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iDocument: How Smartphones and Tablets are Changing Documentation in Preschool and Primary Classrooms

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iDocument

How Smartphones and Tablets Are Changing Documentation in Preschool and Primary Classrooms

Will Parnell
and Jackie Bartlett

Zoe builds a tower in the block area, taking care to leave a hole at the top. Her teacher pulls a smartphone from her pocket and snaps a picture. "What are you building, Zoe?" she asks. "Rapunzel's tower," Zoe replies. The children have been studying the story of Rapunzel for the last two weeks.

"This is Rapunzel," says Aster, showing the teacher a cutout drawing of a person. A piece of ribbon is taped to the head. "I see that she has very long hair," the teacher says, snapping another picture. "Will Rapunzel's hair reach the ground from the window of the tower?" The children see that the hair is too short to reach the bottom of Zoe's tower, and they gather materials from the cut-and-color table to fix it.

By sliding her thumb across the screen of the smartphone, the teacher is ready to record video as the preschoolers explore measurement and spatial relationships while building their fine motor skills. Two minutes later, she presses an arrow icon and uploads the video to her classroom's password-protected video-sharing account. After school, she creates a blog entry about the latest math exploration to emerge from the Rapunzel study and adds photos to the text. The teacher does all of this in a few minutes, using a blog-writing application on her smartphone. This Reggio-inspired early childhood teacher has her finger on the pulse of the latest technology for "making learning visible" (Project Zero & Reggio Children 2001)—that is, documenting young children's learning to better understand and shape it (Rinaldi 2006).

At home, parents ask their children about their day at school while viewing the classroom blog. Because of the blog documentation, parents can ask specific questions about the activities. The questions give the children an opportunity to share their learning and to think deeply about their experiences. For example, after Zoe's dad reviews the video of the children remaking Rapunzel's hair, he asks her questions

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Photos courtesy of the authors.

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such as, "How did you know when Rapunzel's hair was long enough to reach the ground?"

With the increased prevalence of smartphones, laptops, tablet computers, and other digital technologies, knowledge about and familiarity with the educational uses for these devices is important for early childhood teachers documenting children's learning. A single device can manage many functions that previously required a number of steps for inclusion on a website or blog. As teachers' technology skills increase, organizing and reproducing facets of children's learning experiences becomes easy.

Teachers can use smartphones every day to take photos, record video and audio, and make notes, then integrate them into daily blogs and online portfolios that parents can access. They can do all of this as the events of the day unfold, saving valuable planning time and giving families a window into their children's learning at school. As an integral part of teaching, this digital documentation process—gathering and reproducing trails and traces of children's learning experiences—is a topic worthy of study. Technology can be a powerful tool for strengthening children's home-school connection (NAEYC & Fred Rogers Center 2012).

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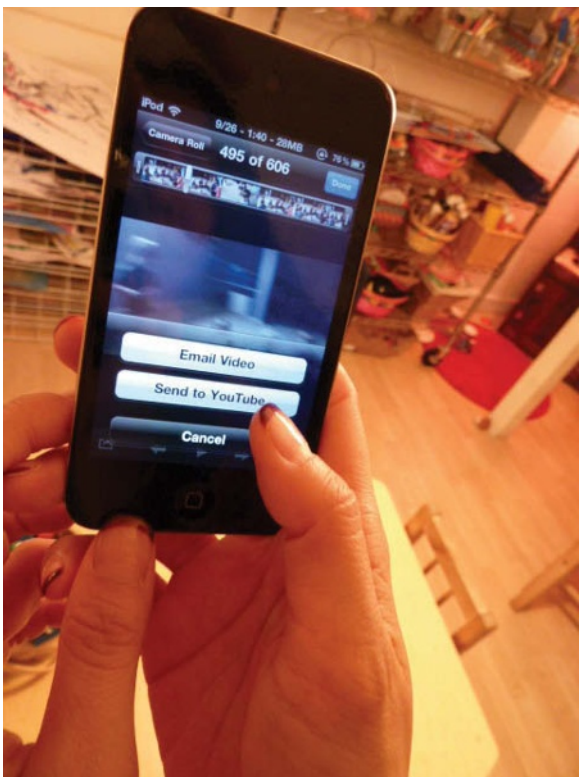
We two authors, Jackie Bartlett and Will Parnell, teacher researchers at a Portland, Oregon, preschool and primary school respectively, joined together to investigate the question of what digital and technological documentation processes look like in teachers' everyday practices. We hope our collaboration sheds light on the value of technology in documenting children's learning.

