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Beyond the Pencil: Expanding the Occupational Therapists' Role in Helping Young Children to Develop Writing Skills

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Beyond the Pencil: Expanding the Occupational Therapists' Role in Helping Young Children to Develop Writing Skills

Abstract

Occupational therapists (OTs) play an important role in early childhood classrooms as vital members of the educational team, particularly for young children's writing development. Children's emergent writing is a foundational literacy skill, which begins to develop well before they enter elementary school. However, early childhood classrooms are lacking in supports for early writing development. OTs are experts in guiding the development of early writing skills in young children and, therefore, should be considered as critical members of the early literacy curriculum team. This paper identifies the critical role emergent writing plays in early childhood literacy development and how to effectively assess young children's writing ability. Practical guidance is provided to identify specific ways that OTs can merge their occupation-centered approach with their expertise in writing to serve as a key resource for classroom teachers and enhance the writing development of all children. Specific strategies are included for encouraging OTs to expand their approaches to writing beyond handwriting.

Keywords

composition, early writing, literacy, occupational therapy, preschool, print concepts

Cover Page Footnote

The author/s have nothing to disclose.

Credentials Display and Country

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Occupational therapists (OTs) serve a critical function in early childhood classrooms. Historically, their role has been to support the development of functional skills for children with special needs, particularly the development of motor skills, through meaningful occupations (American Occupational Therapy Association [AOTA], 1994). Thus, OTs primarily worked one-on-one with children who have an identified disability to develop specific skills. More recently, OTs have broadened their role to include general education, taking a proactive approach to preventive services aimed at all children across a variety of settings (Cahill, 2007). This expansion is a new direction in the profession (AOTA, 2007) that places the OT as a vital member of the educational team, particularly in early childhood education, and emphasizes the importance that OTs can have in promoting the learning of all children, regardless of ability.

OTs have long worked in early childhood settings to facilitate children's writing, especially in the areas of fine motor development and handwriting. This is in line with the most common reasons for referral to occupational therapy services in schools (Chandler, 1994) and the high predictive value of early writing ability for later success in reading (National Early Literacy Panel [NELP], 2008). OTs have specialized training in task analysis, adaptations, and ecological models of practice, which emphasize the intersection among the person, environment, and the occupation (Brown, 2008). Thus, OTs are uniquely qualified to be key point people for fostering children's writing

development. But, the role of the OT within an educational setting involves more than just promoting fine motor and handwriting development. Based on an occupation-focused approach (AOTA, 2008), OTs should be involved in improving children's access to and engagement in early literacy activities as a whole (Bell & Swinth, 2005). When OTs consider writing as an important early literacy and communication skill, in addition to it being a complex fine motor task, their approaches to supporting writing are greatly expanded.

The current paper provides examples of how OTs can apply research related to early writing to augment children's writing during their first years in school, which is important as children begin to understand that writing has meaning and is a form of communication well before kindergarten entry (Ferreiro & Teberosky, 1982). OTs can be a source of much-needed information to early childhood teachers and children by expanding their traditional approach to writing support, an important role given that many early childhood teachers report having inadequate resources to support children's writing efforts (Gerde & Bingham, 2012). OTs can increase the value of their support by going beyond an approach aimed at specific performance-based skills (e.g., fine motor skills and handwriting) in order to embrace an ecological approach to writing facilitation that promotes the engagement and learning of all children more holistically. Understanding children's development of early writing is the first step in developing this holistic approach.

Early Writing Development

On their way to conventional writing, children progress through a variety of writing stages, including scribbling, drawing to represent writing, scribble writing (e.g., a series/pattern of linear loops or zig-zags), letter-like forms (i.e., shapes that resemble letters), and letters (Bear, Invernizzi, Templeton, & Johnston, 2008; Ferreiro & Teberosky, 1982; Levin, Both-de Vries, Aram, & Bus, 2005). Although children vary in the rate they progress through these stages, all children follow this general sequence, even children with special needs (Cabell, Justice, Zucker, & McGinty, 2009). Each stage reflects what children know about print and represents writing that is significant to the child. Initially, children's writing reflects drawing (scribbling, drawing, scribble writing) as a way to convey a message. Next, children use symbols (i.e., letter-like shapes, letters, numbers) to represent their ideas, but there is no connection between these symbols and sounds. Name letters are typically written first (Levin et al., 2005) and are overrepresented in early writing samples due to the child's familiarity with these symbols (Treiman, Kessler, & Bourassa, 2001). Later, children begin to incorporate their understanding of letter sounds into their writing; children often invent their spelling by representing the initial or salient sounds they hear (Bear et al., 2008). This occurs as children develop an understanding of the alphabetic principle—that letters represent sounds in words (Bear et al., 2008). At this point, most forms are letters. However, it is typical for some forms to reflect letter-like shapes as children continue to

