

# FOCUS ON EXCEPTIONAL CHILDREN

## Handwriting Research and Practice: A Unified Approach

*Steve Graham and Lamoine Miller*

A man walked into a New England bank and shoved a piece of paper under one of the teller's windows. The teller carefully examined the note, then kicked the alarm button. Within minutes police officers converged on the scene and arrested the man. They later discovered that the suspect was a respected businessman suffering from laryngitis and illegible handwriting. The note was a poorly written request for a new checkbook (O'Brien, 1959).

The aftereffects of malformed print are usually not so bizarre. Nonetheless, within today's schools poor handwriting has aptly been dubbed an instructional time thief (Enstrom, 1967). Students with handwriting difficulties often lose considerable time completing assignments, and teachers forfeit precious time attempting to grade papers marred by illegible letters and words. Poor penmanship is a barrier to both expressive writing and spelling achievement (Strickling, 1973). Further, regardless of content, teachers assign higher scores to papers with handwriting of good quality (Briggs, 1970; Chase, 1968; Markham, 1976; Rondinella, 1963; Soloff, 1973).

Poor penmanship has at least two possible causes. First, a learner may bring to the task certain predilections that impede effective instruction. For example, a spastic paraplegic with poor motor coordination may not respond well to standard techniques of teaching handwriting (Bachmann & Law, 1961). This is not the case for most students, though. Legible handwriting has not been found to relate significantly to either eye-hand coordination, race, intelligence, or anatomical age (Harris, 1960). Handwriting problems also do not seem to be particularly associated with mental retardation (Kvaraceus, 1954; Love, 1965).

The second explanation — that most handwriting difficulties are the result of inadequate instruction — seems more viable. Enstrom (1966) has suggested that handwriting is the most poorly taught element of the elementary school curriculum. Only one of every 10 schools requires its teachers to have some kind of handwriting training (King, 1961). There is little instructional individualization, and some schools have no formal program for handwriting (Addy & Wylie, 1973; King, 1961; Wolfson, 1962). Additionally, handwriting is an unpopular subject with teachers (Greenblatt, 1962). And student teachers rank handwriting last among subjects

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they feel prepared to teach (Groff, 1962). Failure to adequately teach handwriting is analogous to "the woodcutter who is so busy with his chopping that he hasn't time to sharpen his axe" (Enstrom, 1965, p. 185).

The teaching of penmanship appears to be based primarily on public opinion rather than on research (Groff, 1960). Even though most of the published literature is of a nontechnical and descriptive nature (Andersen, 1965), the twentieth century has witnessed considerable scientific interest in handwriting. While empirical evidence is available, it has not been applied, for the most part.

If handicapped and normal students are to receive adequate handwriting instruction, they must have relevant experiences and considerable practice in developing specific skills. Handwriting instruction should be teacher directed, should contain a variety of relevant instructional options, and should be based on a foundation of research evidence. In this article, we present a model of handwriting instruction based on research and experiential knowledge. The model is designed primarily for mainstreamed handicapped students but could be adapted for use with most school-age children.

## DEVELOPMENT OF HANDWRITING SKILLS

Children become interested in writing at an early age. By the age of two, they are usually fascinated with scribbling. At approximately age three, many children

begin to realize that people make marks on paper purposefully. Somewhere between the ages of four and five, most children attempt to formulate both letters and numbers.

Formal instruction in handwriting begins in first grade. Initially, the student's quality of penmanship is poor, gradually improving with practice (Andersen, 1969; Covert, 1953; Groff, 1964). Similarly, speed in writing increases from about 36 letters per minute in grade two to 50-72 letters per minute in grade six (Freeman, 1915a; Groff, 1961). Both speed and quality tend to vary together (Wills, 1938).

Although most children are eager to learn how to write, some students develop an aversion to penmanship (Quint, 1958). Boys are more likely than girls to dislike handwriting. Moreover, girls are often better handwriters than are boys (Andersen, 1969; Gates & LaSalle, 1924; Groff, 1964; Horton, 1969; Lewis, 1964; Love, 1965; Trankell, 1956).

Although the errors are comparable, adults' handwriting is frequently less legible than that of upper elementary and junior high school students (Newland, 1932). This is, in part, related to experience and increased fluency. As students write more and acquire speed, they have a tendency to become careless and take shortcuts in forming letters. This eventually results in the individual's developing a personal style of handwriting (Eagleson, 1937; Harris & Rarick, 1959; Quint, 1958; Seifert, 1959).

Writers also commonly exhibit different standards of penmanship depending upon the exercise. To illustrate, students customarily write better on a copying task than on a written composition (Lewis, 1964; Wills, 1938). In general, good handwriters evidence more intrapersonal variability than do poor handwriters (Covert, 1953).

## THE HANDWRITING CURRICULUM

Handwriting is essentially a tool for expressing, communicating, and recording ideas. Among the basic skills it is unique because it results in a tangible product. Handwriting is considered primarily as a means to an end, not an end unto itself, and should therefore be produced with maximum efficiency and minimum effort.

The handwriting product should be easy to learn, read, and write. Nevertheless, there is no accepted standard alphabet form used in instruction (Herrick & Otto, 1961). Although there are similarities, each letter of the alphabet has many variant forms. Considerable variation is found in the speed, stability, and legibility of different forms of the same letter (Boraas, 1936). Thus, a teaching alphabet should be simple, and selected on the basis of readability and speed of production.

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In planning a handwriting curriculum, then, which letter forms should be taught, and which skills should receive primary consideration? With respect to the former concern, controversy endures over the merits of manuscript versus cursive writing. With regard to the latter, students should develop handwriting that is both legible and fluent.

