
Teachers' Survey on Problems With Handwriting: Referral, Evaluation, and Outcomes

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KEY WORDS

- elementary education
- legibility
- school-based practice

OBJECTIVE. The purpose of this study was to describe the factors that led elementary school teachers to refer students with handwriting difficulties to occupational therapy, the criteria they used to determine acceptable handwriting, and the handwriting outcomes they looked for after occupational therapy services.

METHOD. A paper questionnaire composed of 31 close-ended questions was mailed to 400 first- through fourth-grade regular education teachers from 32 states to collect data from the 2000–2001 school year. The data were analyzed descriptively using frequency counts and converted to percentages.

RESULTS. Information was obtained from 314 teachers. The main factor for handwriting referral to occupational therapy was that the student was not improving with classroom assistance alone. Teachers chose not being able to read student's writing as the main criterion they used to determine if the student's handwriting was acceptable, and increased legibility was the most important outcome they desired following occupational therapy services for handwriting remediation.

CONCLUSION. The perceptions of regular education teachers on problems with handwriting can provide valuable information to occupational therapy practitioners when providing consultation and direct services related to handwriting in schools.

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Children in elementary school spend 31% to 60% of each academic day on fine motor tasks including handwriting (McHale & Cermak, 1992). 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 (Briggs, 1980; Markham, 1976; Sloan & McGinnis, 1982). This finding indicates that problems with handwriting legibility can have an impact on students' academic success. Based on preliminary data, Sudsawad (1999) found a prevalence rate of handwriting problems in elementary school children of up to 20%.

Occupational therapy practitioners in the school setting work with students on improving the abilities and skills needed for academic tasks, including handwriting. Problems with handwriting has been identified as one of the most common reasons for referrals for occupational therapy services (Oliver, 1990; Reisman, 1993), and therefore one of the main foci of school-based occupational therapy. The occupational therapy practitioner's role for handwriting remediation is to assist both the teacher and the student by consulting with the teacher, making adaptations to the educational environment, and providing direct services to the

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student for skill acquisition (Feder, Majnemer, & Synnes, 2000). When planning occupational therapy services, it is important for practitioners to collaborate with teachers because they are the primary source of handwriting instruction, and they work with students on a day-to-day basis in the classroom. An understanding of teachers' perceptions related to handwriting such as what constitutes handwriting legibility in teachers' opinions, how teachers evaluate handwriting and criteria they use to determine acceptability of handwriting, and the outcomes teachers look for when referring students with handwriting difficulties to occupational therapy practitioners, is important for occupational therapy service provision.

Although in theory it is important for teachers and occupational therapy practitioners to have a common understanding of what constitutes legible handwriting in the classroom, having a common understanding between therapists and teachers is not always the case in practice. Daniel and Froude (1998) investigated the percent agreement of handwriting evaluation results between occupational therapists and teachers and found that the agreement between the two professions ranged only from 21% to 36%. Based on the results of this study, it is questionable whether teachers and occupational therapy practitioners use the same criteria when evaluating a student's handwriting legibility. In addition, there is also evidence that teachers' assessments of handwriting may not be congruent with those obtained from standardized handwriting measurement tools that occupational therapy practitioners use when evaluating handwriting. Sudsawad, Trombly, Henderson, and Tickle-Degnen (2001) compared teachers' judgments of legible handwriting with scores obtained by the Evaluation Tool of Children's Handwriting (ETCH) (Amundson, 1995) and found that the teachers' judgments of handwriting legibility had very small and nonsignificant correlations to the ETCH scores. One of the possible reasons for these findings, mentioned by the authors, was that the criteria teachers used to determine handwriting legibility differed from the criteria the ETCH evaluated.

In order to provide effective and relevant occupational therapy services, it is important to know the factors teachers use to determine their students' level of handwriting performance and what teachers perceive as acceptable handwriting in the classroom. How teachers evaluate their students' handwriting in the classroom has been conceptualized (Graham, 1986; Reisman, 1991), however no empirical study has been done to directly obtain information from teachers on what evaluation techniques they use. Legibility and speed have been identified as the two important determining factors of handwriting performance

(Graham; Graham, Weintraub, & Berninger, 1998; Groff, 1975; Stowitschek, Stowitschek, Hendrickson, & Gable, 1989). However, it is unknown at this time what components of legibility teachers take into account when evaluating their students' handwriting and the relative importance of each component as perceived by teachers.

