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In the 21<sup>st</sup> century, “Digital Children” (Edyburn, 2002) are growing up in a world rich with technology, including cell phones, iPods, email, PalmPilots, Web sites, discussion boards, chat rooms, the Internet, and electronic toys and learning games (Siraj-Blatchford & Whitebread, 2003). Young children whose families use technology acquire knowledge of and skills in language and literacy in part through exposure to technology in the home (Jewitt, 2006).

For example, McGee and Richgels (2006) observed that many young children become aware of the existence of print and its use by their families in their daily lives through screen presentations on the computer, audio feedback from software and websites, and so on. Through multimodal experiences with computers that include images, visual layout, color, sound, and movement, children develop understandings of particular communication events within language based social contexts (Jewitt, 2006). Technology provides tools that can be used as engagers and facilitators of thinking, helping young children construct their knowledge of the world (Jonassen & Howland, 2003, p. 12).

Young children with disabilities often have difficulties developing such emergent literacy prerequisite skills as phonological awareness, alphabetic principles, comprehension, concepts about print, and vocabulary development, (e.g., Cook, Klein, & Tessier, 2004). The use of computer-based presentation software having features with which children may already be familiar (e.g., animation, color, large screen presentation format) may further enhance emergent literacy in these and other children (Turbill & Murray, 2006).

Though syntheses of research-based technology applications regarding school-age populations are emerging (e.g., Silver-Pacuilla, Reudel, & Mistreet, 2004), relatively less is known about the effectiveness of technologies used with early childhood populations (Judge, 2006). Such widely available technologies as MS Windows-based presentation software applications are being used with increasing frequency in P-12 settings. This commonly available software offers great potential to enhance development of emergent literacy skills, given that young children are acquiring 21<sup>st</sup> century learning styles that are consistent with the widespread presence and use of technology throughout their daily lives.

## ***Microsoft® PowerPoint™ and the Preschool Program***

The Microsoft® Office suite, which typically includes the *PowerPoint*™ presentation software, is commonly found on home and school computers (Grabe & Grabe, 2007). In the Making A Difference Using Assistive Technology (MDAT) Project (Parette, Watts, & Stoner, 2004-2007), 10 preschool classrooms were provided with technology packages containing a (a) Dell™ personal computer and keyboard; (b) microphone; (c) scanner; (d) digital camera; and (e) ceiling-mounted projection system with Bluetooth keyboard, wireless mouse, and wall screen. Software included the Microsoft® Office suite, which included *PowerPoint*™. The contents of these technology packages

were used specifically to develop classroom literacy activities that would support the development of emergent literacy skills. *PowerPoint*<sup>TM</sup> was frequently reported as a valuable tool (Parette et al., 2007).

For example, one MDAT participant teacher commented on student responses: “Well, I think they enjoy it, like what I did with *PowerPoint*<sup>TM</sup>. They’re all excited and want to watch it again and again” (Parette et al., 2007). Another teacher reported that, “Well if there’s a picture of them on a *PowerPoint*<sup>TM</sup>, you’ve captured their interest forever” (Parette et al.).

Of particular significance is the capability of *PowerPoint*<sup>TM</sup> to allow (a) ‘feature’ manipulation (e.g., static and animated pictures); (b) audio output (e.g., voices, sounds); (c) symbol size, shape, and position; and (d) color. Early childhood educators are limited only by their own personal creativity when developing classroom learning materials and activities using these features (Carson & Kennedy, 2006). Blum and Watts (2007) currently are conducting outcomes research where *PowerPoint*<sup>TM</sup> and LCD projectors are used in conjunction with direct instruction to teach phonological awareness skills to 4-year-old ‘at-risk’ students. Early results suggest students are highly engaged with the *PowerPoint*<sup>TM</sup> presentations.

While a single computer with standard monitor can be used for developing and delivering *PowerPoint*<sup>TM</sup> presentations to teach emergent literacy skills, the availability of a wall screen and LCD projection system greatly enhances the group teaching potential of the software. In such technology-enriched instruction, young children are highly engaged in the learning activities. They are not simply passive learners, but are interacting with each other, the teacher, and the visual image on the screen (Parette, Wojcik, Stoner & Watts, 2007).