### Manuscript Versus Cursive

Humankind has always used at least two styles of writing (Enstrom, 1968, 1969). One, a formal script, has been used for special documents and books. The other is a rapidly produced, informal cursive style.

Traditionally, writing by hand was an adult skill passed from parent to child. When the formal education of children began, the adult skill of cursive writing was emphasized. But cursive handwriting was difficult for many young children to learn. Consequently, in 1913, Edward Johnston proposed that a simplified script would be easier for children. Teachers soon discovered that primary students could successfully learn the new style of writing. This simplified print later was termed *manuscript*.

Manuscript writing was first introduced in the United States in the early 1920s. Its acceptance gradually spread during the next 20 to 30 years. Today, both manuscript and cursive writing are taught in the majority of American schools (Addy & Wylie, 1973; Herrick & Okada, 1961; Owen, 1954; Soltis, 1963; Wolfson, 1962). Manuscript is commonly introduced in grades one and two, and instruction in cursive writing usually begins in grade three.

Despite the widespread practice of teaching both forms, some experts espouse the use of only one style. These advocates suggest that mastering two styles is more difficult than perfecting one. They further point out that there is no natural transition from manuscript to cursive.

Authors and educators who have championed manuscript writing for developmental and remedial penmanship include Hildreth (1963), Myklebust and Johnson (1967), Mecham, Berko, and Palmer (1966), and Templin (1964). Proponents of manuscript writing indicate that it: (a) is more legible than cursive handwriting; (b) closely resembles book print and therefore is an aid to both reading and spelling instruction; (c) consists of simple movements and hence is easier to learn than is cursive writing; (d) can be written as fast as the cursive style; (e) is required on documents including employment applications; (f) may be the preferred style for children with poor vision or motor difficulties; (g) requires fewer

reciprocal movements and changes of letter forms than does cursive writing; and (h) promotes the independence of letters within and between words.

Authorities who have promoted cursive writing for developmental and remedial penmanship include Cruickshank, Bentzen, Ratzeburg, and Tannhauser (1961), Early (1973), Fernald (1943), Kaufman and Biren (1979), McGinnis, Kleffner, and Goldstein (1963), and Strauss and Lehtinen (1947). Proponents indicate that the cursive style: (a) is faster than manuscript handwriting; (b) is continuous and connected and therefore is perceived as whole units; (c) may be the preferred style for orthopedically handicapped children; (d) results in less directional confusion than manuscript and therefore fewer reversals; (e) is preferred by parents, students, and teachers; (f) is more rhythmical and less cramping than the manuscript form; (g) is a prerequisite to reading cursive script; and (h) is easier to write.

Not all the claims advanced by supporters of either style of handwriting have been substantiated by empirical evidence (see Figure 1). For instance, research examining the comparative speed of the two styles and the effects of manuscript writing on spelling achievement has been inconclusive. The ability to write cursive letters also does not appear to be a necessary prerequisite to reading cursive script. There is considerable evidence, however, that manuscript is more legible than cursive writing, leads to greater gains in reading achievement, can be written as fast, and is easier to learn. The bulk of the evidence, then, tends to support the claims of manuscript style proponents. Nonetheless, the evidence is not conclusive and the relative effectiveness of the two styles has not yet been adequately demonstrated. To illustrate, the two-minute speed test used in many handwriting studies may yield misleading results (Enstrom, 1964). On a longer time sample, cursive script may be faster, more durable, and result in less fatigue.

Which letter forms should be taught? We recommend that manuscript print be maintained throughout the instructional program. Once a student acquires legible and fluent manuscript writing, the instructor should, when appropriate, teach cursive script as a separate but related skill. For many students, acquiring and maintaining two styles of handwriting does not present any overwhelming problems. Most students are eager to learn cursive script, and research suggests that the initial procurement of manuscript does not have a detrimental effect on the subsequent attainment of cursive writing. Still, cursive script should not be viewed as a replacement for manuscript. If both styles are taught, they should be learned and used throughout life.

For a small number of students, the cursive style may be a necessary alternate to manuscript. This practice is

### Relationship to Reading and Spelling

- The initial use of manuscript writing facilitates learning to read and leads to greater gains in reading than does cursive script (Cutright, 1936; Houston, 1938; Long & Mayer, 1931; Voorhis, 1931).
- The initial use of manuscript writing does not lead to greater gains in spelling in comparison to cursive script (Byers, 1963; McOmber, 1970; Varty, 1938).
- The initial use of manuscript writing leads to greater gains in spelling in comparison to cursive script (Cutright, 1936; Lindahl, 1938).
- The initial use of cursive script does not adversely affect spelling or reading achievement (Early, Nelson, Kleber, Treegob, Huffman, & Cass, 1976).

### Reading Cursive Print

- Manuscript writers have little difficulty reading cursive script (Hendricks, 1955; Plattor & Woestehoff, 1967).

### Transition

- The initial learning of manuscript has no detrimental effect on the later learning of cursive script (Crider, 1932; Gates & Brown, 1929; Goetsch, 1934; Heese, 1946).
- The acquisition of manuscript writing can improve a person's cursive script, and vice versa (Conrad & Offerman, 1930; Goetsch, 1934).
- Many students favor learning both manuscript and cursive writing (Gates & Brown, 1929).

### Ease of Learning

- For young children, manuscript is both quicker and easier to learn than is cursive writing (Gates & Brown, 1929; Hildreth, 1936; Townsend, 1951).