Why documentation matters

Documentation has many important defining characteristics. It is the process of observing and recording children's development and learning. As part of the process, teachers ask questions, collect data on the children (work artifacts, quotations, photos, audio recordings, and such), interpret the data, and develop an ongoing dialogue about the process with colleagues, parents, and the children themselves. This helps everyone understand the children's development and learning and how to promote it.

Interpreting children's learning

Although documentation is a record of the events that occur in children's school experiences, making learning visible is not objective. Rinaldi (2006) illustrates this point in her description of the act of photographing a child. She suggests that when we take a photograph of a child, we construct, rather than capture, reality: we do not photograph the child, we photograph our idea of the child. Documentation, therefore, is not a standardized measurement of a child's achievement; it is the teacher's subjective and participatory assessment—her interpretation—of the child or group of children's work and thinking.



When we have a record of a child's learning, we have a tool for interpretation as well as a tool for reporting and understanding learning—sometimes in surprising and new ways. Malaguzzi identifies interpretation as a critical part of the documentation process (1998). He acknowledges the power that interpretation has in shaping curriculum and understanding the nature of learning: "To find clarity and dispel the fog [in the recorded texts of children] yields a great deal of information about the thoughts of children. Through careful interpretation, one learns that children continually attempt to draw connections among things and thereby grow and learn" (95). Malaguzzi's clarity concept lends itself to images of children as strong, competent, and capable learners that challenge assumptions about what children can achieve: "Those who have the image of the child as fragile, incomplete, weak, made of glass, gain something from this belief only for themselves. We don't need that as an image of children" (Malaguzzi 1994). By believing that children are competent, teachers promote their competence. Through documentation, teachers glean information that helps direct learning and bridge the gap between what children have learned and what they learn next.

Digital Documentation Tips

- Record the process (rather than product) of learning.
- Include the children's words.
- Add your own reflections.
- Document with children present and engaged with you in the documentation process.
- Ask the children about their process either while recording or when they're viewing the documentation later.
- Use questions that start with *what* or *how* (What were you thinking about when you chose to paint the flowers yellow? How did you make all the pieces fit in the box?).
- Have someone who can edit, get you to think more, and challenge you in positive ways review your documentation before you post it.
- Ask yourself what is most important—for example, the children's words, photographs of the children, or an artifact of the project. As you edit the presentation, check to see that what you value most is clearly visible, without distractions such as too many fonts, other visuals dominating and overlapping, or too many words. Consider leaving white space around the item.
- Keep the focus of the display on the children's ideas and work. For instance, use solid, muted colors; avoid borders; and use neutral colors for backgrounds. Children are natural designers; their work will provide the color and visual interest in the display.

Shaping children's self-perceptions

Documenting children's learning affects their self-images in positive ways. By committing time and energy to documenting a child's work, teachers affirm that the child is a valued member of the learning community. Rinaldi (2006) states that the child exists when others recognize that what he says is important. Documentation is an expression of this recognition. Scheinfeld, Haigh, and Scheinfeld find that there is a substantial, affective benefit of careful listening and documentation: "The children experience that their expressions of interests, motives, emotions, ideas, and capabilities are noted and embraced by the teacher and are causes of the teacher's responses to them. Thus, the children experience themselves as fully existing, valid, worthwhile, and cherished in the mind and heart of the teacher" (2008, 17).

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Further, by presenting the children's work and documentation to the children as part of the learning process, teachers develop a metacognitive understanding—a framework for learning about how and why learning occurs—in order to deepen the meaning of what is studied. If teachers and children understand the how and why, then they can reflect back on the learning as well as think forward, awakening more questions. Scheinfeld, Haigh, and Scheinfeld echo this idea: "Once the teachers started to listen, observe, reflect, and respond, the children's responses became focused and energized" (2008, 29). Early childhood education professionals can listen, observe, reflect, and respond while using mobile devices to enhance and streamline the documentation process.

Why technology matters

Technological documentation is a powerful tool for teachers as they plan and reflect in the moment on the curriculum. Gathering the digital records—photos, quotes, scanned work samples, commentary, and so forth—in a repository such as a password-protected blog or electronic journal helps teachers, families (including extended family and friends), and children make sense of and build on their own learning.

