

Write-On Handwriting Research Base

The *Write-On Handwriting* products are developmentally sound – supported by research as well as years of experience teaching individuals and groups. Since handwriting is a complex skill, it was essential to incorporate well-recognized developmental components into the handwriting instruction plan. *Write-On Handwriting* incorporates two key developmental skills: the graphomotor function (sequencing pencil movements) and the retrieval memory function.

Applicable research providing the basis for the methodology developed by *Write-On Handwriting* follows. In addition, foundational research is outlined that supports the importance of teaching handwriting to insure future academic success.

Representative research supporting the Write-On Handwriting Methodology

In clinics and schools, children frequently struggle with motor memory. For them, the retrieval of motor patterns is a slow, strenuous, and sometimes futile exercise. Writing can be thought of as a rotating drum connected to memory: it is a tracing, an indelible record of what is recalled and then transmitted through the writing implement. Children with motor memory deficits have characteristic handwriting, marred by frequent hesitation, retracing and illegibility. Memory disorders of this type, in fact, may be the most common cause of poor handwriting (Levine, Mel Dr., “Developmental Variation and Learning Disorders”, 1999).

It is argued here that automatic legible writing is an essential basis for written expression. And yet, crowded school curricula and neglect by educational institutions and researchers often leave no room for appropriate and sufficient attention to teaching this critical skill. . . . There are at least three reasons handwriting must be carefully taught to all children. First, handwriting allows access to kinesthetic memory – our earliest, strongest and most reliable memory channel. Second, serviceable handwriting needs to be at a spontaneous level so that a student is free to concentrate on spelling, and to focus on higher-level thought and written expression. Third, teachers judge and grade students based on the appearance of their work (Sheffield, B., “Handwriting: A Neglected Cornerstone of Literacy”, *Annals of Dyslexia*, (46), 1996).

Direct kinesthetic steps to teaching handwriting leaves nothing to chance in developing writing skill to its highest level. . . . Essentially all children learn to write more expeditiously using kinesthetic techniques (Benbow, Mary, “The Way to Go! Kinesthetic Approach to Handwriting”, 1990).

When handwriting is taught to the automatic kinesthetic level, the student is using implicit memory. This allows him to free up working memory and focus his full attention on the thought he wishes to record or the words he must spell. As long as a student has to shift his attention between remembering how to produce letter configurations and formulating an idea he wants to express, he will be at risk for "output failure" (Benbow, Mary).

Because kinesthetic learning is such a strong learning channel and so reliable, all children need to assimilate accurate formation of alphabet letters to a point that forming these letters requires no conscious effort (Sheffield, B.).

The goal of the [direct] treatment is for the child's writing to become automatic and fluid so that the child does not have to think about letter formation and can produce an adequate volume of work in an expected period of time without undue fatigue. . . . Practice with letter formation is certainly a necessary component of remediation. In addition, the child's motor skills and sensory processing abilities that contribute to and are considered to underlie good handwriting are important to consider (Tseng, M.H. & Cermak, S., "The Influence of Ergonomic Factors and Perceptual-Motor Abilities on Handwriting Performance", *American Journal of Occupational Therapy*, (47), 1993).

Knowledge of letters was the single best predictor of reading success . . . Children learn to discriminate letters by their distinctive visual features rather than holistically. Research suggests that when the child is learning to visually discriminate between letters, visually similar letters should be taught in isolation before they are contrasted. Adams suggests that teaching uppercase letters separately from lowercase also reduces visual confusion. Writing letters helps children focus on the visual features of each, particularly when their formation is emphasized (Jewell, Karen, "Implications for Occupational Therapists From an Occupation-Centered Perspective", *OT Practice*, Oct.1999).

Writing approaches that teach letters in groups with distinctive labels and visual clues are ideal for this (teaching letter formation) (Jewell, Karen).

A cause of difficulty with drawing, printing, and handwriting, and following directions is weak visual-motor processing. This weakness causes individuals to miss the gestalt and distort important parts when drawing or copying, and have difficulty organizing their work on the page, using maps and finding their way in unfamiliar territory (Ellis, William, "Through the Barricades: Multisensory Approaches", *Bulletin of the Orton Society*, 1995).