### Legibility

- Regardless of the mode of instruction or age of the writer, manuscript tends to be more legible than cursive handwriting (Borass, 1936; Foster, 1957; Freeman, 1936; Gates & Brown, 1929; Jackson, 1970; Templin, 1958; Turner, 1930).

### Fluency

- If instructional emphasis and practice are equivalent, students and adults write manuscript as fast as cursive script (Hendricks, 1955; Hildreth, 1945; Jackson, 1970; Turner, 1930; Washburne & Morphet, 1937).
- Students and adults write cursive script *faster* than they do manuscript (Foster, 1957; Gates & Brown, 1929; Gray, 1930).
- The speed of manuscript writing can be significantly increased through direct instruction (Conrad & Offerman, 1930; Gates & Brown, 1929).
- With substantial increases in speed, the quality of manuscript writing deteriorates less rapidly than cursive (Hendricks, 1955).

### Parents

- Parents generally object to their children using manuscript writing beyond the primary grades (Renaud & Groff, 1966).

**Figure 1**  
**Synopsis of Research on Manuscript and Cursive Writing**

recommended for students who are unable to master manuscript or repeatedly refuse to use this form because it looks "babyish."

### Legibility

Conventionally, the quality of handwriting had been rated on the basis of legibility. Legibility refers to the ease with which writing can be read. It is not a unitary characteristic but a composite of simpler elements. Research by Andersen (1969), Craig (1965), Jackson (1970), and Quant (1946) has indicated that readability of print is affected by: letter form, uniformity of slant, size of letters, compactness of space within and between words, alignment, and line quality. For the most part, these elements are interrelated. A change in one element frequently results in a change in another. Thus, no single factor distinguishes between samples of good and poor handwriting (Herrick, 1960).

Legible handwriting is generally neat and uniformly arranged. Letters are well-proportioned and properly formed. Words are evenly aligned, and the spaces within and between words are not extreme. The slant of each letter is regular, left to right, and not too acute (Brogden, 1933; Quant, 1946). Line quality is characterized by a light to medium gray line (i.e., if using a pencil). Conversely, handwriting of poor quality may differ on one or a combination of these traits.

### Fluency

If handwriting is to be functional and done with ease, it must be fluent. Fluency, or speed in writing, is an essential skill for taking notes, capturing one's thoughts, completing timed exercises, and so on. Speed of writing is a highly individual and relative matter (Harris & Rarick, 1957). Students who are forced to write faster than their normal rate may produce less legible handwriting.

Freeman (1954) indicated that an adult may easily reach a speed of 130 letters per minute. Earlier he had proposed the following norms (Freeman, 1915a): (a) grade two - 36; (b) grade three - 48; (c) grade four - 56; (d) grade five - 65; (e) grade six - 72; (f) grade seven - 80; and (g) grade eight - 90. Groff (1961) suggested that these norms may be too high and recommended the following: (a) grade four - 35; (b) grade five - 41; and (c) grade six - 50.

### Scope and Sequence

Figure 2 presents a handwriting scope and sequence divided into eight levels. Each level represents approxi-

mately one school year. Depending upon the student's characteristics and the severity of the handicapping condition, the rate of progression through the curriculum may be either decelerated or accelerated. In any case, the fundamental sequence of skills should remain intact.

Within the program, letters are introduced in groups that share common formational characteristics. Lower case and capital letters are presented separately. The formation of each letter is first overlearned, then practiced in context. For manuscript letters, we recommend an alphabet with oval shape letters rather than the more difficult circle and slant letters.

### THE HANDWRITING MODEL

The major objective of the handwriting model is to develop efficient, legible writers. To meet this goal, an effective program should be based on the following principles and conditions:

1. Handwriting instruction is direct and not incidental.
2. Because handicapped students exhibit a diverse range of handwriting achievement, instruction is individualized.
3. The handwriting program is planned, monitored, and modified on the basis of assessment information.
4. Successful teaching and remediation depend upon the flexible use of a wide variety of techniques and methods.
5. Handwriting is taught in short daily learning periods during which desirable habits are established.
6. Skills in handwriting are overlearned in isolation and then applied in meaningful context assignments.
7. Teachers stress the importance of handwriting and do not accept, condone, or encourage slovenly work.
8. Effective handwriting instruction is dependent upon the attitudes of both student and teacher.
9. The instructional atmosphere is pleasant, and motivation is promoted through incentives, reinforcement, success, and enthusiasm.
10. Teachers practice lessons prior to presentation and are able to write a "model" hand.
11. Students are encouraged to evaluate their own handwriting and, when appropriate, actively participate in initiating, conducting, and evaluating the remedial program.

12. Although students do develop personal idiosyncrasies, the teacher helps them maintain a consistent, legible handwriting style throughout the grades.

