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iPads as a Literacy Teaching Tool in Early Childhood

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Abstract

Considering the increased influence of digital technologies on daily life (Fallows, 2004) and young children's increased use of interactive technologies (Children Now, 2007), early childhood educators are beginning to think about the role of technology in their classrooms. Many preschool programs are beginning to purchase iPads, or similar tablets, for classroom use. Thus, it is important to consider how iPads, or similar tablets, can be used in a developmentally appropriate manner with young children. To this end, this article describes the use of iPads in two preschool classrooms of four and five year-old children.

Key words: iPad, Literacy, Early Childhood

Introduction

Children come to know literacy by interacting with their environment (Goodman, 1986). There is no set time or way that children learn to be literate (Teale & Sulzby, 1986). Rather, children develop their knowledge about the functions of, and purposes for, written language in multiple ways through their experiences, (Kantor, Miller, & Fernie, 1992) in their communities (Moll, Amanti, Neff, & Gonzalez, 1992) and with their families (Taylor & Dorsey-Gaines, 1988; Purcell-Gates, 1996). Children's experiences at home, in their community, and in early childhood classrooms form their knowledge about reading, writing, and other literate behaviors. These varied experiences with print, the pathways to literacy, are known as multiple literacies (Smith, 2001). The multiple literacies of children in the 21st century may be influenced by the increasing importance of digital technology (Leu, Kinzer, Coiro, & Cammack, 2004) and young children's increasing immersion in interactive media (Rideout, VanderWater, & Wartella, 2003). Consequently, Labbo (1996) argues that to describe and explain young children's literacy development completely, the definition of reading and writing must be broadened to include multimedia and computer-based print. This wider definition of literacy is necessary because as children watch their parents, teachers, and other adults read, write, and communicate, children's conceptions of what literacy is, and is for, emerge. Therefore, because digital technology is rapidly becoming an essential part of the daily life of many adults (Children Now, 2007), its use may be influencing young children's emerging ideas about literacy.

Although there has been concern regarding the use of technology with young children in early childhood classrooms (Cordes & Miller, 2000), the benefits of developmentally appropriate interactive technology have been documented as well (Couse & Chen, 2010). Specifically, purposeful use of technology can encourage the cognitive and social growth of young children (Haugland, 1992; Clements & Sarama, 2002). Thus, the conversation has generally moved from whether or not technology should be used to how it should be used (Clements & Sarama, 2003). To this end, the current case study describes how the iPad was used as an instructional tool to facilitate emergent literacy (Teale & Sulzby, 1986) in two preschool classrooms serving four and five year-olds.

Theoretical Framework

In a literate society, children have many experiences with written language prior to their entrance in school (Teale, 1986). Therefore, considerable literacy learning takes place within the first years of a child's life (Sulzby

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& Teale, 1986). Young children are strategic literacy learners who pay attention to the print world, participate in that world, and develop theories about how that world works (Gillen & Hall, 2003). As children explore their literate environment, they develop the understanding that written language makes sense, or what Goodman (1986) calls the roots of literacy. Goodman (1986) defines these roots as: (1) the development of print awareness in situational contexts- this root refers to the knowledge young children gain about the print in their environment. When children understand the print in their environment, they use the print, along with other cueing systems, to make sense of print; (2) print awareness in connected discourse- children develop awareness of print in connected discourse based on the types of written language, such as books, magazines, or letters, they encounter. Specifically, children have the ability to handle books and know that print carries a message, but often state they cannot read; (3) functions and forms of writing- young children view themselves as writers and willingly produce writing by drawing or making scribble forms, letter-like symbols, or letters; (4) the use of oral language to talk about written language- the ability to use oral language to discuss written language, for example, by discussing letters, numbers, or words , and; (5) metacognitive and metalinguistic awareness about written language- the ability to talk about how written language works.

Goodman's (1986) description of the roots of literacy as a metaphor for emergent literacy was characterized by the forms and functions of the literacies of the time, which was print-based literacy. However, in the 21st century it is possible that the roots of literacy may also include knowledge about digital forms of reading and writing. Children's awareness of print may, depending on child's exposure to text in digital environments, include knowledge about the use of the Internet and other digital tools for reading and writing. This change means children's conceptions about print may go beyond traditional print-based text. Therefore, it is important to understand the types of literacy children in the 21st century observe and use beyond traditional print-based text.