In addition to knowing why teachers refer students to occupational therapy for handwriting remediation, what they use to evaluate handwriting, and the aspects of handwriting that are important to them, it is also important to know what outcomes they expect from handwriting remediation. Although standardized testing can be used to determine if there is progress in a student's handwriting performance (Unsworth, 2000), this type of measurement may not discern whether the suggested progress is seen by the teacher to be actual handwriting progress in the classroom. Therefore, it is important for occupational therapy practitioners to know what aspects of handwriting improvement teachers want to see or what they want their students to be able to do after services have been rendered.

The purpose of this study was to gather information, through a survey of first- through fourth-grade elementary school teachers, to address three specific research questions: (1) What are the factors that lead elementary school teachers to refer students with handwriting difficulties to occupational therapy? (2) What are the criteria elementary school teachers use to determine whether their students' handwriting is acceptable? and (3) What are the types of handwriting outcomes elementary teachers look for after the referred students receive occupational therapy services?

This information may help occupational therapy practitioners to better understand teachers' concerns and needs related to handwriting, to develop relevant goals and treatment plans for school children with handwriting difficulties, and to improve the collaboration between teachers and therapists.

Method

Study Design

This study used a mail survey method for data collection. Each participant filled out a paper-and-pencil survey questionnaire to answer questions related to problems with handwriting.

Participants

Of the 400 teachers to whom the questionnaire was sent, 314 (79%) responded including 85 first-grade teachers, 74 second-grade teachers, 74 third-grade teachers, 72 fourth-grade teachers, and 9 teachers in multigrade-level classrooms. Teachers were included in this sample if they were

first- through fourth-grade teachers in a regular education classroom who worked full-time in their position at the time of the survey. The participants were from 32 states including all major geographic regions of the United States. Most participants were female (95.7%), more than 40 years old (57.2%), and had been teaching for a range of 1 to 40 years ($M = 13.8$, $SD = 8.9$). Most participants reported teaching the same grade level for a range of 1 to 32 years ($M = 8$, $SD = 6.8$). Education was the primary college major of teachers (88%). The remainder had other college majors such as communication, psychology, or history. For level of education, 48.8% of the participants had a bachelor degree and 45.8% had a master degree, while 5.4% selected "other" to refer to their degree plus continuing education credits.

Instrument

A paper questionnaire composed of 31 close-ended questions was developed to obtain demographic information of the respondents and to address the study's three research questions. Each available choice within each question was given a code number to facilitate the data gathering and analysis process. The questionnaire was organized for a maximum flow by putting similar items next to one another, and items were arranged logically to ease the participant's response effort. Questions' choices were derived from both teachers' feedback (from pilot data) and published literature (Cornhill & Case-Smith, 1996; Graham, Weintraub, & Berninger, 1998; Groff, 1975; Kao, 1979; Stowitschek et al., 1989).

A preliminary pilot study was conducted by distributing the questionnaire to 12 first- through fourth-grade teachers who were not participants in this study. The teachers were asked to complete the questionnaire and comment in writing on their overall impression of the questionnaire and on choices that they felt were unclear or that they did not understand. Following the questionnaire revision based on the preliminary feedback, a second pilot study was conducted with a different group of five first- through fourth-grade teachers who were not participants in this study. These teachers first filled out the questionnaire and were then contacted individually for an in-depth discussion of their impression of the questionnaire, its logical flow, and to obtain any comments they had on the questions and question choices. The questionnaire was then revised again based on the feedback from the second pilot study.

The demographic and background information portions of the questionnaire were included to obtain information about the teacher's personal demographics and their current teaching setting. Questions also addressed the teachers' current practices concerning the teaching of hand-

writing, and whether the teachers thought handwriting was an important skill for their students.

