



NORTHEAST COMPREHENSIVE CENTER

# Play-Based Technology Platforms and Early Learners

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REGIONAL: INNOVATIONS IN LEARNING



## Introduction

In the United States, there are two recommendations being made by early education specialists and organizations: get technology into early learners' classrooms and move away from direct-teaching methods to a play-based curriculum. The National Association for the Education of Young Children (NAEYC; 2012) succinctly states that "technology and interactive media are here to stay" (p. 2) and that "both direct instruction and play have roles to play in high-quality early childhood education" (Snow, n.d., p. 1). Combining information and communications technologies (ICTs) with play-based learning presents an opportunity to bring together proponents of both pedagogies—direct-teaching versus play-based learning—by delivering specific content in a playful manner while being extremely adaptable to meet changing Common Core State Standards. This research will look at brief play-based learning, ICTs, and play-based ICT platforms for early learners. Section 1 discusses the definition of play-based learning; section 2 discusses how children learn through play; section 3 discusses ICT use in early years education; section 4 discusses the use of play-based technology platforms for early learners; section 5 discusses the potential for play-based ICT platforms to achieve competency-based results; and section 6 makes recommendations for action.

## Section 1: What Is Play-Based Learning?

Arriving at a definition of play is difficult. Much of the foundational understanding of play and its role in development is based on the theories of Lev Vygotsky (Ailwood, 2003, p. 4). Fromberg and Bergen (2006) define play as symbolic, meaningful, active, pleasurable, voluntary, rule-governed, and episodic. Vygotsky would contend that pleasurable is not a criterion, noting that some forms of play, such as sport, are "very often accompanied by displeasure" (1978, p. 1). In *The Ambiguity of Play*, Brian Sutton-Smith laments that "we all know what playing feels like. But when it comes to making theoretical statements about what play is, we fall into silliness" (1997, p. 3).

In 2002, despite the debate among theorists and researchers concerning the definition of play, the Welsh government became the first in the world to adopt a national play policy (Play Wales, 2012). In an official statement, they defined play as "freely chosen personally directed behavior, motivated from within by needs, wants and desires. Play can be fun or serious. Through play children explore social, material and imaginary worlds and their relationship with them, elaborating all the while a flexible range of responses to the challenges they encounter" (Welsh Assembly Government, 2002, p. 3).

## Section 2: Where Is the Learning in Play?

The common perception of play is that it is mostly recreational. Vygotsky contends that "it is incorrect to conceive of play as activity without purpose...play contains all developmental tendencies in a condensed form and is itself a major source of development" (1978, p. 7), implying that the dichotomy of learning and play is false, a point that the NAEYC and others

stress (Hirsh-Pasek, Golinkoff, Berk, & Singer, 2008, p. 2; Snow, n.d., p. 1). Fromberg and Bergen add that “possibly the overriding attribute that is so gratifying and addictive about play is that it is intrinsically motivated, satisfying, and empowering” (2006, p. XVIII), which are all qualities integral to early learning.

Vygotsky theorizes that play develops when a child has needs that cannot be gratified instantly (1978, p. 1) such as wanting to cook dinner, drive a car, or build things. Preschool children do not wait for things in the future; rather they seek instant gratification, and they satisfy that need through play and imagination. Vygotsky is clear that children do not act on every need through play, nor are they fully aware of their motivation—but through play they achieve satisfaction (1978, p. 1). Children gratifying these needs through play “consolidate their understandings of their world and facilitate their development of the representational abilities they will use to think through ideas as an adult” (Whitebread, 2012, p. 16). Along with being a satisfying form of recreation, play is both nurturing of abstract thought and profoundly motivating for a child.

Vygotsky’s theories have been vindicated by specialists who tend to agree that play provides the best learning experiences in early education (Plowman & McPake, 2013, p. 4). Unfortunately, “it is difficult to establish a direct relationship in terms of specific learning outcomes” (2013, p. 4). The Canadian Council of Ministers of Education claims that “play-based learning leads to greater social, emotional, and academic success” through “neural pathways in children’s brains [that] are influenced and advanced in their development through exploration, thinking skills, problem solving, and language expression that occur during play” (2012, p. 1).