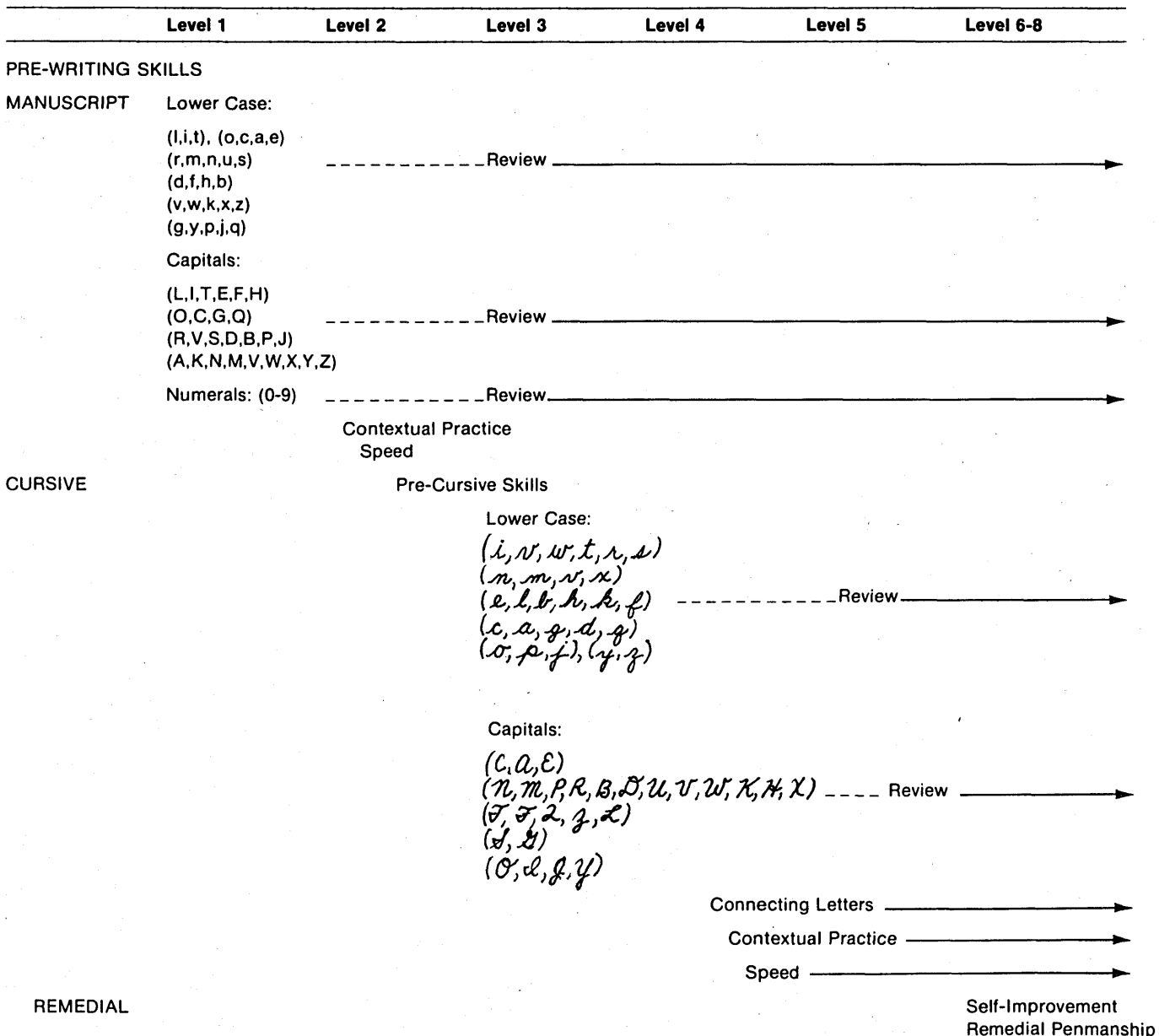
**Assessment**

Assessment is integral to handwriting instruction. Examination of the student's present level of performance, strengths and weaknesses, unique learning needs,

and progress is necessary for formulating, implementing, and evaluating an effective program. Evaluation of student progress should be made individually, and a suitable analysis should at least consider: (a) readiness for formal instruction; (b) general handwriting level; and (c) immediate causes of poor performance.

A few general principles are as follows:

1. A variety of both standardized and informal procedures should be used.



**Figure 2**  
**Handwriting Scope and Sequence**

2. Fluency and legibility should be measured on both copying and free writing exercises.
3. For assessment purposes, students should be told to write as well and as rapidly as they can.
4. The formation of letters should be assessed both in isolation and in written context.
5. Results of various assessments should not be considered as discrete, separate entities but should be analyzed for possible relationships.

### Readiness

As in other content areas, all children are not equally prepared to begin handwriting instruction. Students who have not attained sufficient mental maturity, motor control, or perceptual development are scarcely ready to participate in a formal program. How is handwriting readiness assessed? Generally, a student should demonstrate: (a) a mental age of 4-0 to 5-0 (Simon, 1957); (b) an interest and desire to write; (c) adequate muscular coordination; (d) the ability to make visual discriminations; (e) an understanding of the concept of left-to-right progression; (f) a writing hand preference (left or right); and (g) the ability to draw a circle, diagonal line, and horizontal line. Specific readiness activities have been described by Page (1964), Peterson (1975), Towle (1978), and Wright and Allen (1975).

### Handwriting Scales

Various standardized scales are available for measuring a student's general handwriting legibility and fluency. Figure 3 lists the most useful of these. In addition, the *California Achievement Tests* (Tiegs & Clark, 1970) and the *Test of Written Language* (Hammill & Larsen, 1978) each include a handwriting subtest.