Classroom stories of teachers and technology

The following stories from our teacher research demonstrate the power of using technology in everyday classroom practices. We show how collaboration and group reflection help teachers make sense of technologically captured learning. We tell these stories in the first person to preserve their authenticity and keep our voices alive and coherent.

Reflections in the mirror (Jackie's story)

In a three-month study, I implemented new processes for documenting learning in my classroom of 3- to 5-year-olds. I introduced handheld video cameras and digital audio recorders to my two co-teachers, who began using the tools in their formal observations of the children. We reviewed the recordings in staff meetings to find patterns in the children's words and work—that is, recurring themes in class discussions. We took our discoveries back to the children to see how they responded to our ideas about their thinking.

While the children met in small groups, we also read back their words to them, played the videos, and showed them photographs. We asked the children to reflect on their learning experiences and activities as they looked through work artifacts, watched the videos, or listened to the recordings or transcriptions of their conversations. By the end of the study, we noticed changes in the way the children viewed their work and school.

At the beginning of the study, I asked the children what they learn at school. Their answers varied from "I don't know" to short lists of school activities. By the end of the study, the children's answers reflected their thinking about the process of learning: they gave reasons for why learning is necessary. Children identified examples of cognitive, social-emotional, and motor learning.

When I first asked Alice what she learns in school, Alice named sharing. At the end of the study, Alice gave not only

Important General Tips

- Obtain written permission from the family before posting photos of their child on a website or in a blog.
- Be sure to include all children in videos and photos. Children will feel valued and families will know that their children are an important part of the learning community.

a specific example of her learning, but also a theory for how she learned it:

> **Alice:** I can do different things. I didn't climb on [the bars] at the park and a whole year went by when I didn't even try. I tried again, and I can do it. I didn't even practice, and then the next year I just tried again, and I could do it.
>
> **Jackie:** How did that happen?
>
> **Alice:** I think I just already knew how and then forgot.

Another child identified a social rule as something that she learned in school, and she explained why the rule exists: "[I learn] how to be nice and do things so the other people can treat you that way."

Bringing documentation of their words and learning back to the children seemed to add significance to them. As if looking in a mirror, the children watched themselves in the process of learning and saw themselves as powerful. What came through to the children as they watched the videos was my belief that their work is important. Because I value their work, the children themselves value their work.

Cat faces: Using a smartphone to learn more about children (Will's story)

In my role as a teacher researcher, I studied teachers' uses of technology in documentation with K–3 children at A Renaissance School of Arts and Sciences, where I am a board member. The school uses design technology (Dunn & Larson 1990) to engage children in active learning. In design technology, teachers and children collaborate to engineer and document projects that address a particular problem. The projects draw on children's creative, mathematical, scientific, engineering, technological, and/or expressive skills, knowledge, and ingenuity. Our problem centered on a small armature for a catlike creature. The armature, or basic structure, was made of rolled paper. It was covered in papier-mâché and wrapped in faux fur. The cat needed a face: eyes, nose, mouth, and whiskers.

I observed the children as they worked on pen-and-ink drawings to design a face for the creature. Using my smartphone, I snapped photographs of the children's drawings and sent them by e-mail to their teacher to talk about with the children. The teacher and I wanted to find out what the children were learning about cats as they drew the faces, and how they were researching the eyes, nose, mouth, and so forth, to draw. Meeting with children in small groups, the teacher talked with them about the photos and the questions. One child, age 6, said, "I saw that the creature needed a face, so I wanted to make sure it had whiskers. It seemed so lonely looking down at us without a face."

Using a smartphone, the children began a small research project on the facial features of cats. A 7-year-old shared his experience of searching the Internet and seeing how lions and domestic cats were similar and different: "Cats' pupils become vertical slits to filter light, while lions' don't; they are round, like ours." We (children and teachers together) put up our digital images on the school's blog and wrote down the children's stories on a tablet. We saved the digital stories as PDFs for easy uploading and future access.

Mobile Technology Tips

- Keep your device with you and be ready to document.
- Upload media directly to a video-sharing website (such as You Tube or Vimeo) and your classroom blog.
- Keep blogs and websites secure by requiring users to enter a password.
- Keep notes in the notebook function or use an application like Evernote for mobile devices.
- Organize photos using web albums or photo-organizing software.
- If you have trouble operating your device, use a search engine such as Google or ask.com to search the Internet for help.

