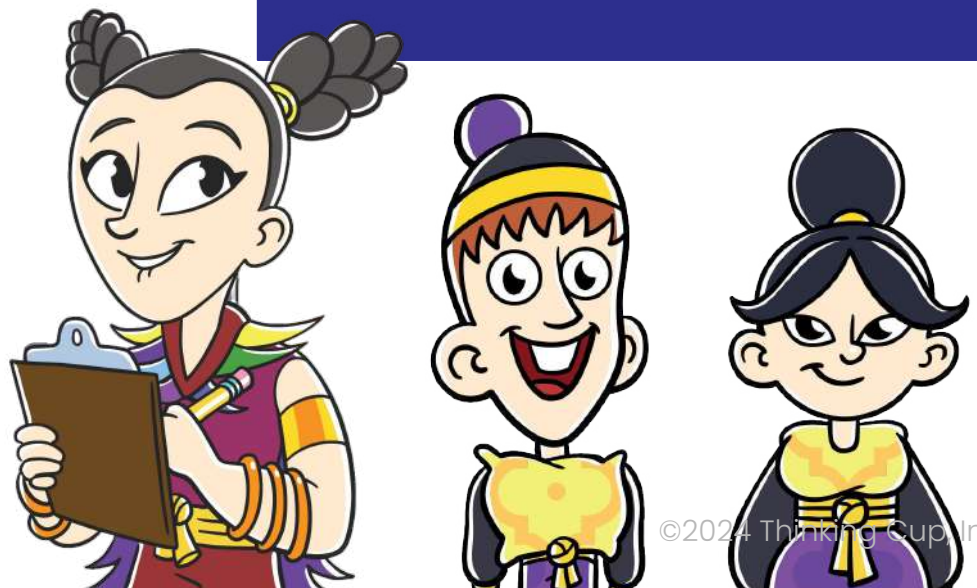
Family gameplay can "amplify academic abilities and is associated with social, mental, and emotional benefits for children. Games require us to take turns, cooperate, learn systems of rules, and persist through setbacks" (Hollis-Hansen, 2024).

Incorporating gameplay into family activities can transform learning outcomes for children and adults alike. Through gameplay, families can engage in collaborative problem-solving, strategic thinking, and decision-making, all while having fun together.

Moreover, games often provide opportunities for experiential learning, allowing players to explore complex concepts in a hands-on and immersive manner. Additionally, gaming fosters communication and bonding among family members, creating a supportive environment where learning becomes a shared experience. This is where great memories are made!

There are six skill areas (for all players—children and adults) where the impact of board games can be found (Brenneman, 2023):

- 1 **Stress Relief (well-being)**
- 2 **Critical Thinking**
- 3 **Collaboration**
- 4 **Working Memory**
- 5 **Confidence**
- 6 **Communication**



STORY TIME LEARNING: APPLICATION OF THE RESEARCH

The in-depth review of the research in the white paper demonstrates how gameplay, storytelling, and family connections can intertwine seamlessly to create a robust support system for children. At the heart of this synergy lies gameplay, where students become active participants in their learning journey, making decisions and facing challenges that promote growth and development. Storytelling adds depth and meaning to these experiences, providing context and emotional resonance that captures students' imagination, encourages empathy,



and motivates problem-solving. Connecting with families further enhances this dynamic by fostering a collaborative learning environment where parents and guardians are actively involved in their children's educational journey.

The weaving of gameplay, storytelling, and family connection is the foundation of all Story Time Learning programs and products. The unifying principle of Story Time Learning is that children's learning is best supported through fun, well-crafted stories. The program reimagines classic games such as chess and backgammon by embedding gameplay in engaging stories that support developing core skills, such as critical thinking, executive function, collaboration, communication, language, and mathematical thinking.





“Chess is seen as having a more significant impact on early learners than on older children (Chityo G. et al., 2023).”

Story Time Chess

Chess has long been lauded for its potential impact on learning and cognitive development. While this paper focused on gameplay research, there is also a recent body of research on the positive impact of the game of chess. Chess is seen as having a more significant impact on early learners than on older children (Chityo G. et al., 2023). Another found that regular chess play was associated with improved cognitive abilities, including problem-solving, critical thinking, and spatial skills (Giovanni S. et al., 2016). Chess can also promote social and emotional skills, such as patience, sportsmanship, and resilience (Aciego, R. et al. 2016).

