Multimedia materials for language and literacy learning

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ABSTRACT

This article introduced educators to inexpensive, commercially-available CD-ROM software that may be incorporated into classroom activities for both normally developing and language learning disabled children. Computer disks read only memory (CD-ROM) combines speech, text, graphics, sound, video, animation, and special effects. Three types of multimedia CD-ROM products are discussed: a) virtual adventures; b) electronic storybooks; and c) desktop tools.

Explosive growth in the power and availability of multimedia offers enticing new opportunities for learning (McKenna, Reinking, Labbo, and Kieffer, 1999; Topping and McKenna, 1999). Multimedia technology combines speech, text, graphics, sound, video, animation, and special effects to convey meaning. Computer disk read only memory (CD-ROM) provides instant access to a diversity of multimedia materials that may be used to facilitate language and literacy learning (Horney and Anderson-Inman, 1999; MacArthur, 1999). For example, with the click of a computer mouse, children can travel the Oregon trail, publish books, meet undersea creatures, and take virtual tours through the animal kingdom.

The purpose of this article is to introduce educators to inexpensive, commercially-available CD-ROM software that may be incorporated into classroom activities for both normally developing and language learning disabled children. Three types of multimedia materials will be

discussed: a) virtual adventures; b) electronic storybooks; and c) desktop tools.

<div align="center">MULTIMEDIA MATERIALS</div>

Virtual adventures

Virtual adventures engage children in meaningful language and literacy experiences. With the click of a computer mouse, students are guided through interactive, electronic field trips via visual images, animation, text, sound, and special effects (Algava, 1999). One program, known as Animals (Zoological Society of San Diego, 1992), provides a virtual tour of the San Diego Zoo with instant access to 15 minutes of video, and over 400 pictures. Users can listen to the animals, learn about their habitats, and watch them during feeding time, play time, and other engaging activities.

Virtual adventures stimulate interest and invite student involvement in a child-centered rather than a teacher-controlled environment (Ernst, 1997). Unlike contrived tasks, virtual adventures encourage users to observe, analyze, predict, and test hypotheses. The programs promote critical thinking skills as students construct knowledge in social interactive learning experiences (Moutray and Ennis, 1998).

Virtual adventures are especially applicable for classroom activities where groups of school-aged students collaborate (El-Hindi and Leu, 1998) as they gather clues, chase criminals, and solve crimes Where in the World is Carmen San Diego, Jr., (Broderbund, 1997), select which weapons, food, and clothing are appropriate for a trip across the Oregon Trail, Oregon Trail: Third Edition, (The Learning Company, 1997), or investigate moons and planets in a jet propulsion laboratory Magic School Bus Explores the Solar System, (Microsoft Corp., 1996).

Virtual programs that foster exploration and inquiry (Harste and Leland, 1998) can be incorporated into a number of classroom problem-solving activities. For example, Barbie Fashion Designer (Mattel Media, 1997) teaches students to create, decorate, and assemble patterns into individual outfits that are later printed onto special fabrics.

Other programs offer innovative language lessons for the preschool population. For instance, Richard Scarry's *Busytown* (Simon and Schuster Interacative, 1993) automatically prompts preschoolers to follow step-by-step methods as they serve food in a deli, build a house, care

for a sick patient, and engage in other activities within 12 interactive environments. A similar product, How Things Work in Busytown (Simon and Schuster Interactive, 1993), teaches preschoolers how to build a tractor, bake bread, pave a road, and engage in other problem-solving tasks.

For primary to middle school age children, Toy Story Animated Storybook (Disney Interactive, 1996), brings toys to life as users engage in a variety of challenging activities. Children are invited to read along in the story, help characters escape danger, construct a puzzle, and participate in other interactive adventures. Another product, Lego Island (Mindscape, 1997), take primary and middle school age children on a virtual island tour via their own customized lego vehicles (e.g., dune buggies, water jets, skateboards). Lego Island engages students in a problem-solving adventure that gradually evolves into the chase and capture of Brickster, the island criminal.

Virtual adventure programs for older children are designed to integrate text, graphics, and other multimedia components into informative expository documents (Stearns, 1994). For example, In The Company of Whales (Discovery Channel, 1996) features videos as well as hundreds of photos and supporting articles. Users listen to a panel of four experts, see rare whales, and listen to whale songs within a compendium of text, video, audio, and other multimedia messages. Another program for older children, 3D Dinosaur Adventure (Knowledge, Adventure, 1996) combines fully narrated text, a talking storybook, movies, and still images that are used to examine 150 different types of dinosaurs and reptiles. Virtual adventures offer visual images, animations, sound and special effects to children with language and learning disorders who may find multisensory learning experiences more stimulating than traditional textbooks.