develop precision in their motor ability and letter knowledge. Finally, children's writing includes more complete invented or phonemic spelling (i.e., child writing includes multiple sounds in words, e.g., bt for boat) and progresses to conventional spelling as they master these skills (Bear et al., 2008). Rapid growth in these skills occurs during early childhood (Diamond, Gerde, & Powell, 2008).

Early Childhood Is The Time To Intervene

Early childhood is a critical time to intervene in children's writing development because writing supports children's early literacy development in preschool and beyond (NELP, 2008). Children's writing in preschool is related to other early literacy skills, such as letter knowledge (Diamond et al., 2008), decoding (Molfese et al., 2011), and phonological awareness (Blair & Savage, 2006). Also, early writing ability is a consistent predictor of later literacy (NELP, 2008) and reading achievement (Hammill, 2004). Furthermore, children's writing skills when they begin kindergarten are related to children's spelling ability through second grade (Aram, 2005). Importantly, research has found that even young children (i.e., ages 3-4 years) benefit from specific writing intervention (Aram & Biron, 2004). Further, occupational therapy-implemented intervention focused on supporting writing within the context of meaningful literacy experiences improves not only writing but also a broad set of literacy skills (Bazyk et al., 2009). Clearly, the intervention OTs provide children in early childhood classrooms can contribute to success in writing and later literacy development.

Theoretical Frameworks for Occupational Therapy and Early Writing Development

Early writing develops within a social context (Vygotsky, 1978) as children interact with adults and their environment to use and create meaningful print. Providing a high-quality writing environment, including a variety of writing tools and materials, is essential but not adequate for supporting writing development (Diamond et al., 2008). Rather, it is critical to also engage children in adult-mediated writing experiences to support children's writing development (Aram & Biron, 2004). Young writers learn when they observe and discuss adult-modeled writing and environmental print (Vukelich, 1994). For example, therapists can write a message for children and draw attention to their writing process (e.g., how they selected the words to write; that they are moving from left to right) and the content of the text they wrote. Clearly, the environments and interactions provided to children are essential for supporting children's writing development.

There are several ecological models in occupational therapy that emphasize the importance of the environment, and how it interacts with the person and their occupations (Brown, 2008). These models place the occupation as central, with a person's occupational performance at its most optimal when the person, the environment, and the occupation intersect. Environment, whether in its physical, emotional, or social form, has a unique influence on occupational performance, and OTs must consider this when examining how people

participate in the occupations that are meaningful to them.

This model serves as a helpful guide when promoting children's participation in the occupations of writing and education. Examining factors related to the person, such as motor skills and handwriting skills, is useful but inadequate when examining the occupation of writing as a whole (Brown, 2008). It is critical to consider the affordances and barriers of the environment, as well as the occupation of writing itself, and its various domains. Therapists can do this by taking a top-down approach to evaluating and supporting writing, looking first at how children are participating in the task, and then working to identify the various influences the person, the occupation, and the environment has on occupational performance.

The Untapped Potential of Occupational Therapy in Supporting Early Writing

Educational settings are a common practice area for OTs to provide services for enhancing children's writing skills (Chandler, 1994). To be successful in writing, children need to develop a multitude of skills, including those related to the physical formation of letters (i.e., handwriting), the function of print in writing (i.e., orthography), and the meaning embedded in what they write (i.e., composition) (Kaderavek, Cabell, & Justice, 2009). Rich opportunities exist when OTs move beyond a strict focus on motor development and the mechanics of writing and use their expertise to support children in their efforts to communicate meaning through writing. In fact, early writing

pedagogy that focuses exclusively on letter formation is insufficient (DeFord, 1980); rather, quality writing therapy and instruction should be comprised of authentic writing experiences, including opportunities for children to express themselves and create meaning in text (Purcell-Gates, Duke, & Martineau, 2007). The OTs' particular expertise in writing within the context of meaningful occupation, combined with the general education teachers' expertise in integrated curricula, can be married to enhance writing opportunities throughout the classroom by creating authentic experiences in which children can compose, develop print knowledge, and form letters.