Even though the use of an appropriate handwriting scale usually results in more reliable measurement than does informal teacher evaluation (Andersen, 1965), relatively few schools utilize scales to assess children's writing (Herrick & Okada, 1963; Wolfson, 1962). At least four factors are responsible. First, most handwriting programs have been designed to instruct children but not to measure the growth of that instruction. Second, handwriting scales are fairly crude instruments and, thus, not very useful for instructional purposes. Third, many teachers are insufficiently aware of the criteria for grading handwriting samples and ultimately rely on their own opinions (Rondinella, 1963). Fourth, what one teacher thinks is good or poor handwriting will most likely not agree with the judgment of another teacher (Feldt, 1962; Manuel, 1915; Watts, 1971). These four determinants, however, should not be considered as proof that handwriting scales serve no useful purpose. The reliability of a teacher's evaluations can be heightened by providing additional training and averaging

Scale	Style	General Description
• Bezzi Scale (1962)	Manuscript	A series of five-step scales for rating manuscript writing at the first, second, and third grade levels. Measures both quality and speed. Normed on a sample of 7,212 specimens.
• Thorndike Scale (1910)	Cursive	A 15-step scale for rating cursive writing in grades 1-12. Measures the general merit of a student's handwriting. Normed on a sample of 1,000 specimens.
• Ayres Scale (1912)	Cursive	An eight-step scale for rating cursive writing in grades 2-8. Measures the general legibility of a student's writing. Normed on a sample of 1,578 specimens, which were read by 10 judges.
• Freeman Scale (1915b)	Manuscript and Cursive	A series of five-step scales for rating manuscript (grades 1-2) and cursive (grades 2-8). Developed by collecting samples from throughout the United States. Legibility measured by examining letter form, uniformity of slant, uniformity of letter alignment, quality of line, and spacing between letters and words.
• West Scale (1926)	Cursive	A series of seven-step scales for rating cursive writing at each grade level. Measures both legibility and speed.
• Herrick & Erlebacher Scale (1963)	Cursive	A master continuum of rated samples for analyzing a wide variety of elements in handwriting. From the master scale, any number of subscales with predetermined elements can be used to evaluate cursive writing of intermediate grade students.

**Figure 3**  
**Handwriting Scales**

student scores from several independent sessions (Feldt, 1962). Further, Otto, Askov, and Cooper (1967) found that teachers experienced in using handwriting scales can make reliable judgments regarding legibility of a student's handwriting.

### *Informal Procedures*

Because using handwriting scales on a day-to-day basis is impractical, most handwriting evaluation is done informally (Addy & Wylie, 1973). Unfortunately, examining a student's themes or other written work provides only a limited amount of information. Obtaining samples of a student's handwriting under reasonably controlled conditions is more beneficial (Otto, McMenemy, & Smith, 1973).

Two simple ways of obtaining a measure of a student's fluency and legibility are copying and free writing exercises (Brueckner & Bond, 1955). On a copying exercise a student is typically given a sample sentence to reproduce. The sentence should contain all the lower case alphabet letters and be simple enough so the student knows the phrase thoroughly and how to spell each word. A sentence that meets this criteria is: "The quick brown fox jumps over the lazy dog."

On a free writing exercise, the student is asked to write from memory a sentence or simple selection, like a short, well known poem. For both copying and free writing exercises, fluency is determined by the number of letters the student can copy per minute over a short time. To judge legibility, the teacher concentrates on letter formation, uniformity and degree of slant, alignment, line quality, spacing between letters and words, letter size, general neatness, beginning and ending strokes and, where appropriate, the joining of letters.

In securing either a copying or free writing exercise from students, a teacher's directions often affect their performance. Otto, McMenemy, and Smith (1973) therefore have recommended that the teacher obtain a sample of each of the student's usual, best, and fastest writing. Specifically, the student first becomes familiar with the test sentence. Then the teacher instructs the student to write the sentence X number of times, "at your usual rate." (At least a two- or three-minute sample should be obtained.) Next, after a period of relaxation, the student is told to write the test sentence, "as well and as neatly as you can." Finally, after another relaxation period, the student is instructed to write the test sentence, "as rapidly as you can in three minutes." These procedures allow the teacher to identify students who are unable to meet minimum standards of fluency and legibility and

whose quality of handwriting deteriorates markedly under the requirement of speed.

In addition to copying and free writing exercises, the teacher should examine the student's knowledge of how to write letter forms and numerals. This can be done by asking the student to: (a) write the numbers 0-9 and the letters of the alphabet; (b) write letters and numbers as they are pronounced; and/or (c) copy specific letters and numbers. Further, written assignments can be examined periodically for possible causes of illegibility (see Brueckner & Bond, 1955, p. 390).

### *Self-evaluation*

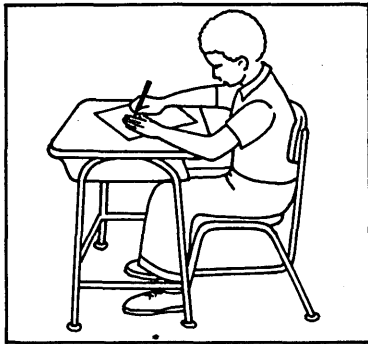
Since self appraisal is basic to all learning, it seems reasonable that students should assist in the evaluation process. Harris and Herrick (1963), however, reported that few children could judge the quality of a handwriting sample and use this as a basis to improve their own performance. Kaplan (1957) found that poor handwriters were less successful at rating the legibility of their writing than were good handwriters. These findings indicate that students should not be given the primary responsibility for evaluating their own handwriting, but the teacher should assist them in noting their progress over time. Also, teachers can train some students to evaluate letter formation through use of a letter template designed to slide under a semitransparent worksheet (Stowitschek & Stowitschek, 1979).