Role of Information and Communication Technologies

The influence of digital technologies and the Internet on literacy practices of the 21st century may influence the types of literacy young children observe and use to read, write, and communicate. Labbo (1996) suggests creating a more inclusive definition of literacy, including multimedia and computer-based print, to describe the literacy experiences of young children. This wider definition is important because children as young as three and four years old frequently see family members using technology, and often use interactive media for a variety of purposes themselves (Kaiser Family Foundation, 1999). Thus, observing and using technology to read, write, and communicate influence young children's emerging conceptions of what literacy is and is used for.

Additionally, the use of rapidly changing technology for reading, writing, and communicating, changes the nature of literacy (Leu & Kinzer, 2000). Therefore, new literacies, the skills, strategies, and dispositions to use and adapt to the changing information and communication technologies, are required when reading and writing on the Internet (Leu, Kinzer, Coiro, & Cammack, 2004). Thus, to be fully literate in the 21st century, children must be proficient in the new literacies of 21st century technologies (IRA, 2009). Considering the importance of new literacies in becoming fully literate and the potential impact of technology on children's emerging conceptions of literacy, exploring the integration of technology for literacy learning in preschool is a valuable exercise.

Tablets as a Teaching Tool

Meaningful integration of technology can transform literacy instruction (Hutchison & Reinking, 2011). Although iPads and other similar tablets have not been extensively studied as a literacy-teaching tool in the early childhood classroom, Dobler's (2012) work with first-graders using iPads provides anecdotal evidence that slightly older children can work together to use many different apps for differentiated literacy practice with limited teacher assistance. Similarly, fourth grade students easily navigated the iPad while reading and responding to text independently and in small groups (Hutchison, Beschorner, & Crawford-Schmidt, 2012).

Previous research supports the developmentally appropriate use of other forms of technology with young children supporting both cognitive and social learning (Haugland, 1992; Haugland, 1999; Clements, 2002; Clements & Nastasi, 1988). VanderScoter, Ellis, & Railsback (2001) explain that how the technology is used, especially with young children, is vitally important. They recommend selecting technology applications that allow children opportunities to discover, make choices and realize the impact of those choices, as well as to explore, imagine, and problem-solve. Programs should support the child's thoughts, emotions, and physical well-being (Hillman & Marshall, 2010). Historically, however, these recommendations have been difficult to follow, because older forms of technology have been ill-suited for use by young children (Plowman & Stephen, 2003). The development of newer, more interactive touchable interfaces may be more suitable for children,

because they allow for physical manipulation that encourages curiosity, creativity, self-expression, and discovery (Plowman & Stephen, 2003). The touchable interface is one feature of the iPad, and similar tablets, which makes the tool potentially suitable for young children.

However, relatively little research has been conducted to explore the viability of such tools with young children. Couse and Chen (2010) found that the stylus-interfaced technology in tablet computers could be used with young children to implement preschool curriculum, but focused on the ability of children to write using the tablet. Although this study provides valuable information pertaining to the students' ability to write, the iPad, and similar tablets, can be used in multiple ways for reading, writing, speaking, and listening.

Tablets for Emergent Literacy

Goodman (1986) described the roots of literacy as the process of making meaning through reading, writing, and communicating. Interestingly, children can use communicative processes of reading, writing, listening, and speaking, with an iPad. The features of the iPad, which can provide platforms for children's emerging understanding of literacy, allow for multiple contexts for the use of communicative processes. In fact, some applications (apps) provide opportunities for children to use multiple communicative processes simultaneously. Using iPad apps to read, write, or communicate may facilitate the emergence of the roots of literacy in digital environments, similar to those that adults frequently use, and within which children will be expected to be able to use more conventionally as they become older. The question guiding this study is: How can iPads be used in a pre-school setting to facilitate the development of the roots of literacy (Goodman, 1986) for digital text.