Using an intervention study, Bazyk et al. (2009) investigated this innovative approach to providing occupational therapy services within a classroom. The authors recognized the need for empirical studies to support the new direction of the profession of providing integrated services aimed at all children. Further, they emphasized the importance of supporting handwriting within the context of an emergent literacy framework, working together with the classroom teacher to support a more holistic view of writing. Bazyk et al. noted that after providing integrated occupational therapy services to all children in a kindergarten classroom, the children made significant gains not only in fine motor and visual motor skills, but also in emergent literacy skills, including letter knowledge, print concepts, and phonological awareness (Bazyk et al., 2009). This study provides empirical support for the notion that OTs can work effectively with teachers in supporting writing within an integrated,

emergent literacy perspective and that this practice enhances children's skills for writing and other early literacy skills.

Assessing Young Children's Writing Assessment with a Top-down Approach

Assessing young children's writing is a critical task for therapists because it is through assessment that they can identify a child's ability to participate in the task of writing and the occupation of education. OTs can then use this information to determine which client factors, performance skills, or contextual elements may be influencing the child's participation. Examining the child's participation in the occupation first will guide the therapist on which factors to intervene, such as motor skills or the environment, rather than vice versa. For instance, a therapist might start by asking such questions as "What sorts of writing activities does the child enjoy? What does writing look like in the context of the classroom for this child? How does the child interact with and access writing materials? What does the child want to communicate via writing? What are the supports and barriers to writing that the child is experiencing?" Asking these questions provides a contextual view of writing, and offers insight as to how other factors, such as composition, orthography, and environmental affordances, in addition to handwriting, are influencing the child's participation in writing.

Writing assessment involves understanding the continuum of typical writing development as described above and identifying where, along that continuum, the child's current writing aligns.

Assessing children's writing can provide information about children's handwriting as well as their understanding of orthography and composition (Kaderavek et al., 2009). As therapists assess children's writing, it is important to consider not only letter formation, but also what the writing tells us about the child's understanding of print knowledge and about the child's content and grammatical structure.

Assessing Formation and Handwriting

To assess letter formation, it is important to study the shapes children use to represent print. In reviewing children's writing samples, be sure to consider whether they represent print using drawing/scribbling, letter-like shapes, all letters, etc. Further, OTs can study the types of lines and curves the child is able to create. For example, OTs can assess whether the shapes the child creates are fluid and whether the child is successful with straight lines but struggling with curves. The use of non-letters may indicate a lack of motor skills or letter knowledge, because both skills are necessary for creating accurate letter formations (Gerde, Skibbe, Bowles, & Martoccio, 2012). Understanding what children know regarding letter formation is key to identifying what supports to provide for handwriting. There are a variety of developmental assessments available for therapists to examine fine motor and visual motor skills, such as the Peabody Developmental Motor Scales (PDMS-2; Folio & Fewell, 2000) and the Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI-6; Beery, Buktenica, & Beery, 2010). Therapists should use these in tandem with detailed

observation of motor skills while engaging in a variety of motor and writing tasks. OTs also have various assessments designed to examine handwriting skills and letter formation specifically, such as The Print Tool (Olsen & Knapton, 2006) and the Evaluation Tool of Children's Handwriting (Amundson, 1995).

Assessing Orthography

To assess children's understanding of orthography, it is important to consider what children's writing samples indicate about the child's understanding of print. OTs can assess whether a child's writing is horizontal and linear (e.g., in English, left to right) and whether any features reflect appropriate use of case, spacing, or punctuation. One key question to ask is whether the child represents any sounds in his or her writing. This is a prime indicator of the child's understanding of the alphabetic principle marking an important step on the way to successful decoding (Bear et al., 2008). When assessing children's writing, it is necessary to ask children to describe the letters they write. Research has shown that some children can write their name letters but not identify the letters by name or sound, whereas other children are able to identify all of the letters used in their name but not write them (Drouin & Harmon, 2009). Often, children write their name logographically, meaning they have memorized the shape of their name and they essentially "draw" their name rather than recognizing each individual letter or sound as they write, which reflects a lack of understanding of the alphabetic principle (Bear et al., 2008). One standardized assessment that targets

both letter knowledge and letter or word writing is The Phonological Awareness Literacy Screening (PALS; Invernizzi, Sullivan, & Meier, 2001), which now includes versions for pre-K, K, and grades 1-3. Also, many handwriting assessments, such as ETCH and The Print Tool, include components of orthography (e.g., whether or not children adhere to conventions of writing, such as case or punctuation).