### **Handwriting Posture, Grip, and Position**

Early studies by Judd (1911) and Freeman (1918) revealed that children and adults use a combination of finger, hand, and arm movements during sustained writing. From this pioneering work a certain grip-movement pattern has come to be accepted as a standard. Essentially, the pen or pencil is seen as an extension of the forearm, and the writing movement combines vertical and side strokes to produce moderately slanted print. The hand is turned so that it rests on the third and fourth fingers and can move smoothly across the writing surface as the fingers form each letter (see Figure 4).<sup>1</sup> The writing instrument is held lightly between the thumb and the first two fingers, about an inch above the point. The first finger rests on the top of the instrument, while the end of the bent thumb holds it high in the hand, near the large knuckle, and pointed in the direction of the shoulder.

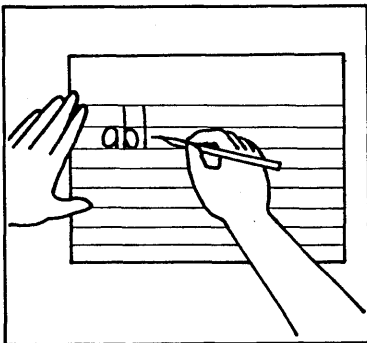
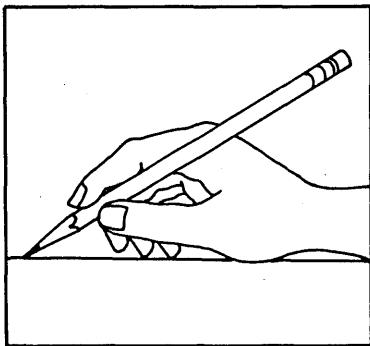
<sup>1</sup>Adjustments for left-handers are illustrated on page 12.





Posture

Pencil Grip

Paper Position  
for Vertical PrintPaper Position  
for Slanted Print

The student is seated comfortably so that the hips touch the back of the chair and both feet rest on the floor. The body leans slightly forward in a straight line, with both forearms resting on the desk and the elbows extended slightly. For vertical or manuscript print the student places the paper perpendicular squarely in front of him or her with the left side at about the center of the body. The student's left hand holds the paper in place and moves it along as needed. For slanted or cursive writing the paper is placed counterclockwise on the desk, as shown in the figure.

Not all good handwriters hold their writing instruments the same way (Little, 1943). For example, Callewaert (1963) suggested an alternative grip designed to relieve pressure and prevent fatigue. The writing instrument is placed between the middle and index fingers rather than between the thumb and index finger as in the traditional grip. And the wrist and hand are turned more sharply to the side. Otto, Rarick, Armstrong, & Koepke (1966) reported that this modified grip results in acceptable levels of speed and legibility.

Appropriate handwriting movements should be established as soon as possible and sustained throughout school. Probably the most common procedure for teaching posture, grip, and position is to model the correct response, physically prompt the student, and provide corrective feedback and reinforcement. Some teachers draw stick figures on the chalkboard to demonstrate these skills. Tape or a rubber band can also be placed on the writing instrument to remind students where to place their fingers (Foerster, 1975; Mendoza, Holt & Jackson, 1978).

### Letter Formation

Developmental and remedial procedures for teaching letter formation are the same for both manuscript and cursive writing. Letters are first overlearned in isolation through concentrated drill and practice, then applied within a written context. The initial formation of letters depends upon external prompts (e.g., copying, tracing) until eventually becoming internalized.

A combination of various instructional and motivational procedures is used to teach letter formation. These procedures include:

*Modeling.* The teacher writes the letter and names it. The student observes the number, order, and direction of the strokes.

*Noting critical attributes.* The teacher compares and contrasts the stimulus letter with letters that share common formational characteristics.

**Figure 4**  
**Posture, Grip, and Paper Positions**  
**for Right-handed Writers**

*Physical prompts and cues.* The teacher physically directs the student's hand in forming the letter. Additionally, the direction and order of strokes can be guided through use of arrows or colored dots outlining the letter shapes.

*Tracing.* The student forms the letter by tracing dot-to-dot patterns, dashed letters, a faded model, raised letters, or an outline.

*Copying.* The student copies the letter on a piece of paper or in wet sand (calling upon the tactile sense).

*Self-verbalization.* The student verbalizes the steps as the letter is written (using the auditory mode).

*Writing from memory.* The student writes the letter without the aid of cues.

*Repetition.* The student practices forming the letter, through concentrated multisensory drills.

*Self-correction and feedback.* The student corrects malformed letters with the assistance of a visual aid (e.g., desk or wall alphabet charts) or under the teacher's direction.

*Reinforcement.* The teacher praises the student and gives primary reinforcers for correct letter formation.

Even though all these procedures are not supported by empirical evidence, research does indicate that letter formation is enhanced through: (a) dramatization of progress (Johns, 1976); (b) copying and tracing (Hirsch & Niedermeyer, 1973); (c) verbalizing self-guiding instructions (Furner, 1969a; Kosiewicz, Hallahan, Lloyd, & Graves, 1979; Robin, Armel, & O'Leary, 1975); and (d) reinforcement and corrective feedback (Fauke, Burnett, Powers, & Sulzer-Azaroff, 1973; Hasazi & Hasazi, 1972; Lahey, Busemeyer, O'Hara, & Beggs, 1977; Nichols, 1970; Smith & Lovitt, 1973; Stromer, 1975). Moreover, Askov and Greff (1975), Gates and Taylor (1923), and Hirsch and Niedermeyer (1973) found that copying is a more effective technique than tracing. And a combination of several procedures appears to be superior to a single technique (Fauke et al., 1973; Kosiewicz et al., 1979; Robin et al., 1975).