Advantages and disadvantages

Virtual adventures immerse students and teachers in a variety of simulated language experiences. Whereas most virtual adventures products are efficient for teaching and easy to use, educators may find it useful to consult the users' manual occasionally to clarify ambiguous on-screen instructions (e.g., Magic School Bus Explores the Solar System, Oregon Trail: Third Edition). In addition, several products (The Magic School Bus Explores the Solar System, Lego Island) require extra read

only memory (RAM) to ensure smooth screen transitions and fast-moving play.

ELECTRONIC STORYBOOKS

Electronic storybooks combine lively animations, music, speech, realistic sounds, and special effects with text (Glasgow, 1997). Short clauses of highlighted words are displayed on the computer screen and simultaneously spoken by a narrator providing a visual focus for at risk students. Users control the pace at which the story pages are turned as they attend to word-by-word or line-by-line reading cues (Talley, Lancy, and Lee, 1998). In addition, animation and special effects may improve the quality of the story model by providing multi-sensory cues to children with language and literacy disorders who might otherwise ignore important contextual information (McKenna and Reinking, 1997). For example, Living Books (Broderbund, 1994) are electronic versions of either narrative or expository texts that combine high quality animations and graphics with speech, sound, music, and special effects (Matthew, 1994).

One of the Living Books, The New Kid on the Block (Broderbund, 1993), brings 18 poems to life via graphics and animation. The narrator reads the words aloud while the animations convey meaning. For example, a click of the computer mouse on the written phrase "fled screaming down the street," prompts the story character to run screaming down the road amid the sights and sounds of traffic. Teachers can use these types of point-and-click activities to build vocabulary and enhance word meaning within the context of interactive, animated stories (Horney and Anderson-Inman, 1999).

Another Living Book illustrates the story of the Tortoise and the Hare (Broderbund, 1994) in both Spanish and English. Users either read the story along with the narrator or "play inside the story." For the play option, students search for a variety of animated surprises that are embedded within each of 12 story pages. On one page, a click of the computer mouse prompts an animal to sing, "I'm a beaver and I rap and I wear a baseball cap." On an adjacent page, a click on a rooftop causes the chimney to wake up and say, "Good morning!"

Because Living Books are packaged with both the traditional hard copy and the electronic CD-ROM, teachers may decide to incorporate

both electronic and traditional materials into classroom activities. For instance, children can read the animated story along with the narrator during repeated reading sessions and then use the pictures in the hard copy to recall story events. According to McNinch, Shaffer, Campbell, and Rakes (1998), children improve in reading by reading. Electronic storybooks provide students with repeated reading experiences that combine story narration and word pronunciation in the context of realistic animations and special effects (McKenna and Reinking, 1997).

Another electronic series, Discis Books, are multimedia versions of children's narrative (e.g., Robert Munsch's Mud Puddle) and expository texts (e.g., National Geographic's Edition of Birds and How They Grow) (Knowledge Research, Inc., 1993). Discis Books are equipped with a variety of built-in features that permit teachers to monitor student progress, change vocabulary, and alter reading rate (Matthew, 1994). For instance, educators can incorporate spelling words into electronic stories and adjust the reading rate to meet individual student needs.

Paul, Hernandez, Taylor, and Johnson (1996) suggest that storytelling ability involves higher level linguistic skills that integrate events, vocabulary, and cause-effect relationships within culture-specific story structure. Davidson and Associates have created a variety of electronic folktales that highlight cultural differences. For school age children, Baba Yaga and the Magic Geese (Russian), Imo and the King, (African), and The Little Samurai (Japanese) (Davidson and Associates, Inc., 1995) allow teachers to present different types of cultural folktales into classroom activities. Each folktale reflects the culture and the country from which it came via animation, graphics, music, and special effects.