Considering Composition

To assess composition, it is critical to compare the child's writing sample to his or her reports of what was written. Research indicates that children as young as three years old vary their writing to depict various genres (Purcell-Gates et al., 2007). This suggests that young children recognize that their print has meaning and that different types of print and text can represent meaning in different ways. Therapists can use these writings to consider what the child understands about the print features represented by each genre (e.g., story, map, list, letter).

Contextual Factors in Writing Assessment

Children's writing samples can reflect a range of writing stages depending on the task and setting. This variation can even occur on the same day. For example, a child may write his or her name correctly using all letters. However, the child might then take an order at the classroom restaurant using scribble writing and/or use a journal to label a picture of a building the child drew using letter-like shapes (e.g., Vukelich & Christie, 2009). Thus, to obtain an accurate assessment of a child's current writing ability, it is critical for therapists to gather

multiple writing samples reflecting a child's work in different classroom settings. Further, it is important that only one of the samples is name writing because name writing is often learned first (Levin et al., 2005) and is typically expressed using a more sophisticated level of writing than other samples (Puranik & Lonigan, 2011).

Meaningful writing experiences yield writing samples that can be used in lieu of a formal assessment. Therefore, OTs can collect writing samples from children's actual work rather than creating an assessment of dictated or forced writing. Importantly, assessing writing from existing writing samples saves face-time with the child for intervention rather than for assessment. For example, OTs can gather children's name writing from their classroom sign in or from their "signed" artwork and assemble other samples from the child's journal, writing center work, or writing from play experiences, such as making a grocery list in dramatic play or labeling their town in the block area. The OT can obtain samples from teacher-led activities as well (e.g., small group writing). To assess accurately what the child can do independently and with support, it is vital to note in which setting the sample was created and what type of adult support was provided.

The knowledge generated from assessing young children's writing samples can be used to prepare individualized strategies to support each child's writing. Assessment can identify both the strengths and the gaps in children's writing skills, which offers direction for where to begin writing intervention. Effective writing mediation begins by

identifying what children already know and planning experiences that support them to develop skills just beyond what they can do independently (Vygotsky, 1978). A comprehensive approach to assessing writing allows the therapist to tailor the intervention to address the specific areas of writing, whether it's handwriting and motor skills, composition, orthography, or a combination thereof, while utilizing the contextual factors that can promote writing participation.

Expanding the OT Approach to Writing:

Guidelines for Treatment

OTs engage children in a multitude of developmentally appropriate activities to promote their fine motor skills and letter formation. OTs can help general education teachers to recognize these activities as foundational for writing development and encourage all children, regardless of whether they have a disability, to engage in such experiences because they are imperative for preparing fine motor skills, which are critical for formal writing initiatives (Gerde, Skibbe et al., 2012).

Furthermore, by using a broad definition of writing, OTs can design multiple experiences for encouraging young children to write and attend to print. These opportunities can be made available in a variety of settings within the classroom, allowing OTs to facilitate learning within the context of the general education classroom, rather than removing children from their peers, thereby creating an authentic educational experience considered best practice in occupational therapy (AOTA, 2004). The following sections provide research-based practical guidance for OTs regarding ways to

support children's writing development using a holistic approach.

Accept and Encourage all Forms of Writing

Therapists should work with teachers and parents to recognize and accept all forms of writing as meaningful. These early writing forms include scribbling, drawing, scribble-writing, letter-like shapes, and letters (Bear et al., 2008; Ferreiro & Teberosky, 1982; Levin et al., 2005). Writing is an emerging skill and thus, each of these forms reflect children's typical writing development and are children's true attempts to communicate through print (Levin et al., 2005). It is critical for teachers and parents to recognize what it means when children begin to scribble or draw to communicate their message if they are to encourage these initial writing behaviors.

In order to provide appropriate intervention support for an individual child's writing efforts, it is essential for OTs to understand a child's current skill and the next step in his or her developmental sequence (Puranik & Lonigan, 2011). It is also important to recognize how to scaffold children's writing at each stage (Cabell, Tortorelli, & Gerde, 2013). For children who scribble and draw to represent meaning, OTs can engage in discussions with young children to support their understanding that print has meaning and that the marks they make on a page can be read. It is important to draw children's attention to print in books and on classroom postings while reading to children (Evans & Saint-Aubin, 2005). In fact, when adults contextualize children's experiences with print in a meaningful way, children improve in their ability to

read environmental print (Vukelich, 1994). For children with special needs, parents who are encouraged to call attention to print during book reading have children who develop more print-related skills (Justice, Skibbe, McGinty, Piasta, & Petrill, 2011). OTs can help children compare print and illustrations and guide the addition of print to children's own illustrations by showing them features in picture books and discussing how their writing is similar to or dissimilar from the book (Figure 1; Cabell et al., 2013).