Methods

Description of Study

This study was conducted in two pre-school classrooms over a seven week period. Teachers were given six iPads to use as instructional tools. The classroom teachers were not familiar with the iPad, or any similar tablets, in any context so apps were selected for use by the researchers. Apps that seemed viable to help meet the teachers' learning goals for development and learning as defined by Creative Curriculum (Heroman, Dodge, Berke, & Bickart, 2010), which was used in the school, were evaluated and selected using the criteria suggested by Hillman and Marshall (2010). Accordingly, apps that allowed for problem-solving, initiated decision making, had a high level of interactivity, and that required reading, writing, listening, and/or speaking were selected. There was a large quantity of apps that could provide students with opportunities to engage with multiple literacies and provide different opportunities for students to make sense of language (Goodman, 1986), so new apps were selected and introduced to the students bi-weekly. However, the apps from previous week(s) were not removed from the iPads, so by the end of the study students had many different app options from which they could choose.

During the first and second weeks of the study, apps that allowed for writing and speaking were introduced to students. During the third and fourth weeks, apps that encouraged listening and print awareness were selected. Finally, in the fifth, sixth, and seventh weeks, additional apps that allowed students to write, speak, and listen were selected.

Although the apps were selected by the researchers, the teachers made the instructional decisions regarding the use of the apps, and ultimately used them in multiple ways for teaching literacy. Like many other classroom tools, (ie. a white board, markers, magnetic letters, etc.), the iPads could be used in different contexts for many purposeful activities. First, children could choose to use an iPad during center time. At this time, children were able to use any installed app to read, listen, or write. In addition to individual use, children frequently used the iPads in small groups for a variety of purposes. A specific example of this small group work was when the children searched the classroom for words they knew and used the Magnetic ABCs app to work together to write the words using magnet letters. An additional small group use of the iPad was story book listening. Children often listened to stories together on the iPad. Assistance from the teachers was limited during individual and small group use in order to encourage independence among the students.

The iPads were also used for one-on-one learning and for whole class instruction. Creating digital books was the most frequently observed one-on-one use of the iPads. While making class books using the Storykit app, the teachers assisted children in creating a page in a book that was compiled as each child wrote one page. These books often included photographs, audio, and writing and were ultimately shared with parents via email. The iPads were also used occasionally as whole-class teaching tools. For example, the teachers initially taught the students how to treat and care for the iPads in a whole class setting. They also often used an iPad as a whole

class teaching tool during their opening routine to check the weather on the local radar before recording it on a whole-class chart. During these uses, the teacher directed the use of the iPad.

Description of Setting

Independence Preschool (IPS) is a non-profit, private preschool located in a small suburban community in the Midwest and serves approximately 95 three, four, and five year-olds. The study was conducted in two pre-kindergarten classes, the Yellow Class and the Blue Class, which served 18 and 17 four and five year-olds respectively. All of the children in these classes will enter kindergarten upon completion of the school year, thus the primary focus of the class is kindergarten-readiness. The Yellow Class meets five mornings per week for two and a half hours and the Blue Class meets five afternoons per week for two and a half hours. However, parents of children in the Blue Class determine if they would like their child to attend four or five days per week. Thus, on Fridays the Blue Class has a smaller group of children, because the students that attend four days per week are not at school.

The Yellow and Blue Classes meet at different times in the same classroom space. The teachers have carefully constructed a room that has space for all children in both classes to hang their belongings and display their work. Although both teachers have unique teaching styles and choose to do different activities occasionally, the physical structure of the classroom provides space for similar activities. Near the front of the room, there is a large chart where each child signs-in upon entering the class. There is a rug on the floor that is used for group time as well as two large tables were the children eat snack and participate in some whole-group writing or craft projects. The classroom also includes centers that give the children an opportunity to write, paint, color, build, participate in dramatic play, and use a desktop computer. These centers, as well as other learning materials, such as play dough and puzzles, are used at arrival time and during 30-45 minutes of choice time near the end of the class meeting time.

Participants

Each class had two teachers, a lead teacher and an assistant. The lead teacher for the Yellow Class, Mrs. Miller, has six years of preschool teaching experience, but has also taught high school English previously. The lead teacher for the Blue Class, Mrs. Timmons, also has six years of preschool teaching experience, serving two of those years at IPS. Due to the nature of the class schedules, Mrs. Schultz, who had worked at IPS for seven years, was able to serve as the assistant teacher for both classes. None of the teachers had any experience using an iPad in any setting.