Six questions on the questionnaire addressed the first research question regarding the factors that led elementary school teachers to refer students with handwriting difficulties to occupational therapy. These questions were related to the referral of students with handwriting difficulties to occupational therapy (whether teachers referred and why or why not) and the handwriting problems typically seen in the referred students.

Seven questions on the questionnaire addressed the second research question regarding the criteria teachers used to determine acceptability of their students' handwriting. These questions addressed the criteria used to determine whether a student demonstrated handwriting difficulties, how teachers evaluated their students' handwriting, and if they graded their students' handwriting. Teachers were also asked to rank the importance of handwriting to them, and to indicate their expectations of acceptable handwriting for their students.

Three questions on the questionnaire addressed the third research question regarding the types of handwriting outcomes elementary teachers looked for after the referred students received occupational therapy services. These questions asked the teachers how they felt occupational therapy services should be delivered, and to choose the outcomes they would like to see at the conclusion of occupational therapy services.

The questionnaire was accompanied by a cover letter indicating the reason for this study. The cover letter also stated that the questionnaire would take approximately 20 minutes to complete, responses would be confidential, and that filling out and returning the questionnaire indicated consent to participate in this study.

Procedure

This study received an exempted status from the researchers' university institutional review board for the protection of human subjects. A preliminary recruitment was conducted through the Internet. A mass e-mail was sent out, during the first semester of the 2000–2001 school year, to all available e-mail addresses of first- through fourth-grade teachers in public schools from 49 states (Alaska was not included due to unavailable Web sites). The e-mail content included the information about this study, and asked if the teacher would be interested in participating. Teachers received the e-mailing if their school had a Web site on the Internet and if that Web site listed their e-mail addresses. The questionnaire, a cover letter explaining the purpose of the study, and a self-addressed, stamped return envelope were sent out during the second semester of the 2000–2001 school year, to the first 400 teachers who

both indicated their willingness to participate and met the study's inclusion criteria. Neither a follow-up questionnaire nor a reminder postcard was sent due to the good response rate.

Data Analysis

The quantitative data received through this questionnaire were analyzed using descriptive statistics to summarize responses. A frequency count was obtained for each answer choice on all questions. The frequency was then converted to a percentage based on the ratio of each answer choice's response frequency to the total number of responses for that question. The data analysis was completed using the Statistical Package for the Social Sciences (SPSS) (version 10.0.0).

Results

Of the 400 questionnaires mailed to teachers in 49 states, 314 were returned from teachers in 32 states yielding a 79% response rate. Classroom demographics indicated that the average number of students per classroom was 22, with an average of five students (23%) demonstrating handwriting difficulties per classroom, similar to the previous report of 20% (Sudsawad, 1999).

Not all teachers answered all questions on the questionnaire. In the following reporting of results, the number of respondents is not the same for each question, and will therefore be reported throughout (denoted by an *n*).

Occupational Therapy Referral

The first research question pertained to the deciding factors that led teachers to refer students to occupational therapy for handwriting remediation. Of the teachers who responded to the survey (*N* = 314), 18% indicated that they referred students to occupational therapy services for handwriting remediation during the 2000–2001 school year, with the most frequently chosen reason for referral as student was not improving with classroom assistance alone. Illegible handwriting was indicated as the handwriting problem most frequently seen in those students. The rest of the participants (82%) reported that they did not refer, mainly because they worked on resolving handwriting difficulties in the classroom themselves, and because they did not know that they could refer students to occupational therapy for handwriting. See detailed results related to occupational therapy referral in Table 1.

For the teachers who did refer handwriting students to occupational therapy (*n* = 57), 42% referred one student, 28% referred two students, and 11% referred 3–4 students. Nineteen percent of those referring their students for occu-