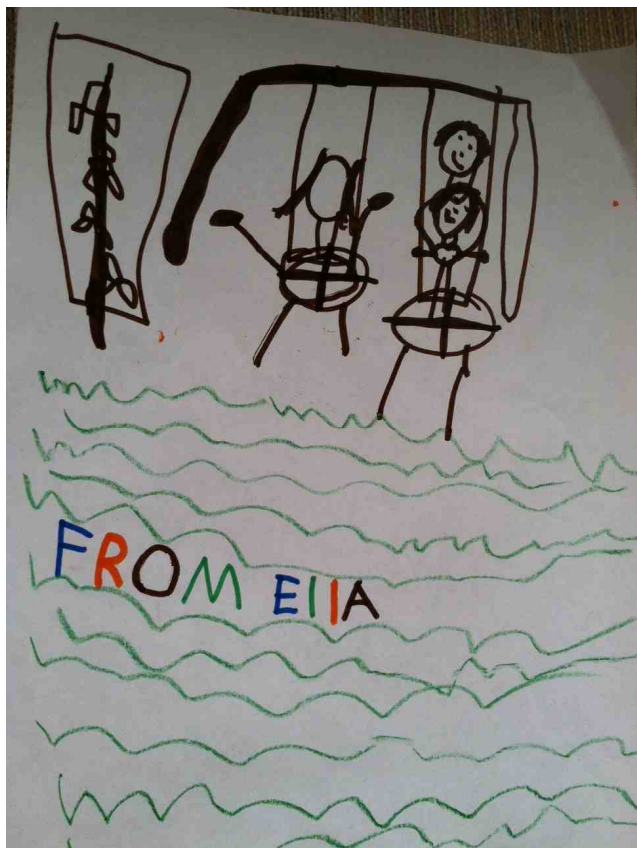


Figure 1. A child adds print in the form of scribble writing and letters to her own drawing.

Even children who write at a more advanced level need varying supports to be successful (Puranik & Lonigan, 2011). Scaffolding writing through the use of prompts, cues, modeling, and

feedback can facilitate writing (e.g., Bus & Out, 2009). For children who are writing letters, OTs can ask children to break words into syllables and then into smaller units of sound to identify initial sounds in the words they want to write and connect these sounds to their corresponding letters (Aram & Biron, 2004) without insisting on accurate spelling (Bear et al., 2008). This often results in children writing more often. Encouraging invented spelling reinforces children's understanding of the alphabetic principle—that letters represent sounds—which aids children on their way to successfully decoding words, a necessary skill for writing and reading (Bear et al., 2008). For children who already write using initial or salient letter-sound connections, encourage them to identify ending or middle sounds in words that are less pronounced; these are often vowel sounds (Cabell et al., 2013). When therapists individualize their guidance, each child can be successful in his or her own writing endeavor.

Talk About Writing

When children generate what they want to write, they often write about their interests and home experiences, creating a personally relevant context for their writing activity (Kissel, 2011). Even children who struggle with writing are more interested in writing when they can write about their favorite topics. Thus, therapists can offer children opportunities to select their writing topic by first encouraging children to verbalize what they want to write prior to writing (Bus & Out, 2009; Gerde, Bingham, & Wasik, 2012). As children share their ideas, OTs can ask questions that guide children to

expand on their thoughts (e.g., “When you arrive at the park, what will you do?”). For less verbal children, OTs can urge them to first draw about what they will write or mold their inspiration from dough. Drawing is a typical part of young children’s writing (Levin et al., 2005), thus the drawing or sculpture can become a stimulus for children’s writing or further discussion with the OT or peers (Kissel, 2009). To extend a child’s writing, OTs can encourage children to add details to their drawing or sculpture first and then urge the child to incorporate the new ideas into their writing. After children compose and write, OTs can invite children to read their own writing to help solidify the link between reading and writing (Gerde et al., 2012). Ask one or two children each day to share their writing with the class or small group. Commenting on or encouraging peers to comment on children’s writing can stimulate revision and offer new ideas for content and process, expanding children’s knowledge and skill for writing (Kissel, Hansen, Tower, & Lawrence, 2011).