Transitions and animations are special effects in *PowerPoint*<sup>TM</sup> for the introduction and transitioning of slides. Thoughtfully employed, they can enhance student interest and attending (Mills & Roblyer, 2006). When slides are created, the teacher can have any or all slides fade in, fade out, ascend or descend, etc. The speed of these transitions can also be controlled and linked to other unique effects, such as sound and animations. Animation effects in *PowerPoint*<sup>TM</sup> that may particularly engage students include ‘Neutron,’ ‘Bounce,’ and ‘Pinwheel.’

Given the ready availability of *PowerPoint*<sup>TM</sup> and its potential to support emergent literacy skills in early childhood curricula, practitioners should be aware of key features of the software when developing instructional slideshows. The following suggestions target fundamental elements of emergent literacy using relevant features of *PowerPoint*<sup>TM</sup>, based heavily on experiences of classroom teachers working with young children who are at-risk or who have disabilities (Parette et al., 2004-2007).

### ***Phonological Awareness***

Phonological awareness refers to awareness of both large and small parts of spoken language (Carnine, Silbert, Kame’enui, Tarver, & Jungjohann, 2006). The National Reading Panel (2000) found that instruction in phonological awareness significantly improves children’s reading abilities. *PowerPoint*<sup>TM</sup> has many features to facilitate acquisition of these skills, including the ability of the teacher to modify such features as (a) color, (b) pictures, (c) sounds, (d) animation, (e) slide design, and (f) slide transition.

Educators can help young children develop initial sound fluency by making them aware of words that start with the same sound, or alliterations (i.e., consecutive words having the same beginning sounds) (McGee & Richgels, 2008). As seen in Figure 1, the first teacher mouse click brings up a standardized picture cue on the left side of the slide to alert children to listen to a beginning sound. The second teacher mouse click presents the clip art depictions (i.e., ‘van’ and ‘vine’) as words that begin with the targeted same sound. After the teacher then models that sound, the children practice and then are assessed on their ability to discriminate initial sounds of the words presented. Engaging reinforcement features (such as the van moving around and making noise) can be added when children provide correct responses during an assessment phase of the lesson.

<Insert Figure 1 about here>

### ***Alphabetic Principles***

Alphabetic principles (or phonemic orthography) refers to the relationships between letters and their associated sounds (Hutinger, Bell, Daytner, & Johanson, 2006). To teach this concept, instructors demonstrate the connection

between a letter and its associated sound(s). For example, a song in which the teacher points to the letter as the children say the phoneme associated with the letter would help young children develop this connection.

*PowerPoint*<sup>TM</sup> activities can be constructed to help young children develop letter-sound correspondence. The teacher might use the animation features to control the appearance of each letter in a word so that it is isolated, and can be linked with the sound that corresponds to it. For example, the teacher might click on the mouse bringing up the letter 'D' on the screen. The teacher would model the sound that corresponds to the letter, and ask the children to repeat the sound, making a direct connection between the letter and sound. The animation features could be customized to allow only one letter to appear at a time. Once the children correctly connected the letter 'D' to the phoneme /d/, a CVC word could be created by combining 'D' with the 'og.' Such a *PowerPoint*<sup>TM</sup> strategy could further help students learn about the blending of sounds and how letters connect with sounds in various words. Each of these features is shown in Figure 2. (During an actual slideshow, only one or two items would be shown at a time.)

<Insert Figure 2 about here>

*Sounds* can also be incorporated for each letter in a *PowerPoint*<sup>TM</sup> presentation. For example, a slide might have a pink letter 'P' that students are to learn is associated with the /p/ sound (see Figure 3). To embed a sound, the education professional clicks on the insert tab, chooses the sound feature (far left on the insert toolbar), and then selects a prerecorded sound. That sound might be a prerecorded /p/ sound, or as an initial hint, of a pig making an 'oink, oink' sound that has been saved in a .wav or .mp3 format. An icon of a small speaker appears when the file is selected. The teacher can then make choices regarding when the sound is to be heard (e.g., when the slide first opens or on a mouse click).

<Insert Figure 3 about here>

*Animation* can also be used to make slides more engaging for young learners. A motion path allows images or letters to move across the slide in numerous pre-set directions or a customized direction or path. The education professional selects from a menu of choices for motion paths or a customized path for motion created in freehand using the mouse cursor. For example, in using the *PowerPoint*<sup>TM</sup> animation feature (i.e., motion paths), the pig could move around the screen, and the associated letters could follow the picture (see Figure 4).