### **Section 3: Are Information and Communication Technologies Effective for Early Learners?**

ICTs is the catchall acronym for computers, tablets, interactive whiteboards, and other multimedia devices. The use of ICTs in learning remains a contentious topic in early learning because “convincing evidence of improved learning outcomes remains surprisingly elusive” (Livingstone, 2012, p. 9). Many contend that ICT use is merely supplemental, and its potential is limited by the competency of the instructor (Howard, Miles, & Rees-Davies, 2012; Kennewell, 2008; Livingstone, 2012). Kennewell found that there was “no significant difference” (2008, p. 2) in attainment between a class using ICTs and a more traditional learning environment. Additionally, there was a correlation between dialogic interactivity and attainment, “in some cases, significantly so” (Kennewell, 2008, p. 2), which points to the peripheral place of ICT use in education. However, in a second phase of the study, teachers using ICTs for a second round showed improvement, most likely due to increased familiarity with the technology (p. 2). This is consistent with other reviews of educational ICT use (Aubrey & Dahl, 2008; Higgins, 2003; Livingstone, 2012; Plowman & McPake, 2013).

Despite the “inconsistent findings on the impact of advanced technologies in human life, no doubt is posed on the imperative for the effective use of digital technologies in education” (Heo & Kang, 2009, p. 191). Jones argues that the ubiquity of ICTs both at home and in school has made their use a competency in its own right (2003, p. 3). With moves to push the learning of competencies down to even the preschool years, it makes sense to incorporate ICT use in early years education (Almon & Miller, 2011, p. 1).

Opponents of ICT use in early years education describe a host of negatives including the development of antisocial behavior, exposure to unsuitable content, and the displacement of other activities and play (Shah & Godiya, 2009, p. 2). The American Association of Pediatrics (2011) has echoed these concerns. In the case of very young children, the use of ICTs may not provide any benefit and could be detrimental. The AAP recommends that “screen time” for children two and under should be avoided (2011, p. 1). The AAP cites both developmental and health implications in a restatement of their 1999 policy (p. 1). For children over two, they recognize that “certain high-quality programs have educational benefits” (p. 3) but reject that children less than two years old can gain anything from screened media (p. 3).

Along with the AAP’s concerns for health and cognitive development, research indicates that children are unable to conceptualize screened media. For example, in a study of children up to five years old, an image of a bowl of popcorn was placed on the screen and children were asked if the popcorn would spill if the screen were turned upside down. Children three and under consistently answered that it would spill while four-year-olds recognized the difference between physical objects and objects on a screen (Kirkorian, Wartella, & Anderson, 2008, pp. 4–5). Between the abundance of evidence concerning the negative health effects of screened media and very young children’s inability to even understand it, there should be no debate on the use of ICTs among this demographic. Considering the AAP’s warning and the evidence that points to a lack of understanding of screened media in children less than two years old, there is little support for ICT use, educational or otherwise, within this demographic.

Beyond the age of three, when children can distinguish between screens and physical objects, it would be remiss to not include some aspect of their use in early education, considering the rising rates of ICT use at home and in schools (Jones, 2003). Doing so smartly is the key to doing so successfully. While there is significant evidence for growing effectiveness of ICT use, the arguments against expanding the role of ICTs are not without merit. Jones (2003) suggests further integration of ICTs within early education while remaining vigilant with regards to the developmental appropriateness of content and taking care not to displace other activities; “when appropriate guidelines are followed, there is an abundance of computer-based learning activities and experiences, in almost every curriculum key learning area, available to classroom teachers” (Jones, 2003, p. 6). It is Jones’s opinion that the educational opportunities available through ICT use span the entire curriculum, and with proper guidelines, their use in classrooms can greatly improve educational outcomes (Jones, 2003).

#### **Section 4: Are Play-Based Technology Platforms a Good Idea for Early Learners?**

One of the main dilemmas with play-based learning is that teacher involvement during play causes children to perceive the activity as work (Howard, Miles, & Rees-Davies, 2012, p. 13). This may be a hindrance to play-based learning through technology because students often require assistance (p. 186). Research conducted by Howard (2010) and Garrick, et al. (2010) without ICTs found that teacher involvement in an activity signaled to students that the activity was not play. However, Howard, Miles, & Rees-Davies (2012) later found that teacher involvement during ICT use in a play-based curriculum did not affect the children’s perceptions of the activity as work rather than play. (McMannis & Gunnewig, 2012). Moreover, Howard, Miles, & Rees-Davies found that the “moderate to high levels of engagement found across most types of computer use suggest it is a suitably motivating activity for children in early-years

classrooms” (2012, p. 10). ICT use in a play-based curriculum may mitigate the problem of teacher involvement and pave the way for a curriculum in which children learn through play and teachers are free to guide.

Assessing the effectiveness of any teaching strategy is difficult for the many factors that are at play (Heo & Kang, 2009, p. 190). Notwithstanding the inconsistent evidence in regarding ICT use within classrooms, Heo and Kang urge that their integration within education is “imperative” by virtue of their ubiquity in the modern world (2009, p. 191). If ICTs truly are a necessary development for education, then the focus becomes *how can we make ICT use as effective as possible?* The considerations of *platform* and *content* are paramount to properly integrating ICTs into early education—*platform* because children have special physical and cognitive needs and the platform has to be “fun” for its use to be considered play (Howard, Miles, & Rees-Davies, 2012), and *content* so that learning can be developmentally appropriate, focused, and effective.