Specific instructional strategies for teaching letter formation are given in Figure 5. With a few simple modifications these procedures can be used to teach number formation as well. Letter qualities like size, slant, alignment, and spacing can be improved by using lined or

graph paper, slant guides, corrective feedback, reinforcement, and self-evaluation.

## Fluency

Remedial procedures to improve speed are relatively straightforward. After the mechanics of handwriting have become automatic or habitual, speed is gradually increased by having the student apply and practice the skills on meaningful, written assignments. For some students, though, it may be necessary to provide self-competition on timed exercises plus motivation through reinforcement. Fluency can also be improved by increasing on-task behavior (Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979).

## Cursive Writing

The acquisition of cursive as a second style of writing is usually made sometime between first and fourth grades. This is primarily a matter of tradition since little evidence exists to support any of the widely used transition periods (McOmber, 1970; Otto & Rarick, 1969). A student's readiness to acquire a second style of writing should be determined on an individual basis rather than arbitrarily.

When should students begin formal cursive instruction? First, they should be proficient at writing and reading manuscript. Second, they should express an interest in learning the cursive style. Enstrom (1968) further indicates that it is helpful if the student's manuscript writing is slanted.

Once instruction begins, the cursive style can be learned in as little as six months (Crider, 1932; Gates & Brown, 1929). Initially, students practice drawing ovals and curved lines (O, ~, J). They should also be told that all lower case letters are connected,<sup>2</sup> that they start at the baseline, and that cursive script is to be slanted. Cursive letters are usually connected by overcurves (f) and undercurves (j). Therefore, teaching each letter and its connecting curve together (f + d = d; j + c = c) is advisable.

## The Left-handed Writer

A student's hand preference is probably the most obvious difference between individual writers. Approximately one of 10 children is left-handed, with boys

<sup>2</sup>Not all capitals are joined to lower case letters.

slightly outnumbering girls (Enstrom, 1957). Without intervention, many of these children develop an awkward, hooked writing position. Left-handed students should therefore receive special assistance as soon as formal instruction begins.

A common belief is that left-handed writers are less fluent and their writing less legible than their right-handed counterparts. Research by Guilford (1936), Horton (1969), and Lewis (1964) tends to support this supposition. Investigations by Clark (1957), Groff (1964),

Smith and Reed (1959), and Trankell (1956), however, found no significant differences between the two groups. This conflicting evidence may result from differences in instructional procedures rather than actual differences between left-handed (sinistral) and right-handed (dextral) students.

What special provisions should the teacher make for the left-handed student? First, before beginning instruction the student's hand preference should be determined. Second, left-handers in a class might be grouped in the

### **Fauke Approach** (Fauke et al., 1973)

1. The teacher writes the letter, and the student and teacher discuss the formational act.
2. The student names the letter.
3. The student traces the letter with a finger, pencil, and magic marker.
4. The student's finger traces a letter form made of yarn.
5. The student copies the letter.
6. The student writes the letter from memory.
7. The teacher rewards the student for correctly writing the letter.

### **Progressive Approximation Approach** (Hofmeister, 1973)

1. The student copies the letter using a pencil.
2. The teacher examines the letter and, if necessary, corrects by overmarking with a highlighter.
3. The student erases incorrect portions of the letter and traces over the teacher's highlighter marking.
4. The student repeats steps 1-3 until the letter is written correctly.

### **Furner Approach** (Furner, 1969a, 1969b, 1970)

1. Student and teacher establish a purpose for the lesson.
2. The teacher provides the student with many guided exposures to the letter.
3. The student describes the process while writing the letter and tries to write or visualize the letter as another child describes it.

4. The teacher uses multisensory stimulation to teach the letter form.
5. The student compares his or her written response to a model.

### **VAKT Approach**

1. The teacher writes the letter with crayon while the student observes the process.
2. The teacher and student both say the name of the letter.
3. The student traces the letter with the index finger, simultaneously saying the name of the letter. This is done successfully five times.
4. The student copies and names the letter successfully three times.
5. Without a visual aid, the student writes and names the letter correctly three times.

### **Niedermeyer Approach** (Niedermeyer, 1973)

1. The student traces a dotted representation of the letter 12 times.
2. The student copies the letter 12 times.
3. The student writes the letter as the teacher pronounces it.

### **Handwriting with Write and See** (Skinner & Krakower, 1968)

The student traces a letter within a tolerance model on specially prepared paper. If the student forms the letter correctly, the pen writes gray; if it is incorrect, the pen writes yellow.

**Figure 5**  
**Letter Formation Strategies**

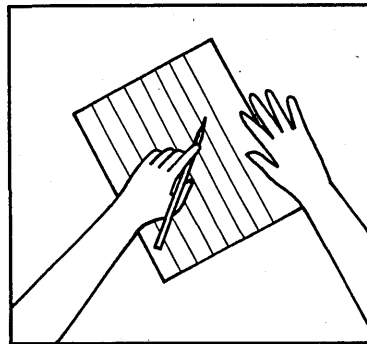
front right corner of the room facing the chalkboard. Third, the desk of a left-handed student should be slightly lower than that of a right-handed child of the same height. Fourth, the left-handed child should be provided a left-handed person as a model. Fifth, to help the student establish left-to-right direction, practicing on rightward sliding exercises is beneficial. Sixth, the student should be encouraged to do a lot of writing on the left side of the chalkboard. Finally, the left-handed student should always keep his or her writing paper turned somewhat clockwise and hold the pencil slightly farther back than right-handers do. Figure 6 presents four relatively effective approaches to writing with the left hand (Enstrom, 1957). Adjustments one through three are recommended unless a student has used hook writing for a long time or is unable to conform to any of those adjustments. Then, adjustment four might be effective.