As a way to clarify the process of writing for children, OTs can talk about their own writing. Children benefit from daily opportunities to see and discuss the writing process (Bus & Out, 2009; Gerde et al., 2012). OTs can model writing by composing a message for children and drawing children’s attention to the words as they write (Evans & Saint-Aubin, 2005). Further, they can create opportunities to explain not only what they are writing (e.g., “I’m writing e-g-g-s on my grocery list, see?”), but also why they are writing (e.g., “I’m writing a list so I can remember what to

buy from the grocery store”) (Gerde et al., 2012). This supports children as they consider functional reasons for writing and offers therapists and children opportunities to discuss their writing and the writing process.

Provide Varied Writing Tools to Encourage All Children to Write

OTs often promote the use of adaptive writing implements, which provide support for children with varying abilities to write and use print (Schneck & Amundson, 2009). Because writing is a very difficult task, children without identified disabilities can benefit from using these developmental tools, as well. These materials may include tactile paper, pencil grips for a more efficient grasp, adaptive pencils (e.g., triangular shaped, shortened), weighted pencils, or keyboards (Schneck & Amundson, 2009). Activities used to strengthen fine motor muscles, such as molding dough or clay; manipulating small wooden shapes to form letters; picking up small objects with tweezers; and writing letters in sand, gel, or foam, support children’s writing development, as well (Schneck & Amundson, 2009). Therapists offer a variety of tools, surfaces, and positions for writing in order to promote engagement and independence. Recent observational research of 68 preschool classrooms has found that typically only one to two children are observed writing independently during the school day (Gerde & Bingham, 2012). Housing these specialized materials in the writing center and making them available for all children may increase the number of children who participate in writing experiences in early childhood classrooms and

could boost social acceptance of adaptive materials. Ensuring that all writing materials are available in accessible, well-organized areas, labeled with both words and pictures, so that children can access these as independently as possible, is important. Further, OTs can educate families and teachers about the importance of all children, regardless of ability, having daily, meaningful interactions with writing, as this is recommended best practice for early childhood education (Gerde et al., 2012).

Expand Opportunities to Write within Meaningful Experiences

Providing varied and interesting writing materials in all areas of the classroom, or throughout the child's home, affords children the opportunity to embed meaningful writing experiences into all activities (Neuman, Roskos, Wright, & Lenhart, 2007); and writing within a functional context encourages children's writing development and letter-sound knowledge (Diamond et al., 2008). Unfortunately, this is not typical practice in many early childhood classrooms (Gerde & Bingham, 2012), which reinforces the need for OTs to inform teachers about the benefits of creating multidisciplinary opportunities to write by infusing writing opportunities throughout classroom activities and into center-based play experiences (Aram & Biron, 2004; Neuman et al., 2007). OTs can work with teachers to assure there are a variety of literacy materials available in dramatic play settings, construction/blocks, and science areas (Neuman et al., 2007). Not only do these materials provide children with writing experiences, they enhance play overall by encouraging children to use

writing in functional ways. For example, in dramatic play children might write a letter or address an envelope at the post office, create signs and price tags for their vegetable market, or take an order in the restaurant (Figure 2).

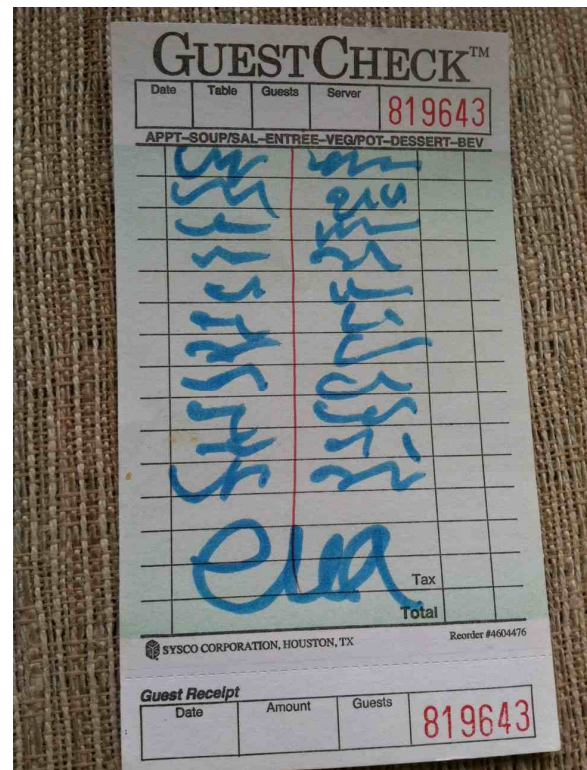


Figure 2. Taking an order in the dramatic play restaurant.