It is important to consider the choice of platform when judging the effectiveness of play-based learning with ICTs, not only for the students but also the instructors. Howard, Miles, and Rees-Davies found that a main of concern of teachers is that many platforms available, such as desktop computers, are not suited for children (2012, p. 5). Specifically, they found that the use of a mouse and keyboard is problematic, as is the size of a desktop computer (2012, p. 5). Additionally, teachers who are unfamiliar or uncomfortable with the platform perform worse than those who report to be comfortable (Howard, Miles, & Rees-Davies, 2012; Kennewell, 2008). This trend points to a need for professional development. Teachers in the Howard, Miles, and Rees-Davies study reported an adequate support staff (2012, p. 12); unfortunately, this is often not the case.

Along with teachers, children must also be comfortable with the platform. A potential avenue for addressing this problem would be using devices children are already familiar with. Chiong and Shuler describe pass-back effect, where parents let their child use their device such as smart phones, tablets, and other similar devices. In a study commissioned by Sesame Workshop and the Cooney Center, 114 children aged four to seven were surveyed on their use of mobile devices and how much they enjoyed using them. According to the results, children prefer the Nintendo Wii and DS above all else, followed by the iPhone. Making up the bottom were Blackberries, non-smart cell phones, and television. Notably absent are the multitudes of other smart devices such as Android platforms and Windows phones. It may be safe to assume that children would rate these devices similarly to iPhones; however, that data is not available. In addition to kids describing mobile devices as “fun,” they reported few problems in using them. Common problems were swiping, tapping icons, powering on the device, and exiting apps, but children were not discouraged and easily learned how to do these things (Chiong & Shuler, 2010, pp. 17–20).

From these rankings it appears that children value interactivity and playfulness in their platforms. Television is the least interactive of the eight platforms surveyed and accordingly appears in the bottom half. Similarly, non-smart cell phones and Blackberries have less interactivity than touchscreen devices or a platform like the Wii, which makes use of complex motions and controls to manipulate its games (Chiong & Shuler, 2010, pp. 17–20).

While children prefer the Nintendo DS and Wii to other platforms, app marketplaces available on mobile platforms have revolutionized the way software is procured (Levine & Ree,

2012). With the vast selection and ability to instantly publish updates, users are able to obtain materials far faster than ever before. Kommers (2000) believes that this flexibility and speed distinguishes ICTs from more conventional teaching implements. In a study of Apple's education section of their marketplace, it was found that 60 percent of the top 25 and 58 percent of the overall educational apps were targeted at toddlers and preschoolers, showing a "strong demand for educational apps for children" (Levine & Ree, 2012, p. 16).

In addition to platform, the NAEYC suggests that content needs to be "developmentally appropriate for children...and integrated into the classroom and curriculum" (McMannis & Gunnewig, 2012, p. 1). Children must also perceive the app and its contents as playful and fun. Along with the usability study on technology platforms, Sesame Workshop and The Cooney Center also commissioned a study to evaluate two PBS Kids apps.

Rockman, et al. (a private evaluation firm) was commissioned to study the efficacy of *Martha Speaks: Dog Party* and *Super Why*. The former is an app featuring the talking dog Martha, of the *Martha Speaks* television series, that guides children aged three to seven through four games designed to improve vocabulary. The latter also features characters from its namesake's television series and is intended to teach literacy skills to children aged three to six.

The study was conducted with 90 children aged three to seven, from Title I schools in Washington, DC, and Bloomington, Indiana, approximately half female and 64 percent white. The participants were given an iPod Touch and allowed to play with their game for two weeks. At the conclusion, they were evaluated on what they had learned. For *Martha Speaks*, the vocabulary app, five-, six-, and seven-year-olds all saw a 21 percent or greater increase in average test scores over a control, while three- and four-year-olds achieved 10 and 14 percent increases, respectively. For *Super Why*, the literacy app, three-year-olds saw an increase of 17 percent but four-, five-, and six-year-olds saw only 9, 8, and 9 percent increases, respectively. Seven-year-olds saw a decrease of 3 percent. These numbers, especially the decrease seen with the *Super Why* app, highlight the importance of developmentally appropriate content. What was successful for three-year-olds may be detrimental to seven-year-olds, and this is no different from traditional curriculum (Chiong & Shuler, 2010, pp. 17–23).