The Story Time Chess program, the foundational program of Story Time Learning, brings chess to children as young as three and applies the research on how to impact early development. The Story Time Learning curriculum is meticulously crafted and designed to captivate young minds with its unique story, song, and movement blend. Each lesson has a chess-based strategy, a piece move, and an explanatory story narrative. The teacher carefully uses the stories to promote learning and development in the young children's social, emotional, language, and cognitive domains beyond success at the games.

The program includes:



Chess sets with the Story Time Chess characters.

Journals for each child as they follow and practice each lesson.



Teachers' materials, such as storybooks with lesson posters and an online portal to learn the lessons, track student progress, communicate with parents/caregivers, and expand the learning.



With its multiple U.S. state and national standards-aligned goals for chess play, reading, writing, unique domain vocabulary, speaking, singing, and listening outcomes, the curriculum is adaptable to various learning styles. There are planned routines, reviews of past lessons, and practice to build skills and self-confidence. Materials and activities are tailored to various modalities, including chess figures, songs, and opportunities to make character moves (Chessercises).

The design of every Story Time Learning program incorporates evidence-based core principles of applying a story narrative within games (see page 9 above):

- **Distributed narrative:** The characters within each game become familiar to children; their storylines and patterns of behavior create continuities across lessons
- **Endogenous fantasy and intrinsic integration:** The story and the gameplay are interwoven such that the story elements are directly related to the learning goals
- **Empathetic characters and virtual agents:** The characters have distinct personalities, allowing children to find characters with whom they can identify.
- **Adaptive and responsive storytelling:** Through play children make decisions that change the narrative and create a more engaging experience with personalized feedback.

In-the-Moment Training and Family Connections

The Story Time Learning Portal provides access for educators to quickly implement the program (chess, backgammon, and more). Rather than having a long text-based training program, each module or lesson comes with a brief 3–6 minute training video. The videos are fun and engaging, enabling the viewer to prepare for the lesson and be ready to go. The portal also includes best practice videos with tips on what has worked for others implementing the program, guides on the game, and downloadable assets such as puzzles to use during gameplay. The educators can also track the lessons and progress of the students.

The best application of the research in connecting with families is the automatic feedback loop after each completed lesson. Families receive an update on their children's progress, ideas for at-home activities, and a list of the skills their children are learning. The program provides the three essential elements listed on page 8: communicating, learning at home, and decision-making (Epstein, 2020).

Developmental Skills within Story Time Learning Gameplay

Story Time Learning programs stand out with their unique blend of animations, storybook characters, and arts-driven digital literacy environments. These multidimensional platforms are about learning, empowering, and enabling students to be 21st-century thinkers. The program introduces students to emergent ways of thinking necessary for strategic, social, and life success, heightening and inculcating the necessary 21st-century thinking skills at an early developmental level.

Each lesson is aligned to the state and other standards with a specific focus on the core skill areas listed in the research on pages 2-4: critical thinking, language development, social-emotional skills, and approaches to learning.

The following examples demonstrate the application of the research in the program design and implementation:

Story Time Learning Gameplay empowers and enables 21st-century thinkers by introducing students to emergent ways of thinking necessary for strategic, social, and life success:

- **Critical Thinking**
- **Language and Literacy**
- **Social-Emotional Skills**
- **Approaches to Learning**

Critical Thinking

Students ask questions and make predictions based on observations and manipulation of things and events in the environment. The Story Time Chess program is about inquiry and predicting how moves or actions affect the game or the story. Young learners manipulate the pieces during class to develop responses to their predictions and discuss why the reactions were what they anticipated. The programs are designed to have children ask "why," "how," and "what if" questions.

Language and Literacy

A vital element of the games is the teaching of unique vocabulary (such as those in chess or backgammon) and an allusion to actual mythic characters and factual animals in the ongoing stories. Children can define these terms and use them as part of the game. They can also mimic and identify pictures through animation and react to questions. They are prompted to practice and to communicate effectively with gestures and facial expressions as they present to peers and adults.