As part of a construction project, children can draw and label a blueprint as they plan their building or create a map of their block city/roads or zoo to guide visitors. To support children as they engage in extended projects, encourage them to write or use a computer to type and post an "Under Construction" sign to let peers know they have not yet finished their work. At the science area, children might record their findings about living and non-living things, graph and label the various

types of beans they sorted, or survey their friends to create a chart of who did and did not like the rainbow they saw after the storm (Figure 3).



Figure 3. Charting survey data.

Meaningful writing activities can be embedded throughout the school day, including in small groups, routines, and transitions. In the writing center or in small groups, therapists and teachers can help children create class books by providing a writing topic (e.g., “What is your favorite place to play in the classroom?”) or creating their own version of a favorite classroom storybook. In preparation for a field trip to the ice cream parlor, children can survey peers about their favorite ice cream and, as a group, graph the results of their study on large paper. Offering children daily opportunities to write in their personal

journals can be particularly rewarding for children and OTs. Not only can children write about whatever interests them, OTs can scaffold their writing at an individual level (Cabell et al., 2013). To encourage children to understand and use writing for many functions, it is important to support children as they use play contexts and journal time to create a variety of writing which represents various genres (Purcell-Gates et al., 2007). For example, children can use their journal to create a treasure map at the sand table to help a friend as they search for buried treasure. In the science area, they could record their results on a sink/float chart and summarize their data to share with their peers at group time. In the writing center, they might write a letter to a peer who is home from school due to illness. Capitalizing on the meaning that is at the heart of all writing is essential for OTs as they work to promote fluid writers who are motivated to share their thoughts through writing.

Use Technology for Writing

In a time when personal communication is likely to occur via e-mail and text message, using technology for developing children’s written communication skills is authentic. When used in a meaningful way, technology can be an invaluable resource for facilitating young children’s writing. Technology can often engage young learners when other methods fail, and it has the potential to foster development in motor, social, cognitive, and communication skills. The use of computers and other assistive technologies often translates into success for children because they allow the child to be in control; offer an engaging interface, with

multi-sensory stimuli and feedback; create opportunities for making choices; generate the potential for immediate feedback and self-correction; and circumvent motor difficulties (Longcamp, Zerbato-Poudou, & Velay, 2005). Furthermore, many children find technological media to be interesting and software offers a variety of options for children to engage in educational experiences with their favorite characters; this alone is highly motivating for many children.

When considering supports for children's writing, therapists can contemplate what technology can offer children. For students with fine motor and handwriting difficulties, OTs can utilize programs that offer picture-supported text or a picture library for building a sentence or story with pictures only. These programs offer children the ability to compose and develop print concepts by eliminating the obstacle of poor motor skills (Longcamp et al., 2005). These same students may benefit from tablet applications that allow for fine motor games and the practice of letter formation. For students who are beginning to compose, text to speech options — which speak aloud letters, words, and sentences as students type — may be beneficial. Text to speech provides immediate feedback about what the student has typed and allows opportunities for immediate self-correction. Voice recognition software, in which spoken words are converted into written words, allows children with motor difficulties to compose hands-free, breaking down the barriers to writing and communication (Longcamp et al., 2005).

When therapists first began using technology to support early writing, simply offering the option to use a keyboard or a portable word processor afforded students new opportunities for communication. Now, with rapid advancements in technology, including smartphones, tablets, and their applications (i.e., apps), OTs have an incredible array of options for individualizing their support of writing for young learners. Tablets have become extremely popular for working with young children because their size and picture navigation permits guided and independent use.

There are a variety of forums that therapists can access to learn about the use of technology in support of writing, including how specific applications and programs have been used successfully with young children. AOTA maintains an application database organized by practice area so that OTs can explore different apps that fellow practitioners use in practice (see <http://www.aota.org/Practice/Children-Youth/CY-Apps.aspx#General>). Another site, www.therapyapp411.com, provides descriptions and reviews of apps by OTs, speech and language therapists, and other special education professionals. Reading Rockets (http://www.readingrockets.org/teaching/reading101/writing/literacyapps_writing/) shares top writing apps for young writers, targeting such things as handwriting, sentence construction, and planning and drafting stories.