All the children in these classes have attended at least one year of preschool prior to their entrance in this class. Additionally, the local school district is a recipient of a grant that allows all four or five year-old children to attend preschool for free at the local elementary schools. However, the parents of the children at IPS have, for a variety of reasons, but primarily because of a rich history of quality education and reputation of the teachers, chosen to send their children to IPS even though they are required to pay monthly tuition. In keeping with this fact, the children who attend IPS are typically supported with literacy experiences by parents who are committed to quality early education.

Data Collection and Analysis

This study was conducted as a qualitative case study (Yin, 2008). Data were collected through twice weekly observations for seven weeks, children's digital work samples, semi-structured interviews of the teachers, parent emails, and an informal survey of parents. An inductive approach for qualitative data analysis (Creswell, 2007; Thomas, 2006) was used. Initially, categories were created using open coding (Maxwell, 2005). Subsequently, the data were given to a second researcher for independent parallel coding (Thomas, 2006). After the initial coding process, more specific themes were discussed and generated. The more specific codes that were generated following the initial analysis were applied to a sub-set of twenty-five percent of the data and a consistency check was subsequently performed. Finally, because the application of codes was consistent and the categories refined, the data were split between two researchers for independent coding using the finalized coding scheme. Data analysis resulted in six themes, which are described in the findings section.

Findings

The results of this study suggest that the iPad, or other similar tablets, can be used in multiple ways as an instructional tool to support the teaching of emergent literacy in an early childhood classroom. The following sections describe the six themes that emerged from our analysis of the data.

Digital environmental print

Awareness of print is developed when children interact with, organize, and analyze the meanings of the print in their situational experiences (Goodman, 1986). The design of the iPad allowed the preschoolers in the current study to develop this awareness. For example, to select an app, the user must press a square, which usually contains an image and print, on the touchscreen. This image and print serves as an entry point for a particular app, which serves a specific function (ie. a writing app, an app that will read stories, or a letter game). Thus, children became familiar with the image and print for each app, developing meaning for the on-screen representation. This was initially evident when children were able to recognize the app for the PBS Kids app independently because of their familiarity with the symbol for PBS kids. Over time they were able to identify many of the apps independently. For example, Elizabeth (all names are pseudonyms) was listening to Cinderella and two other children were interested in listening to the story on their iPads. Elizabeth recognized, and was able to select, the correct app on the other children's iPads.

Additionally, children were able to use their knowledge of situational print to move easily from one app to another. For example, Julie played Pocket Phonics for ten minutes and then decided she would like to use Magnet ABCs to write her name. She was able to leave the Pocket Phonics app and find the Magnetic ABCs app independently. Further, children developed favorite apps and visited them often. This was possible because they had acquired an understanding of the meaning for the image and print on the screen. This was evident when a child, Gary, searched diligently for a game he had played with a friend the previous day. He was purposeful as he flipped through the icons, searching for the one that he understood would take him to the game he wished to play. In addition to games, similar to the one Gary was searching for, children frequently used apps that allowed them to write in varying emergent forms.

Emergent writing using digital technology

Goodman (1986) argues that young children view themselves as writers and willingly produce writing by drawing or making scribble forms, letter-like symbols, or letters. The children in this class clearly viewed themselves as writers as they created varying forms of writing in the digital environment of the iPad. For example, children were able to write using letters or symbols and/or write drawings using several apps. The Doodle Buddy and Drawing Pad apps were both frequently used by students to write messages using letters and/or drawings formed on the screen using their finger, typed text using the keyboard, digital stickers or stamps, and photographs taken with the iPad. Children talked extensively about their writing on the iPad saying things like, "I am writing hearts on the page." and "I am writing this for my mom." Children used different writing tools (ie. a paint brush of varying thicknesses, a thin marker-like tool, or a spray paint) to write. They chose from a variety of colors, some of which had special features like glitter, and could add stamps as well as photographs. Figure 1 illustrates one child's ability to communicate a message by drawing a picture of herself. In addition, she further communicated her message by using her fingers on the touch screen to write the letters of her name. In this work sample, the child was able to select the digital writing tool, and the medium to write with- in this case, purple glitter paint.