Social-Emotional Skills

In all of the Story Time Learning programs, the emphasis is on "playing with" and "playing together" as opposed to "playing against" and "playing to win." This meta-cognitive story-based teaching method encourages children to work together, playing with the story characters' feelings and moves. Children are encouraged to describe problems the characters (pieces) have in their chess moves and reflect on the outcomes of different solutions.

Approaches to Learning

Story Time Learning Programs support several learning approaches, such as sustaining persistence, where young learners are motivated to practice for improvement. Another area is self-regulation. During the gameplay, the children learn how to reflect, plan, and react with confidence and measure emotion-to-peer moves and the results of matches they play with one another.



Story Time Learning Additional Programs

Story Time Learning continues to expand its products and programs beyond chess using the foundational research to guide the game and story development:



**Story Time
Backgammon**



**Story Time
Classics**



**Story Time
Playgroup**

Story Time Backgammon

Teaching backgammon to young children can positively impact their development. The game is included in the research on gameplay and studies involving the playing of chess. The game supports the development of strategic planning skills as children must anticipate their opponent's moves while planning their own. This fosters problem-solving abilities from a young age. The game of backgammon is not just about the moves on the board. It is about the social interaction and sportsmanship it encourages, promoting healthy competition and cooperation. Story Time Backgammon is geared toward young children and uses the same principles as those applied to Story Time Chess:

- Continuous narrative
- Empathetic characters
- Adaptive and responsive storytelling
- Family connections

Story Time Classics

Everyone loves classic stories, but some may be difficult for young children to read and understand. Introducing classics like *Moby-Dick* and *The Odyssey* to young children exposes them to universal themes such as courage, friendship, and the struggle between good and evil, allowing them to explore and develop their values and beliefs. Exploring the classic tales encourages a lifelong love of literature and learning, instilling in children an appreciation for storytelling (Radulescu, C.M., 2020).

Story Time Classics takes this idea and brings several classic tales to life by simplifying the story and weaving it into gameplay. For example, with *Moby-Dick*, the accompanying game is Go Fish. They support working memory as well as social-emotional skills.

Story Time Playgroup

Playgroups foster crucial cognitive, emotional, and physical skills, laying the foundation for future social interactions. Studies emphasize that playgroups enhance language acquisition, encourage imaginative play, and promote essential socialization skills such as sharing and cooperation (McLean, K et al., 2022; Armstrong J, 2021). These social settings provide:

- A supportive environment for parents and caregivers.
- Networking opportunities.
- Sharing experiences.
- Access to valuable resources.



Playgroups serve as vital catalysts for early childhood development, nurturing the holistic growth of young children while fostering a sense of community among families (Deadman, L et al., 2020). Story Time Playgroup is a research-driven program designed to support the holistic development of babies and toddlers. At the same time, not chess lessons or gameplay, developmentally appropriate activities, and social-emotional learning are woven into simple stories with the engaging Story Time characters from the chess curriculum.

The scope and sequence of the activities follow what little ones are interested in, such as singing, dancing, repeating favorite stories, building and creating things, etc. The program follows the CDC milestones standards and best practices for playgroups from the Center for the Study of Social Policy (2020). Each lesson includes:

- **Greeting:** A consistent welcome song, a reflection of what happened in the previous session, and setting the stage for the session's activities
- **Storytelling:** An engaging and playful storytime focused on a specific topic
- **Creating:** Time for creating during open-ended play with materials related to the story
- **Exploring:** A guided learning experience
- **Singing & Moving:** A time to sing familiar songs, dance, and move or interact in fingerplays
- **Reflecting & Goodbye:** A time for reflection on what they did in that session, along with a consistent goodbye song.

Story Time Playgroup is offered in settings such as libraries, preschool programs, home-based child care, etc. The program is offered once or twice per week for one hour per lesson, providing a scope and sequence of activities adapted to the children within the group. Families are provided with a lesson summary of what children learned and skills they practiced, along with at-home activities to extend the learning.