When considering a comprehensive view of writing as communication, we recognize that writing is multifaceted and requires the integration

of various skills, including fine motor skills, such as handwriting and forming letters, print knowledge, and idea generation or composition. Accordingly, our technology support should be tailored to meet the specific needs of the child. Some examples of applications and programs that target some of these specific areas include:

- Fine Motor Skills: *Dexterity* (www.dexterity.net) - an app designed by an OT aimed at developing young children's fine motor skills and handwriting readiness.
- Letter Formation: *Letter School* (<http://letterschool.com/>) - an interactive app aimed at teaching letter formation with a variety of animations.
- Print Knowledge: *Talking ABC* (<http://talkingabc.com/>) - introduces children to all alphabet letters and their name and sound through animated animals, and engages children in word spelling games as they advance.
- Story Composition: *Popplet* (<http://popplet.com/>) - an app that can be used to create graphic organizers to help guide story composition. Allows for combining individual "Popples" to create complex sentences and stories.

Whether using an adapted keyboard or a tablet application, it is essential to remember that technology is only a tool, and all tools are secondary to the clinical judgment of the therapist and in service of the occupational needs of the child. One benefit of utilizing smartphone, computer, or tablet technologies, is that these

technologies are no longer exceptions, but rather reflect mainstream communication. Thus, they provide children with authentic experiences in communication and are often found in children's homes.

Communicate with Families

Families are an important resource for supporting children's early literacy development. Typically, the types of strategies families use to help children write are considered low-level and occur with low frequency (Skibbe, Bindman, Hindman, Aram, & Morrison, in press). These strategies include writing for the child rather than encouraging the child to compose or write independently or saying letters for the child as they write. However, it seems children benefit from families providing access to writing experiences at home (Skibbe et al., in press). To encourage developmentally appropriate writing experiences at home, OTs can communicate with families about typical writing development, providing appropriate writing materials for children to use at home, and identifying ways to stimulate the child's interest in writing. First, they can inform parents that writing is a developmental skill that begins with scribbling and drawing to represent meaning and encourage families to celebrate the scribbles by asking children to talk about their drawing and writing (Bus & Out, 2009). OTs can make note of observed writing and drawing in the classroom and share with parents their enthusiasm for their child's writing at any level, for example, their children's use of scribble writing when they write a phone message in the dramatic play area. For children who show

little interest in writing, OTs can reassure parents that this is typical for some children and suggest that they identify ways to model writing for the child at home, perhaps while making a shopping list and to facilitate experiences for the child to include writing in his or her favorite activities (Bus & Out, 2009). For example, if the child likes to take baths, parents can offer the child tub crayons. If the child likes to feed the family pet, OTs can work together with parents to create a chart of feeding times on which the child can sign his or her name or check off the feeding time. Finally, OTs can help families have realistic expectations for their child's writing by explaining how to involve children in home writing activities. For example, OTs might initially suggest that parents encourage children to draw to express their ideas. Then, families can encourage children to identify sound-letter relationships as they write their own name and the names of family members before they move on to other meaningful words (Aram & Biron, 2004).

Just like in the classroom, it is important to encourage families to provide children with a variety of writing materials (e.g., markers, colored pencils, paper, envelopes) at home and include children in home writing opportunities, such as making grocery lists, writing task reminders, marking calendar events, and writing letters to friends and family members. Involving children in writing tasks that families already engage in is crucial, particularly for busy families. Writing tasks can be highly motivating when the materials are used in purposeful ways, such as writing invitations for the child's birthday party or writing a list of

books the child would like to check out at the library. Families can support writing and responsibility by creating task charts and encouraging children to sign or check off when they complete a task like tooth brushing, toileting, or toy pick up. Finally, writing can be one way to connect families to classrooms by encouraging families to write about themselves (e.g., weekend experiences, pets) and having children share the writing at school (Gerde et al., 2012).

Conclusions

Children's early writing development is a critical component of their later reading achievement (NELP, 2008) and should be an integrated part of all early childhood education programs (Neuman et al., 2007). Although the typical early childhood classroom generally provides material supports for children's writing (Gerde & Bingham, 2012), OTs have the opportunity to contribute to children's learning by sharing their expertise in writing development and strategies to support writing with the general education teacher, thus becoming a key member of the literacy education team. Further, it is necessary for OTs to embrace an expanded definition of writing to encompass not only handwriting, but also orthography and composition, in an effort to engage children in experiences that support each of these skills, reflecting a holistic approach to literacy education. Using the practices outlined here has the potential to promote writing development more effectively for all children attending early childhood classrooms.

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