Table 1. Findings Related to Occupational Therapy Referral

Reason for referral ¹ (<i>n</i> = 57)	
Student not improving with classroom assistance alone	94.7%
Student started out with handwriting delays needing help to catch up	75.4%
Student becoming increasingly frustrated with handwriting	73.7%
Parent requesting further handwriting intervention	47.4%
Student's handwriting getting worse	30.6%
Most frequent handwriting problem areas (<i>n</i> = 57)	
Illegible handwriting	49.2%
No uniformity to letter size or case	15.8%
Student being frustrated with handwriting	10.5%
Awkward pencil grip	7.0%
No handwriting improvement in class	3.5%
Slow pace or can't keep up with peers	3.5%
Poor spacing of letters or words	3.5%
Other (parent referral and physical impairment, other fine motor challenges, large letter)	7.0%
Reasons for not referring students to occupational therapy services ¹ (<i>n</i> = 257)	
Teachers worked on resolving handwriting difficulties themselves	53.7%
Teachers did not know they could refer students for handwriting	38.3%
Teachers believed that occupational therapy services were not available	20.1%
Teachers had not had students needing occupational therapy services	14.0%
Teachers referred students with handwriting difficulties to other sources	7.0%
Other ² (e.g., could not refer unless student was in special education, handwriting problem was due to developmental readiness, etc.)	19.0%

Note. ¹Each respondent indicated all applicable choices given on this questionnaire item. Therefore, the response percentages equal more than 100%. ²No specific theme emerged from this question choice.

pational therapy services did not respond with the number they had referred.

Criteria Determining Acceptable Handwriting

The second research question pertained to the criteria teachers used to determine acceptability of their students' handwriting. The two factors that teachers (*n* = 299) indicated most frequently as very important factors for handwriting to be acceptable were correct letter formation and directionality and proper spacing. See the percentages of teachers who chose the level of importance for each factor in Table 2.

The most important criteria that teachers (*n* = 314) used to determine whether or not a student is having handwriting difficulties was their not being able to read the student's writing. The majority (89.5%) answered the inquiry about the methods they used to evaluate their students' handwriting, with the most frequently used evaluation method of comparing student handwriting to classroom peers followed by comparing student handwriting to models in a book. The remainder (10.5%) indicated that they did not evaluate their students' handwriting. See detailed results in Table 3.

Of all participants (*n* = 314), the majority (72.7%) reported that they graded students on the quality of hand-

Table 2. Relative Importance of Factors That Teachers Used to Determine Acceptable Handwriting

Students should demonstrate:	Very Important %	Somewhat Important %	Important %	Not Important %
Correct letter formation and directionality	55.2	40.5	4.0	0.3
Proper spacing	55.2	40.1	4.7	0.0
Letters sit on writing line	38.5	50.2	11.0	0.3
Uniformity of letters	28.4	55.5	14.1	2.0
Appropriate size print for grade level	25.1	48.2	25.0	1.7
Attentiveness to handwriting activity	22.7	54.5	19.5	3.3
Motivation toward handwriting task	16.4	44.1	32.1	7.4
Smooth appearance of letters	11.4	49.5	35.8	3.3
Pencil pressure (line thickness)	4.3	30.4	51.3	14.0

Note. Each respondent indicated the level of importance of all factors given on this questionnaire item. Therefore, each row of response percentages equals to 100%. n = 299.

writing (legibility, neatness, writing on the line, etc.) and that good handwriting was either important or very important to them (80%). Fifty-eight percent indicated that they assigned time for handwriting instruction or practice at least once a day to a couple times a week. Fifty-four percent felt that the time they spent on handwriting instruction and practice in the classroom was sufficient but, if possible, 62% would have liked to spend more time on this activity. Ideally, most teachers (69%) would have liked to have 3–5 handwriting instruction sessions per week with 15–20 minutes per session. The majority of the teachers (58%) used a specific handwriting instruction program to teach handwriting, with Zaner Bloser (Hackney, 1999) being the top program reported.

Expected Outcomes Following Occupational Therapy

The final research question pertained to the teacher's expectation of occupational therapy service outcomes after their students received occupational therapy services for handwriting remediation. The teachers who indicated that they referred students for occupational therapy services ($n = 57$) were asked about therapy outcomes. Increased legibility was

the most frequently ranked as the most important outcome by the majority of the teachers (64.4%), followed by students being less frustrated with writing (14%), writing in left to right direction (7.4 %), able to perform age- or grade-level writing expectations (5.3%), good pencil grip (3.5%), able to keep up with required writing pace for classroom writing activities (1.8%), achieve an average handwriting (1.8%), and develop writing hand preference (1.8%).