SUMMATION

Story Time Learning's programs are powerful tools for fostering children's learning across academic, cognitive, and socioemotional domains. By integrating games and stories into educational practices and family activities, they create enriching experiences that support children's development and learning. Future research and game design efforts continue to explore and expand these opportunities to enhance educational outcomes for young learners.



AUTHOR BIOS



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Nationally known consultant and author in early learning.

Lee has more than 30 years of experience in program and curriculum development, early childhood education services, professional development, after-school programs, assessment of young children and supplemental educational programs. She has been a consultant to The Goddard School for the past ten years and is chairperson of their Educational Advisory Board. Lee was a senior officer and business developer for Primrose Schools, Sylvan Learning Systems and Connecting with Kids where she developed parenting tips, curriculum products and children's entertainment programs. She co-founded Curiosityville, an online personalized early learning platform. Lee has launched strategic partnerships on a variety of family-oriented and educational projects with National Head Start Association, Johns Hopkins Brain Science Institute, National Geographic Society, Scholastic Publishing, Discovery School, Houghton Mifflin Harcourt, Amazon Kids and Mattel Learning and a PlayLab Advisor for Fisher-Price. She is the author of the Partnership for 21st Century Learning Early Learning Framework, P21-ELF, the parenting program for Thomas and Friends–United Nations All Aboard for Global Goals!, and the educational guides for Do Re Mi, an early learning music program on Amazon Kids.



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Jennifer is a Professor of Psychology and Child Development at Cal Poly. She recently concluded a 3-year term as department chair and is currently serving as Faculty Liaison to the Cal Poly Preschool Learning Lab, Faculty Director to the Cal Poly Foundation Board, and Faculty Fellow in the Office of the Provost. Her research investigates how young children develop interests, understandings and identities related to science, health and technology. She publishes regularly in scholarly journals and co-edited the book *Relating Research and Practice: Cognitive Development in Museum Settings* and has an established track record of effectively obtaining extramural funding to support her work. Dr. Jipson teaches a variety of child development courses including *Infant Development*, *Children, Adolescents and Technology* and *Children's Learning in Out-of-School Time*. She received the Richard K. Simon Faculty Award for Excellence in Teaching at Cal Poly. She is a member of the Educational Advisory Board for The Goddard Schools and offers exhibit and programming support to children's museums and science centers. Additionally, she has served as a Content and Curriculum Advisory Board Member for Nickelodeon Jr., a PlayLab Advisor for Fisher-Price, and a consultant for Inherquests (financial literacy program for girls) and Wee Gallery (an infant and toddler toy company).

A portrait of Deborah Weber, Ph.D., a woman with long dark hair, smiling, wearing a blue top. The portrait is set within a rounded rectangular frame.

Deborah Weber, Ph.D.

Global Child
Development and Play
Expert, Founder, Play
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As Founder of Play Elevated, Deborah is widely regarded as an expert in early childhood development and purposeful play. The purpose of her consultancy reflects her experience with leaders in the US, United Kingdom, Singapore, Malaysia, China: Beijing, Shanghai, Shenzhen; Hong Kong, and Quebec, Canada. Her mission is to support fun, happy and healthy experiences, for kids around the world, by elevating early childhood development benefits of their play.

Play Elevated, LLC has garnered partnerships among established toy industry leaders, start-ups, as well as reputable non-for-profit organizations and global leaders in children's products, toys, media & entertainment, and digital experiences. She is a consultant, advisor, published author, and well-networked among thought leaders in early childhood psychology and other relevant fields, including infant toys, children's media and technology. As part of her 28-year career leading at the Play Lab at Fisher-Price, she has been interviewed by various journalists worldwide, on subjects such as child development and play, electronic learning toys, computer and television peripherals and video programming for children, age-grading, developing age-appropriate toys and products, and the process of child research as it relates to the product development process.

Additionally, Weber is advisor for the Partnership for 21st Century Learning Early Learning Framework, P21-ELF, and Thomas and Friends–United Nations *All Aboard for Global Goals!* Weber lives in Buffalo, New York with her husband Gary. Her daughter Macy is a Content Strategist and Natalie is a Junior at the University of San Diego. When she is not enjoying global travel with her family to build memories, Weber loves to participate in outdoor recreation, such as hiking, biking, and skiing with her family and lifelong friends.

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