## **Section 5: Have These Platforms Shown an Improvement in Competency-Based Testing Over Traditional Methods?**

Despite the political debate surrounding the effects of No Child Left Behind (NCLB) and Race To The Top (RTTT), the standardized testing requirements imposed as a result are here to stay for the time being (Chaddock, 2010). Teachers, feeling the pressure for their students to perform well on these tests, have been cutting play, art, and gym time out of their curriculums as a result (Russo, 2012, p. 3). Play-based learning advocates argue that these conditions are not in contention with direct-teaching environments but have their "greatest impact...situated within a theory-grounded, carefully planned, and assessment-based classroom" (Trawick-Smith, 2009, p. 11). Unfortunately, while there is an abundance of research conducted on ICT use and play-based learning separately, little research has been carried out on the impact of play-based technology in competency-based education. In light of this dearth of research, the evidence in favor of both ICT use and play-based curricula in early learners at least deserves further inquiry.

ICT use has been shown to increase motivation and engagement while preparing students for more intensive ICT use in upcoming levels. ICT use is also unique in a teacher's ability to participate and direct without signaling to students that the activity is not play (Howard, Miles, & Rees-Davies, 2012). Regarding play-based learning, research demonstrates that classrooms described as play-based have outperformed their teacher-directed counterparts in elementary and middle schools (Trawick-Smith, 2009, pp. 2–3).

Play-based educational apps like *Martha Speaks* and *Super Why* show a short-term increase in attainment when compared to a control, but specialists remain skeptical:

Some of the products available for young children use the concept of interactivity to claim they can accelerate progress in learning to read, write and use numbers. The learning toys are marketed at parents who want to get children ready for school but they are often based on mundane educational tasks disguised as entertainment. The so-called interactivity may well provide some initial motivation for learning but it rarely continues beyond the first few encounters and may even get in the way of educational potential.

(Plowman & McPake, 2013, p. 4)

Adding to the skepticism surrounding play-based learning as pedagogy, Wood points out that “while there is substantial evidence on learning through play, there has been less evidence on teaching through play” (2008, p. 1). However, Wood (2008) goes on to indicate that the use of technologies presents new opportunities for teaching through play.

Almon and Miller characterize direct instruction of early learners with the intent to meet competency-based testing requirements as “inappropriate” (2011, p. 1). Dr. Trawick-Smith argues that “removing play from preschool will actually undermine the intended outcomes of achievement-oriented programs” (2009, p. 1). Hirsh-Pasek, et al. point out that “learning and play are not incompatible; learning takes place best when children are engaged and enjoying themselves” (2008, p. 2). The use of a play-based technology platform, though yet unproven, shows promise to satisfy both the need for students to meet mandated standards and the call to reintroduce play in early education curricula.

## Section 6: Recommendations for Action

The task of implementing play-based technology use in early classrooms in the United States is tall considering the current trends in early education. To effectively carry out a plan that is both beneficial for students and convinces districts that it is worthwhile, proponents must develop plans for professional development, use platforms that are suitable for small children, and work closely with developers to produce appropriate content.

Professional development is needed to acquaint teachers with platforms (Almon & Miller, 2011). Using popular products can speed up the process. Both Kennewell (2008, p. 2) and Howard (2012, p. 12) found that more experience using ICTs in the classroom correlated with better results. For a district to implement a play-based ICT component to their early childhood classrooms, it would have to be accompanied by the appropriate training.

Early learners have unique needs due to their small size and developing reading skills (Howard, Miles, & Rees-Davies, 2012). Howard, Miles, and Rees-Davies (2012) found that

teachers were concerned with the size of desktop computers. Conversely, Chiong and Shuler (2012) found that children, even those as young as three years old, have the ability to work with small, touchscreen devices such as iPhones and iPod Touches with ease. Although the study participants had some issues, the issues were easily overcome and were not outside the children's cognitive or motor abilities.

Test scores in the United States have become tremendously important at all levels of the education profession since NCLB (Almon & Miller, 2011). State and local education authorities will need to work closely with developers to produce applications that are developmentally appropriate and that teach to the Common Core Standards. More broadly, working with developers to make content suitable and relevant to the current curriculum is important even in the absence of pressure for higher test scores. The relationship between the content and the way it is delivered should always strive to be additive.

## Conclusion

The future remains uncertain, but it can be safely assumed that the use of smart phones, tablets, game consoles, and all manner of ICTs are going to continue to grow. Children are going to become increasingly exposed to ICTs at home and will expect them in their schools (Jones, 2003). With well-designed apps and games, aimed at Common Core Standards, there is a great opportunity to reintroduce play into early learning and to improve schools at the same time.



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