Parents commented on the project via the blog. Some parents shared how they too were learning about cats. One reported feeling closer to her child's learning through "reading and talking about the drawings on the blog" with her child.

The smartphone and tablet proved critical as research and communication tools in this design technology experience. Without my phone handy, I might not have taken the initial photos, and the learning journey might have been lost to other events. The smartphone allowed the children to research and access relevant project data. We wonder if the children would have uncovered the richness in the data without having the Internet at their fingertips. Most important, the school blog allowed for family, teacher, and child interactions, permitting closeness to develop around the learning.

Limitations of handheld technology

Among the limitations we experienced in this teacher research project are negative attitudes toward mobile devices in the classroom, the time commitment for learning about the various technologies, staying present while using a technology tool, and keeping children focused on the learning and not on the technology to the exclusion of the learning.

In some settings, teachers are not allowed to use smartphones in their classrooms. This view of mobile devices may change as administrators see the potential uses for these devices beyond personal communication, and how they benefit the whole learning community. For these teachers, we recommend using touchscreen MP3 players, which have many of the same features as smartphones.

As for the learning curve with new technology, we learn as we practice. We search the web to watch basic technical or how-to videos that aid in our understanding and offer tips for using a tool. Web searches for these are becoming easier, and tips are often available from multiple users, from novices to experts, and in click-to-watch video format. Then we begin to learn in real time by using the technology tool on the job. Finally, we meet up with others to discuss what we have learned about the technology and what the documentation teaches us about children's learning and our teaching.

Operating a handheld technology device at first tends to take concentration. However, the more we are "behind the lens," the more the lens becomes part of our being present in the moment. This may be a matter of learning the language of technology, just as children learn the language of clay, paint, and drawing in "the hundred languages of children" (Edwards, Gandini, & Forman 1998).

The technology is merely a tool, and we learn about it alongside the children.

The children's attitudes toward technology tools follow our attitudes. We engage the children naturally in our uses of technology in the classroom. The technology is merely a tool, and we learn about it alongside the children. The technology exists in the classroom for the sake of the learning, capturing the learning to make it visible and valued.

Another limitation of using mobile devices is the quality of the recordings. Though photography and display quality is improving, it still is not comparable to the quality of most cameras or monitors. However, in a fast-paced classroom, the devices' convenience and portability outweigh the drawbacks.

Learning about technology

As we look back at our stories, we realize that technology has influenced our ability to retell learning experiences. We can look at a photo, video, blog, or website repeatedly to recall past events and share more of the details with families, children, and colleagues. This habit of looking back with children at their shared work and learning brings joy to the learning and our everyday experiences. Being open to the trends in technology and trying out multiple ways of recounting learning have made the documentation process integral to our work in understanding children's learning and development.

Mobile devices and the documentation that they enable have the potential to change the way we assess students of all ages.

The reflections in the mirror and cat face stories show how teachers' technology skills and their ideas for using technology grow. Handheld devices help teachers maintain learning blogs and make them readily available to families and to members of the internal school community who may be involved or want to learn more about the learning process.

Further, since adding the web-accessible component, many teachers no longer need to print out large volumes of information around photos and text. They can now print a few pictures that relate to current learning and store most photos on the tablet. With the tablet's larger screen, the photos and videos are big enough to be seen by all children at once. Limitations fall away as we continue to experiment.

Conclusion

Mobile devices and the documentation that they enable have the potential to change the way we assess students of all ages, expanding current testing practices into a more open-ended, child-driven, and sophisticated method of assessing and communicating learning. However, to achieve this level of making learning visible, we need many more studies to corroborate the evidence presented here and elsewhere on the role of mobile technology in documenting children's learning.

As for our personal research, we plan to stay abreast of technological trends because, as technology makes our documentation work more efficient, we become freer to interact with young children, confident that we will have a record stored in the clouds for us to reflect on later.

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Mobile Device Applications and Their Uses

App	Website	Description
BlogPress	blogpressapp.com	Allows you to type text and add photos and video from your mobile device to blog posts.
Blogger	blogger.com	Allows you to type text and add photos from your mobile device to a blog on Blogger.
Evernote	evernote.com	Lets you organize and store files, take notes, share specific folders with families, and use folders to maintain individual electronic portfolios for the children.
Quickoffice	quickoffice.com	Is similar to Microsoft Office Suite, but for mobile devices.
SoundNote	soundnote.com	Lets you type notes while recording audio. Later, selecting a word will play back the audio from the point that you typed that word. Great for documenting circle time discussions.

