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ScienceDirect
Research in Developmental Disabilities 28 (2007) 489–505
Research in Developmental Disabilities

Computer-based spelling instruction for students with developmental disabilities☆

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Received 6 April 2006; received in revised form 28 June 2006; accepted 30 June 2006

Abstract

Learning to spell on the computer may lead to functionally useful writing skills. Alan and Suzy, teenagers with developmental disabilities, were already proficient on a variety of naming and matching tasks but had difficulties spelling; Suzy also made errors reading orally. In Experiment 1, computer teaching led to new anagram and written spelling performances. Suzy's reading also improved. On tabletop tasks, Alan and Suzy sorted and retrieved objects to a list they wrote and read aloud. When the tabletop tasks were repeated weeks later, Alan's spelling accuracy declined but Suzy's was nearly perfect. In Experiment 2, using a different and refined teaching format, Alan relearned his old words and Suzy learned to spell new words. Immediately afterwards, and weeks later, both Alan and Suzy performed nearly perfectly on the tabletop matching, sorting, and reading tasks. The results replicate previous research and extend it with a refined package of computer methods that establishes durable and potentially functional writing skills. The possibility that learning to spell also improves oral reading is worthy of further research.

Keywords: Computer assisted instruction; Computer-based spelling; Transfer hand writing; Reading; Matching to sample; Teenagers with developmental disabilities

Language arts skills are interrelated and deficiencies in one area may adversely affect another area. For example, poor spellers often have difficulty communicating freely and effectively (Graham, 1983). Spelling is a vital part of the educational process because learning to read, write, spell, and express one's thoughts accurately in writing is essential for a literate society (Heron, Okyere, & Miller, 1991). However, traditional practices tend to focus mainly on reading, with

☆ This report is based on a thesis submitted by Joe Vedora to the Department of Counseling Psychology, Rehabilitation, and Special Education, Northeastern University, Boston.

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doi:10.1016/j.ridd.2006.06.006

only minimal instruction devoted to spelling. Reading instruction may or may not yield spelling (Lee & Pegler, 1982). Thus, an explicit focus on spelling, in contrast to traditional approaches, may be needed if more students are to benefit fully from instruction that seeks to establish integrated repertoires of language art skills (Stromer & Mackay, 1992b).

Use of the computer may be an effective and efficient way of teaching spelling to students with specific and pervasive developmental disabilities (e.g., Dube, McDonald, McIlvane, & Mackay, 1991; Kinney, Vedora, & Stromer, 2003; Stevens, Blackhurst, & Slaton, 1991; Stromer & Mackay, 1992a,b, 1993; Yamamoto & Miya, 1999; Yamamoto & Shimizu, 2001). Furthermore, use of the computer may improve writing skills "off computer." For example, Stromer, Mackay, Howell, McVay, and Flusser (1996) taught two students with hearing and developmental disabilities to construct the names of pictures on the computer. After the student with autism learned the anagram spelling task on the computer, he wrote each word correctly on an index card, wrote lists of two to four words, and used the lists to gather objects from a shelf.

Computer methods that bestow functional writing skills might improve a learner's ability to communicate in the natural environment (Graham & Voth, 1990; Horner, Sprague, & Flannery, 1993; Stromer, Mackay, McVay, & Fowler, 1998). This might happen because written expression may yield reinforcers difficult to obtain by imprecise speech or unconventional forms of communication (e.g., manual signing). So, learning to produce and use text may enhance a learner's communicative competence. The number of such learners is substantial, a situation acknowledged by the publication of a curriculum for students with autism and related disabilities that focuses on teaching nonvocal reading and writing skills (Watthen-Lovaas & Lovaas, 1999).

The computer methods used by Stromer et al. (1996) are illustrative of those that could complement a literacy curriculum. In the present application, testing, and teaching involved five blocks of trials in a session. Block 1 required writing words (on index cards) to dictated computer cues on some trials and to computer pictures on other trials. Block 2 involved anagram spelling—touching letters on the computer to construct words to dictated cues and pictures. Block 3 gave practice in constructing words from memory to printed words (delayed copying). Blocks 4 and 5 repeated the anagram and writing tasks, respectively. Typically, teaching with three-word sets continued until a student mastered the writing and anagram tasks in Blocks 1 and 2. Then, another trio of words was taught.

The success of our computer-based teaching package recommends it for further research. The present study sought to replicate prior successes with a refined package that addressed a practical limitation of past research: participants in Stromer et al. (1996) had difficulties remembering how to spell words learned previously as training progressed and new words were introduced (and see Stevens et al., 1991). So, the present study incorporated review trials, cumulative criterion tests, and classroom supports to encourage maintenance. Such refinements are needed if the computer methods are to be put into actual practice (Watthen-Lovaas & Lovaas, 1999). We also examined whether the computer package enabled the students to write lists, read them, and use the lists to sort and gather objects. The methods would be of little value unless they produced outcomes that included new off-computer performances (Stromer, Mackay, & Stoddard, 1992).

1. Experiment 1

In Experiment 1, we wanted to replicate previous studies by examining whether computer-based spelling enabled students to write lists that could then be used to sort objects or gather items in a nearby room (e.g., Stromer et al., 1996, 1998). We also attempted to expand upon previous studies by systematically reviewing previously trained words. The assessment of the maintenance of spelling