Fifty-two teachers answered the question about service delivery models. The majority of teachers (57.7%) thought the "pull-out" method was the best service delivery model. The choices that were less frequently indicated as the best way to provide occupational therapy services were for the therapist to consult with the teacher on techniques to use with the student (28.8%) and for the therapist to work with the student in the classroom (13.5%).

Discussion

The results of this study provided insights on factors related to elementary school teachers' perceptions of handwriting. Information has been obtained as to why teachers refer handwriting students to occupational therapy, what teachers feel qualifies as acceptable handwriting, and what outcomes teachers would like to see after occupational therapy services have been rendered.

Occupational Therapy Referral

The leading reason that teachers referred students demonstrating handwriting difficulties to occupational therapy (not improving with classroom help alone) may be interpreted to mean that, at first, teachers tended to work on remediating handwriting problems themselves, and that they only referred the student to occupational therapy after their attempts yielded unsatisfactory results. The other top responses for occupational therapy referral, student needs more help to catch up and are increasingly frustrated with handwriting, support the idea that although they did try to

Table 3. Other Findings Related to Criteria Used to Determine Acceptable Handwriting

Criteria teachers used to determine whether students had handwriting difficulties (N = 314)	
Not being able to read student's writing	67.8%
Student not performing at age/grade level in writing	14.6%
Student not being able to keep up with the writing pace of the classroom	5.1%
Student's handwriting is below average	3.8%
Other ¹ (e.g., incorrect formation of letter, poor/improper pencil grip, student unable to read his or her own writing, etc.)	8.6%
Methods teachers used to evaluate handwriting (n = 281)	
Comparing student handwriting to classroom peers	36.6%
Comparing student handwriting to models in a book	34.5%
Using formal handwriting assessment ²	26.7%
Comparing student handwriting to teacher's own writing	2.2%

Note. ¹No specific theme emerged from this question choice. ²The majority did not answer the inquiry of specific formal assessment used, and those who answered listed the components of handwriting they focused on when assessing students' handwriting (e.g., slant, size, formation) rather than identifying the specific assessments used.

work on handwriting in the classroom, teachers understood when help was needed beyond what they could provide.

The reasons teachers gave as to why they did not refer students to occupational therapy for services related to handwriting, even when 23.1% of students in their classroom demonstrated handwriting difficulties, seem to show that teachers may not know enough about occupational therapy or about what occupational therapy practitioners can do to help them in the classroom. This finding seems to indicate a need for more advocacy for, and education about, occupational therapy services for handwriting, and for occupational therapy practitioners to work collaboratively with teachers to define clear guidelines and procedures for appropriate referrals of students with handwriting difficulties for occupational therapy services.

In some cases, referring students who have handwriting difficulties to occupational therapy services may not be possible. According to the Individuals With Disabilities Act, occupational therapy is a related service put into place to assist students who receive special education (Individuals With Disabilities Act of 1997). In a number of school districts, students must already be in special education programming or have a medically documented condition to be able to receive the related service of occupational therapy. In some cases, students with handwriting difficulties may neither receive special education nor have a medical condition. In that case, the teacher may have no other choice but to work on handwriting remediation on his or her own.

Criteria Determining Acceptable Handwriting

Although past literature suggested important underlying components of handwriting legibility (Cornhill & Case-Smith, 1996; Daniel & Froude, 1998; Reisman, 1991), it is not clear what degree of each component (or their combinations) constitutes legible handwriting (Graham, 1986). The findings of this study help to describe some of the components that teachers considered to be more important than others when determining acceptable handwriting.

Despite the importance teachers placed on each of the handwriting components, the main criterion teachers used to determine whether or not a student had handwriting difficulties still concerns the overall readability of a student's handwriting comparing to the student's peers. The findings from this study seem to also indicate that legibility is given more emphasis by teachers than pace (speed) of writing, evidenced by the higher ranking that the legibility-related items received compared to the speed-related item.