### Diagnostic and Remedial Instruction

After the basic letter forms have been mastered, the bulk of the instructional program should be geared to helping students remedy specific difficulties. For the most part, this process is straightforward and uncomplicated. Examination of children's and adults' handwriting indicates that a few errors account for a large percentage of the illegibilities in writing (Horton, 1969; Kvaraceus, 1954; Lewis, 1964; Newland, 1932; Pressey & Pressey, 1927; Rollstin, 1949). For example, only four symbols— a, e, r, t— account for about 50 percent of all the malformed letters at any grade level. By focusing remedial and diagnostic instruction on the most common types of errors (see Otto, McMenemy, & Smith, 1973), the remedial teacher can improve both the student's quality and speed of handwriting.

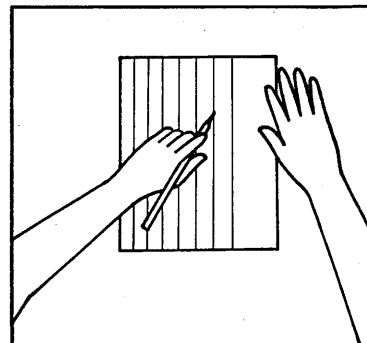
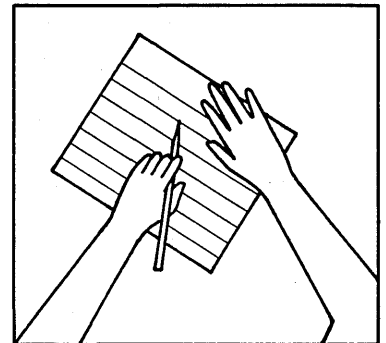
Even though elimination of common errors can decrease illegibilities by more than one-half (Lewis, 1964), a student's specific difficulties still must be identified. Individualizing instruction so that students' practice is confined to the problem areas is an effective instructional strategy for improving handwriting skills (Bradley, 1933; Cole, 1935-36, 1939; Scruggs, 1931; Tagatz, Otto, Klausmeier, Goodwin & Cook, 1968). Teachers can pinpoint specific handwriting strengths and weaknesses by using one of the various diagnostic charts available in many commercial programs or the *Criterion Test of Cursive Penmanship* (Starkel, 1975).

A type of error that deserves special consideration is the written reversal. Although reversal errors are generally rare after seven or eight years of age (Chapman,



Adjustment  
Number 1

Adjustment  
Number 2



Adjustment  
Number 3

Adjustment  
Number 4

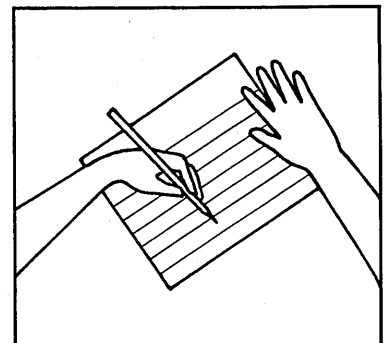


Figure 6  
Approaches to Writing With the Left Hand

Lewis, & Wedell, 1970; Schonell, 1942), a few older students continue to reverse letters and numbers.

In many instances, reversals disappear without direct intervention. For instance, Sidman and Kirk (1974) found that written reversals dissipate simply as a result of continued testing. Some students, however, do require direct instruction. The following are examples of direct intervention strategies:

1. The student simultaneously traces and names the problem letter.
2. The student writes the reversed letter to the right of the midline of the paper. If the symbol is written correctly, the student makes a row of letters moving toward and recrossing the midline so the end of the row falls into the proper writing place (Zaslow, 1966).
3. The teacher presents the student with a visual model of the problem letter and reinforces the correct written response (Cooper, 1970).
4. When initially teaching a commonly reversed letter, the teacher uses heavy black lines, color cues, or drawings to indicate directionality. The cues are then slowly and systematically withdrawn.
5. The student associates the problem letter with another letter that is not commonly reversed (e.g., c and d).
6. The teacher gives the student a verbal cue for correctly writing the letter (e.g., "B — right!").

### ADDITIONAL CONSIDERATIONS

In designing an appropriate handwriting program, the proposed methods, materials, reinforcers, and daily activities should be realistic with respect to the instructional time available. Our recommendation is to allot 50 to 100 minutes per week to handwriting instruction. The allocated time can be maximized by advantageous use of tutors and by assigning specific teaching responsibilities to the student's special and regular classroom teachers.

Beginning writers commonly are given comparatively large writing tools, but no objective evidence supports use of the beginner's pencil (Tawney, 1967; Wiles, 1943). The current practice of having students learn to write using large tools and later changing to smaller instruments may not be necessary in most cases. Neither does evidence support use of paper with widely spaced lines.

Finally, the effectiveness of an instructional program depends greatly upon the student's interest and motivation. Teachers can help students develop a "handwriting

consciousness" by showing examples that reveal the importance of legible handwriting and by encouraging pride in their written products. And teachers should practice their own recommendations, serving as role-models for their students.

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## ALERT

### October 30-November 1, 1980

Association for the Severely Handicapped  
Los Angeles, California

### October 31-November 1, 1980

Division for Children with Learning Disabilities  
Denver, Colorado

### February 15-17, 1981

CEC Conference on the Exceptional Black Child  
New Orleans, Louisiana

### February 18-20, 1981

CEC Conference on the Exceptional Bilingual Child  
New Orleans, Louisiana

### April 12-17, 1981

CEC Annual International Convention  
New York, New York