Similarly, one app, Magnetic ABCs, allowed students to manipulate letters on the screen. Initially, children frequently used the digital magnet letters to write their names. After children had used the iPads several times, they began to use the magnet letters to write their friends' names as well as other print in their environment. The mobile nature of the iPad made this app particularly useful, because students could carry it around as they looked for words in their classroom environment to write using their digital magnets.

Figure 1. An example of writing using Doodle Buddy

Using the keyboard to form writing. Some children could form letters using their finger on the screen and others were not yet able to write letters. However, all the children were able to use the on-screen keyboard to write letters, because, even though they could not yet form the letters, they could identify the letter and touch it on the screen. For example students used the Storykit app to write digital books independently. For that activity, Wyatt used the keyboard to type the title of his book, 619, which may initially-seem arbitrary. However, it is the name of a popular wrestler. Kiley used the keyboard to type her name on the cover of her book, as well as her friend Ashley's name who her story was about. Dillon chose to write a book about hunting. He sounded the word out carefully out loud. While he was unable to hear all the sounds in the word, he was able to hear the /h/ sound at the beginning of the word and find the letter h on the keyboard. After he typed the letter h, he asked the teacher what letters came next. As the teacher spelled out the word, Dillon found each letter and typed it. On the second page of the digital book, Dillon used the keyboard to type random letters. The availability of a keyboard, for what was initially conceived as a drawing activity, prompted students to practice their spelling and pursue further knowledge of spelling and writing. Such interest would likely not have occurred with a paper-based activity of the same variety because the majority of students in the class are unable to form letters by hand.

Functions of writing. The teachers in this study often shared the children's work by emailing it to parents because sending emails containing photographs, videos, or screenshots of student work using the iPad is quick and intuitive. Because their work was often shared in this manner, children were frequently excited about writing something to or for someone else. Thus the children gained an additional understanding of the function of writing. For example, a parent indicated that while her family was sitting at the dinner table, her son, Andy, said to his dad, "Hey, Dad. Did you get the email that I sent you?" In addition, two children, Sara and Julie, asked their teacher, Mrs. Timmons, to email their writing to their mothers. Writing digitally was also purposeful for students when one teacher, Mrs. Miller, asked the children in her class to create a class book using the Storykit app. For example, after the class learned more about emotions, each child wrote a digital page of a book about emotions with some teacher assistance. To complete the book, Mrs. Miller asked each child to complete the statement, "I am…" with a feeling word, helped them type text to write the sentence, made an audio recording of the child saying the sentence, and took a photograph of the child making a face representing that emotion. Figure 2 provides an example of one of the child's pages. While most of the children chose one feeling to describe, this child chose to write about being happy and sad. Thus, her illustration shows two people, one happy and one sad. The photographs of the child, which were taken by the teacher, show the child demonstrating a happy face and a sad face. The book was then shared with parents via email and read to children in other classes by their teacher.

Figure 2. Student sample from Feelings Book

Connecting reading, writing, listening, and speaking

One of the potential benefits of the iPad was that many apps connect reading, writing, listening, and speaking naturally within one app. This was primarily evident when children used the iPad to read, or listen to, digital texts, which were readily available in the app store. Students were often engrossed in listening to stories, some of which were familiar stories they had heard before like The Three Little Pigs, Cinderella, and Jack and Jill. They frequently enjoyed listening to stories together. Although this activity is similar to a traditional listening center, several apps had additional features, which made the experience of listening on the iPad unique. For example, iTouch Books includes interactive illustrations and the ability for the user to record their own voice reading the story. This practice of recording was often exciting for students whom often giggled and smiled when they heard themselves reading, and sometimes played the recording repeatedly. By recording their retelling of the story, children were able to demonstrate their knowledge of story structure, use the oral language of a storybook, and express their understanding of concepts about digital print. In addition, the Toy Story Digital Storybook app highlights the text as it is read and allows the reader to turn pages at their own pace backward and forward through the story. This is in direct contrast with a traditional listening center using a cassette or CD, which directs the listener when to turn the page by providing a signal and often does not have the capability to easily replay a page. Children were able to utilize these digital features and navigate through the books independently.