When guiding children's letter formation, practice, consistency and legibility are the goals. Do children make the same letters the same way each time? (Einhorn, K., "Handwriting Success for All", *Instructor*, January 2001).

Classroom teachers may not be aware of the long-term benefits of careful consistent teaching of handwriting. The curricula in our schools are so packed with requirements that it is often difficult to include the basics. Although the time required for teaching handwriting is not so great, it has to be incorporated regularly into a class schedule. Novice teachers, if they teach the mechanics of writing at all, are often thrown upon the resource of using publishers' copybooks. They expect children to copy, self-teach, and internalize the material. And yet, without direct teaching, the attempt to learn writing often ends in disaster (Sheffield, B.).

There can be agreement that handwriting needs to be taught appropriately and consistently from an early age. It can be enhanced through developing specific perceptual and motor skills appropriate to the requirements of handwriting (Addy, Lois M., "A Perceptual-Motor Approach to Handwriting", *British Journal of Occupational Therapy*, (59), 1996).

Time for direct teaching of handwriting needs to be built into busy school schedules. Too many students are kept from a successful school experience by inadequate handwriting . . . the choice of form and type of letters is not as important as consistency and careful direct teaching. Consistency within a classroom and in a school system is essential (Sheffield, B.).

Representative research supporting the importance of teaching handwriting to insure academic success

Handwriting is an important functional task used frequently in every grade beginning in kindergarten. Children are expected to gain skill gradually in handwriting legibility as formal instruction is introduced in the kindergarten and first-grade curriculum (Marr, D., & Cermak, S. Consistency of handwriting in early elementary students. *American Journal of Occupational Therapy*, (57), 2002).

According to Steve Graham, professor of education at the University of Maryland College Park, ". . . the researchers found the pupils given handwriting lessons produced grammatical sentences much more fluidly than their counterparts in the control group. . . . (A) growing number of studies suggest that handwriting may play a bigger role in the writing process than is

commonly believed. 'If you have to stop and think about how to form a particular letter, that increases the likelihood that you're going to lose something you might hold in your working memory,' said Mr. Graham" (Viadero, D., "Penmanship problems hurt quality of student writing, study suggests", *Education Week, February 2001*).

Children in elementary school spend 31% to 60% of each academic day on fine motor tasks including handwriting. Handwriting is the primary way for these students to communicate with and to display what has been learned to the teacher. In the classroom environment, elementary school students use handwriting in almost all subject areas and are graded on their written output. Past studies showed that when teachers were given papers to evaluate, varying only in their degree of legibility, the papers with better handwriting received better grades (Hammerschmidt, S. L., & Sudsawad, P., Teachers' survey on problems with handwriting: Referral, evaluation, and outcomes. *American Journal of Occupational Therapy, (58), 2004*).

Typically, elementary school children spend up to half their school day engaged in writing tasks, some of which (e.g., paper and pencil tests) are performed under the constraints of time. Therefore, a child's ability to write in a manner that is both legible and efficient, directly affects his or her school performance and academic advancement (Rosenblum, S., Parush, S., & Weiss, P.L., Computerized temporal handwriting characteristics of proficient and non-proficient handwriters. *American Journal of Occupational Therapy, (57), 2003*).

Legible handwriting is necessary for children to carry out many academic activities, and difficulties with handwriting can interfere with related writing processes such as planning and generating ideas. "(O)ne of the most serious effects of poor handwriting occurs when the quality of handwriting detracts from the student's ability to convey information and ideas" (Handley-More, D., Deitz, J., Billingsley, F. F., & Coggins, T. E., Facilitating written work using computer word processing and word prediction. *American Journal of Occupational Therapy, (57), 2003*).

Handwriting is one of the most important skills that children acquire and use throughout the school years as part of their occupation as students. . . . When handwriting skills are deficient, children suffer various consequences related to their academic performance and social interactions, thus limiting their successful participation in everyday school activities (Preminger, F., Weiss, P.L., & Weintraub, N., Predicting occupational performance: Handwriting versus keyboarding. *American Journal of Occupational Therapy, (58), 2004*).