<Insert Figure 4 about here>

### ***Comprehension***

Interactive storybook experiences can enhance comprehension abilities (Pierce & McWilliam, 1993). *PowerPoint*<sup>TM</sup> can be used to allow a learner to playfully interact with images, and in the process acquire comprehension skills. For example, a 'talking book' can be created (see Figure 5) incorporating text, pictures, and sound. The teacher can record his or her own voice reading the story, save it in an mp3 format, and then insert this media into the slide show. [Note: free downloadable software, such as Ultra Hal Text-to-Speech Reader can be used to convert text into an mp3 format. See [http://www.download.com/Ultra-Hal-Text-to-Speech-Reader/3000-7239\\_4-10071733.html](http://www.download.com/Ultra-Hal-Text-to-Speech-Reader/3000-7239_4-10071733.html).] After the story is completed, the next slide could present simple comprehension questions related to the story. The transition features within *PowerPoint*<sup>TM</sup> can present a question, and then, with a mouse click, the answer (see Figure 5).

<Insert Figure 5 about here>

### ***Concepts about Print***

Young learners should understand that print carries a message (Justice & Pullen, 2003). Gately (2004) noted that emergent literacy learners in part must (a) recognize the difference between print and pictures; (b) know that pictures and words are related; (c) know where to begin reading on a page; (d) know that print is read from left to right; and (e) know that print is oral language written down. An ideal way to teach concepts about print is shared reading with engaging texts (Justice & Pullen, 2003; Teale & Martinez, 1988).

*PowerPoint*<sup>TM</sup> offers unique possibilities to create interactive learning activities with engaging texts. Large, colorful fonts in good contrast to the background can help to maintain learner interest. The animation feature can also

enhance student engagement in reading. For example, a single letter could appear on the slide, followed by the sequential appearance of other letters, until an entire word is created, illustrating left-to-right sequencing in the construction of words and the reading process (see Figure 6). Pictures can also be embedded on the slide, and appear in targeted spaces in proximity to the word to facilitate the child's growing comprehension of print as communication.

<Insert Figure 6 about here>

### ***Vocabulary Development***

In developing vocabulary, children gain knowledge about the meanings of spoken and written words (Stahl & Yaden, Jr., 2004). Using *PowerPoint*<sup>TM</sup>, the teacher might identify two or three target words, such as 'under' and 'on' (see Figure 7). Then, a slide show of a story containing the target words would be presented. This story might be created by the teacher with text enhanced with pictures, animation, and sound to heighten learner interest. After the story was read to the children, a follow-up slide could be presented highlighting one of the target words. Then, the animation feature would allow the instructor to incorporate pictures, definitions, examples, synonyms and/or antonyms of the word to facilitate student acquisition of this new vocabulary word. Using a digital camera and importing pictures taken in the classroom, in the community during field trips, or even in home environments can help contextualize the literacy experience for children.

<Insert Figure 7 about here>

### **Discussion**

Given the ubiquitous nature of technology in contemporary society, it is important that teachers of young children develop competence in using readily available computer tools such as *PowerPoint*<sup>TM</sup>. A number of *PowerPoint*<sup>TM</sup> tutorials are available to help educators acquire these critical instructional skills. Some of these tutorial sites include prepared and downloadable *PowerPoint*<sup>TM</sup> presentations (see Table 1).

<Insert Table 1 about here>

With practice, teachers will develop independent *PowerPoint*<sup>TM</sup> competence, which in turn leads to greater proficiency and speed with which emergent literacy materials and activities can be developed. At this point the educators no longer must concentrate on the mechanical implementation of the technology, and instead can devote all attention to the instructional potential of using *PowerPoint*<sup>TM</sup> in developing emergent literacy skills with young children who are at-risk or who have disabilities. (For discussions of strategies for monitoring child progress using technology see Peterson-Karlan & Parette, 2007).

Certainly play activities in preschool settings should remain as part of the educational milieu in a developmentally appropriate curriculum (National Association for the Education of Young Children, 1996). However, young children will powerfully benefit from exposure to such technologies as *PowerPoint*<sup>TM</sup> integrated throughout an emergent literacy curriculum. One can easily envision scenarios in which children initially receptively engage with the literacy content presented through the technology, consuming presentations prepared by others. Later, as they acquire higher levels of skills in both literacy and technology, these same students can begin using this and other technologies to express themselves in contemporarily and technologically relevant formats.

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