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Announcing . . .

Teaching Young Children's first themed issue

The December 2012/January 2013 issue of *Teaching Young Children/Preschool* (*TYC*) will include a variety of articles on The Role of Planning in a Preschool Program. The *TYC* team selected this theme based on reader feedback. We are seeking practical articles that share real-life classroom experiences while addressing topics such as these:

- planning for individual children and the group
- addressing early learning standards through the curriculum
- leading small group activities
- using routines to support learning
- connecting the daily schedule with the curriculum and activity plans
- knowing when and how to change plans
- creating and updating learning environments
- supporting children's projects and studies

Article proposals for this themed issue are due **June 1, 2012.** Find our proposal submission form and further information on writing for *TYC* at **www.naeyc.org/publications/forauthors/writetyc**.

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Websites and online resources

Diigo Group—Blog, or follow others' postings and links to early childhood education technology articles. Join the group **ECETECH**, supported by NAEYC's Technology and Young Children Interest Forum, to archive pages, organize tagged items, and highlight sections of linked web pages or articles. You can also access information via an iPhone app (coming soon). **http://groups.diigo.com/group/ecetech**

Education Week: Digital Directions—This site contains articles on digital topics such as reading apps for children, integrating tablets into assessment, and educators weighing the cost-effectiveness of adding technology to the classroom. The site features a blog, ed-tech videos, webinars and chats, and special reports. Browse archived issues of *Education Week*. Sign up to get free newsletters via e-mail. **www.edweek.org/dd/?intc=thed**

Edutopia Elementary Tech Integration Blog—Elementary computer teacher Mary Beth Hertz writes this blog as part of the Edutopia website, offering her experiences and reflections about technology in early education. Updated approximately twice a month, recent posts discuss celebrating women and technology, educational apps in the classroom, and Internet research for elementary school children. **www.edutopia.org/blog/meaning-tech-integration-elementary-mary-beth-hertz**

Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College—In keeping with Fred Rogers' vision of using television and other media to educate young children, the center teamed up with advisors at Saint Vincent College to build "bridges between early learning and children's media." Available resources include issue briefings, an online support community, and a resource database of links to key organizations, publications, and media sources of early learning and children's media. The center also offers information on accessing the Fred Rogers archive, which includes Fred Rogers' speeches, his personal correspondence, and a digital audio and video archive from his television programs; and curriculum toolkits that provide assignments, in-class activities, syllabi, research links, and videos. **www.fredrogerscenter.org**

The center is also launching a new website, the **Fred Rogers Center Early Learning Environment**, or **Ele**, which offers free access to digital early learning resources, including an online community and library of 100+ free, high-quality e-books, mobile apps, and videos that support early learning and literacy. **www.ele.fredrogerscenter.org**

Hatch—Find links to industry research, ideas for obtaining grants, and free webinars on a variety of topics concerning different aspects of technology in early childhood education under the Research tab located at the top of the home page. **www.hatchearlychildhood.com**

NAEYC—Read about and view NAEYC's recently updated technology joint position statement with the Fred Rogers Center. Find a brief summary of key messages from the statement and selected examples of effective classroom practice involving technology and interactive media. **www.naeyc.org/content/technology-and-young-children**

NAEYC Technology and Young Children Interest Forum—This NAEYC Interest Forum website is divided into sections: Technology with Children, Technology Tools for Educators, Technology at Home, and Research. Links include online activities, Internet safety, developmentally appropriate practice guidelines, apps, and web-based tools. The forum holds online discussions and meets yearly at NAEYC's Annual Conference. **www.techandyoungchildren.org/children.html**

The forum has also begun a wiki project where members can discuss early childhood education tech issues. **http://ecetech.wikispaces.com**

Technology in Early Childhood [TEC] Center at Erikson Institute—The TEC Center seeks to promote appropriate use of technology in early childhood settings. The site offers updated news and blog posts, listings of upcoming center events, and a free webinar series, Early Childhood Investigations, taught by leaders in the field of education and technology. **www.teccenter.erikson.edu**

University of Maine Listserv—Follow and post current news about technology in early childhood education. The web archive interface is available for anyone to view. However, you must sign up and log in to post to the listserv. Subscribers can see and manage different lists. **www.lsoft.com/scripts/wl.exe?SL1=ECETECH-L&H=LISTS.Maine.edu**