The results of this study support a suggestion from the literature that teachers do not use standardized assessment tools, but rather assess their student's handwriting subjectively, through visual analysis (Daniel & Froude, 1998;

Graham, 1986). Findings from this study also support a speculation from the study by Sudsawad, Trombly, Henderson, and Tickle-Degnen (2001) that teachers may take into consideration the components of handwriting, as opposed to just global legibility, when evaluating their students' handwriting. Although teachers felt legibility was important, it appears that in their visual analysis when determining the acceptability of handwriting, teachers took into account letter formation, spacing, letters sitting on the writing line, uniformity of letters (size), and the student's attentiveness to the handwriting activity, in addition to global legibility.

Expected Outcomes Following Occupational Therapy

The top desirable outcomes specified by the teachers indicated that improved handwriting function in the classroom context was an ultimate goal that the teachers expected at the conclusion of occupational therapy services. In order to provide relevant services with satisfactory outcomes related to handwriting remediation, the changes that teachers specified as being important should be taken into consideration when setting up the overall goals of occupational therapy services. Although occupational therapy practitioners already work on the underlying components of writing skills (e.g., left to right direction, speed, reversals, etc.), improvement in those components alone (Case-Smith, 2002; Duger, Bumin, Uyanik, Aki, & Kayihan, 1999) may not be sufficient to produce satisfactory treatment outcomes. Rather, the occupational therapy practitioners may need to focus beyond the component level and consider the improvement on a functional level (as indicated by the teachers) in a natural environment (in the classroom setting) as the overall goal when working on handwriting remediation.

The majority of teachers surveyed felt that occupational therapy practitioners should pull the student from classroom to work on handwriting, which is opposite of the current trend in occupational therapy service delivery to either provide more indirect and consultative services in the schools (Feder et al., 2000) or combine the two types of service (Case-Smith & Cable, 1996). More information is needed to determine why teachers preferred the pull-out method for handwriting remediation when it has been shown in one study that teachers have a more positive attitude about the services provided when receiving collaborative consultative services (Dunn, 1990). These findings may indicate that the type of service desired by teachers is dictated by the nature of the reason for referrals (e.g., handwriting issues versus other issues, such as gross motor skills or activities of daily living). More studies are needed to confirm this speculation.

Limitations

The participants' selection may have been a limiting factor in this study. Participants were selected from the Internet if their school had a Web site with a listing of the teachers' names and e-mail addresses. Selection in this manner excluded schools that did not have an Internet Web site, which may have influenced the characteristics of the participant pool. For example, schools that do not have a Web site may be smaller schools, not as technologically advanced, located in rural areas, or located in lower socioeconomic communities. The characteristics of teachers in these schools could have been different from those included in this study. Therefore, the results can only be generalized within the limits of representation of 32 states and regular education teachers in this study only.

Implications for Practice

This study provides descriptive information that may be used by occupational therapy practitioners when working with children who are referred for handwriting remediation in the school setting. Occupational therapy practitioners can use the information obtained regarding why teachers refer handwriting students to occupational therapy and the criteria teachers use to determine whether their students' handwriting is acceptable will help occupational therapy practitioners be aware of teachers' methods of handwriting evaluation, and the components they considered important in determining handwriting acceptability. This awareness can also help structure both the content of the occupational therapy evaluation as well as the goals of therapy to ensure that occupational therapy practitioners focus on what is important to teachers in the classroom setting, and that occupational therapists' handwriting assessments produce results that are relevant to the children's handwriting function in the classroom as determined by their teachers.

Because the majority of teachers did not refer handwriting students to occupational therapy, it may indicate the need for occupational therapy practitioners to advocate for themselves and their handwriting treatment services. This can be done by providing in-service to teachers about occupational therapy and occupational therapy services, as well as making themselves available to teachers for assistance with handwriting questions the teachers may have. Occupational therapy practitioners should also be aware that, according to the findings from this study, teachers might prefer a pull-out service delivery model than other models for handwriting remediation in the school setting. Future studies to examine further what teachers know about school-based occupational therapy and why they pre-

fer the pull-out service delivery model would also be of benefit to the occupational therapy community. More information is also needed to understand the components and techniques teachers use to evaluate their students' handwriting in order to develop future handwriting assessments that measure these components.▲

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