Another Davidson product, Chicka Chicka Boom Boom, (Davidson and Associates Inc., 1995) adds an exciting dimension to multimedia digitized video. Chicka Chicka Boom Boom is the electronic version of a rhyming alphabet book of the same name for preschoolers. Videoclips of real-life children appear on the screen to guide users through a variety of language and literacy activities. Options include song and story narration (by Ray Charles and others), click-and-play musical instruments, letter-sound sequencing games, and other literacy experiences. As an added feature, users are invited to record their own voices within the story format. The voice recorder integrates children's speech into realistic storytelling sessions. Because a hard copy of *Chicka Chicka Boom*

Boom is packaged with the electronic book, both story versions may be incorporated into a variety of language and literacy lessons.
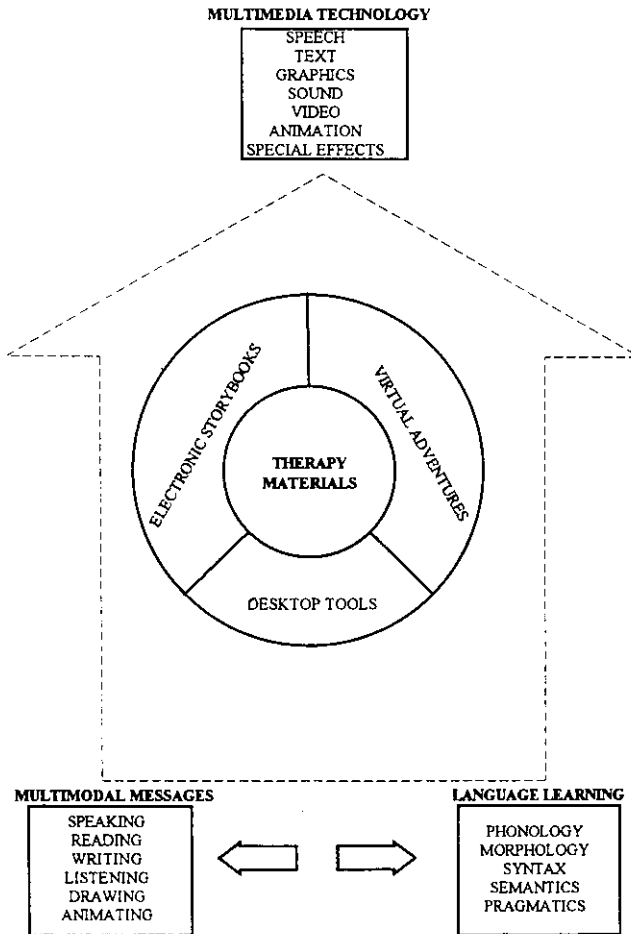
Advantages and disadvantages

The advantage of electronic storybooks is that they provide students with multi-sensory learning opportunities. The primary disadvantage is that they are limited by the manufacturer's design. While user-friendly Living Books feature high-end graphics and animations, they are not equipped with built-in options that permit users to alter reading rate and monitor student progress. On the other hand, Discis Books combine flexible options with low-end graphics and no animation. Finally, although their graphics and animations do not approach the quality of the Living Books, Davidson products are simple to use, and applicable to a variety of student populations.

DESKTOP TOOLS

Desktop tools integrate paint, graphics, animation and other multimedia ingredients into a wide variety of creativity tools. Students can use desktop tools to incorporate a variety of multi-modal messages (e.g., speaking, reading, writing, drawing, animating) into a whole language approach to learning. Multimedia technology delivers a variety of multi-modal messages which may be used to convey meaning (Lapp, Flood, and Fisher, 1999). Researchers suggest that when children are naturally involved in language, and when they are building, creating, exploring, and they can see a purpose in their work, the learning will occur spontaneously (Goodman, 1986; Smith, 1986).

Figure 1 illustrates the mixture of speech, text, graphics, sound, video, animation, and special effects (multimedia) that provides students with new modes of self-expression (Grone, 1998; Topping and McKenna, 1999). For example, using desktop tools, children with language and learning disorders may use computer graphics rather than words to draw detailed diagrams that visually communicate information (Weaver, 1993). Later, the visual diagrams may be used to create verbal descriptions of the message.

Figure 1. Language and literacy learning in a multimedia environment.