Some digital book apps, such as I Like Books, have additional features, which further enhance the connections between reading, writing, listening, and speaking. For example, in addition to being able to listen to and record the digital story, the child can also change the text and photographs in each book. Therefore, children can create their own stories using familiar words and images, record themselves reading the text, and listen to their book. Likewise, Storykit, an app described previously, allows users to create digital stories by writing pages using typed words, drawing pictures, inserting photographs, and recording audio. Thus, the children were able to create meaningful connections between the words they printed, the images they used, and the story the words and images represented by recording the story they had written. As children were working on their digital books, and utilizing other apps, there were frequent opportunities to work with one another.

Social learning

The classroom was often buzzing with low chatter amongst the children, including those working with iPads, during choice or center time. In fact, both teachers suggested that the communication between children when utilizing the iPad was the biggest difference they noticed in their classroom during the present study. Mrs. Timmons noted that, even when working individually with an iPad, children would still engage in meaningful conversations with the children around them, often asking one another, “What are you doing?”. However, the teachers often had the students work together in pairs or small groups. Mrs. Miller commented that even when it was not their turn to manipulate the screen, the children wanted to see what was happening and offered suggestions and ideas. She stated, “I really saw this kind of increased maturity of the students in taking turns

and being involved without it officially being their turn" and called her students "a more peaceful community of learners."

Children were also able to solve problems together. Mrs. Miller noted that, "I'd see a kid teaching other kids." For example, when Kiley was writing her digital book using Storykit she wanted to make her cover a solid color. Kiley noticed that Ashley had made her cover solid pink, so Kiley asked Ashley how to change the cover. Similarly, Mrs. Miller witnessed that children would often want to watch how their peers were using the tool and offer suggestions and ideas, even if they were not the one using the iPad. For example, Sienna saw Brady using an app that looked interesting and wanted to try. Sienna asked, "Which app is that? Can you help me find it?" Similarly, children would often say, "I want to do what you are doing," to one another. Thus, children frequently worked together and spoke with one another for a variety of purposes, including inquiries regarding how to solve a problem or to provide ideas.

Conclusion

Preschool teachers have traditionally given children experiences, pathways to print, with traditional print-based texts and tools to prepare children for more formal reading and writing instruction in subsequent years of schooling. However, as digital technology becomes more important, the conceptions of literacy and instruction students will receive may be changing to include the integration of technology. The iPad, in particular, is one tool that young children can navigate and use independently. This case study indicates that children can develop emerging knowledge about print in digital contexts using an iPad, or a similar tablet, and that it offers unique ways to employ reading, writing, listening, and speaking within one context. Specifically, children use environmental print to navigate within and between apps, and can use the iPad to read, write, and talk about print. In addition, using the iPad frequently becomes a social activity for young children as they often talk and work together while using the tool. It is possible that the mobility of the iPad contributes to the socialization that takes place, because children can see the screens of other children easily and can manipulate the touchscreen in groups. In light of these possibilities, the iPad could be a promising instructional tool for early childhood educators.

Although this study is helpful in illuminating the possibilities of the iPad as an instructional tool for early childhood teaching, it has limitations. The participants in the study were a homogeneous group of middle-class children. Thus, it would be beneficial to conduct a similar case study in a setting with a more diverse group of children. In addition, the teachers in this study were willing, and even excited, to integrate the iPad into their instruction. Many teachers, particularly early childhood teachers, may not be as willing, or feel as able (Wood, Specht, Willoughby, & Mueller, 2008), to integrate technology into their teaching.

However, in light of Labbo's (1996) call for a wider definition of literacy to include multimedia and computer based print to describe young children's emerging conceptions of print, this study is useful, because it provides some context for how children may use technology to form ideas about literacy in early childhood classrooms. Although the present study suggests that iPads and similar tablets can be used as an instructional tool to support children's emerging understandings of literacy, future research may focus on technology integration with a more diverse group of children, with more reluctant teachers, or more specific uses of tablets, or other forms of technology, for literacy learning.

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