MULTIMEDIA TECHNOLOGY

| SPEECH |
| TEXT |
| GRAPHICS |
| SOUND |
| VIDEO |
| ANIMATION |
| SPECIAL EFFECTS |

ELECTRONIC STORYBOOKS

VIRTUAL ADVENTURES

THERAPY MATERIALS

DESKTOP TOOLS

MULTIMODAL MESSAGES

| SPEAKING |
| READING |
| WRITING |
| LISTENING |
| DRAWING |
| ANIMATING |

LANGUAGE LEARNING

| PHONOLOGY |
| MORPHOLOGY |
| SYNTAX |
| SEMANTICS |
| PRAGMATICS |

According to Smith (1986), the ultimate curriculum goal is to create an environment filled with language use that gives students a need to convey information to a host of audiences for a variety of purposes. Desktop tools stimulate new learning opportunities and permit children to create messages that are both personally meaningful and socially appropriate (Moutray and Ennis, 1998). Desktop tools offer a variety of

features including computerized drawing tools, paint brushes, image libraries, animations, music, speech, text, and special effects. Multimedia messages take the form of stories, poems Kid Pix Studio Deluxe (Broderbund, 1994), essays, journals The Amazing Writing Adventure (Broderbund, 1995), letters, Internet messages Kidworks Deluxe (Davidson Associates, Inc., 1995) signs, greeting cards, posters, banners Print Shop Deluxe (Broderbund, 1997), news stories, plays, and animated movies Magic Theatre and Haunted House (Instinct Corp., 1996).

Other types of desktop programs inspire children to use multiple symbol systems (Wolf, 1998) as they engage in personally meaningful reading and writing activities (Bouas, Thompson, and Farlow, 1998). One product, The Amazing Writing Adventure, allows students to write and publish their own books, journals, poems, and other multimedia messages. For instance, the Bright Ideas option provides young writers with quotations, jokes, fun facts, and ideas for topics. Other options include: a) a rebus picture tool that allows users to replace text with pictured symbols; b) a spin feature that includes point-and-click changeable words and phrases; c) a secret code tool that interchanges text with graphic codes; d) a variety of stimulating story starters; and, e) several pre-formatted page templates designed for stories, essays, poems, and other genre. In particular, the rebus picture tool may be used as a "keep-going" strategy (Harste, Woodward, and Burke, 1984) for children with poor phonics skills who prefer to compose their ideas holistically with the aid of graphic illustrations.

Another very useful desktop tool is the text-to-speech function available in Kid Pix Studio Deluxe. Students listen as their multimedia messages are read aloud via built-in character voices, or they record their own narration. As a result, students can share their ideas in talk and writing (Nistler, 1998) via voice-recorded plays, stories, poems, and other creative products that can be integrated into a variety of language and literacy experiences.

The Internet interface in Kidworks Deluxe permits children to transmit multimedia messages to conversational partners in other parts of the world. For example, student "speakers" in one location have the opportunity to send multimedia messages to "listeners" in other locations via the Internet. Internet conversations promote pragmatic language skills (Pershey, 1997) as students ask and answer questions, send and

receive messages, and exchange greeting and closing remarks during naturalistic language activities. As a result, students engage in language and literacy learning in the context of a worldwide community of readers and writers (McKenna, Reinking, Labbo, and Kieffer, 1999). In particular, computer networking as an instructional medium may benefit struggling readers and writers including children with language and learning disabilities (Fey, 1997).

On another front, KidCad (Davidson and Associates, Inc., 1994) provides school age children with an opportunity to create innovative three-dimensional artistic designs. According to Heymsfeld (1997), artistic creations are cognitive activities that are vital to academic and personal development. Students can use KidCad's electronic building blocks to create houses, castles, and other three-dimensional buildings. Zoom-in features and multiple camera angles permit children to rotate objects, characters, and buildings. A variety of user-friendly options such as animation, sound effects, and music are provided. In addition, an image library consisting of furniture, animals, and other characters may be added to self-designed scenes. Children who have difficulty processing spatial concepts may find it helpful to create and move three dimensional objects in space and time. Moreover, self-constructed scenes can be saved and retrieved for future learning sessions.

Advantages and disadvantages

Desktop tools inspire students to write, illustrate, and publish a variety of multimedia products. The major disadvantage is that the procedures for creating desktop products are generally more complex and time-consuming than those of other multimedia materials. Educators may be wise to begin with a user-friendly program (e.g., Kid Pix Studio Deluxe, KidCad) that meets the needs of students across a wide variety of skills and age levels.

SUMMARY

According to Harste, Woodward, and Burke (1984), the real curriculum is what happens in the mind of the language user. Multimedia materials permit students to process information in whatever modes they choose. Computerized speech, text, graphics, sound, video, animation, and special effects are combined to convey meaning. Regardless of the

tool, the ultimate goal is the expansion and extension of the communicative potential.

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Appendix

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