

CURSIVE HANDWRITING INSTRUCTION IN K-12 CLASSROOMS: A SYSTEMATIC REVIEW OF RESEARCH

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Rationale

In recent years, educational policy has shifted toward including cursive handwriting in state standards, as states such as Oklahoma, Iowa, Kentucky, and California have reintroduced cursive requirements. This renewed emphasis has created a need to identify effective and efficient ways to teach cursive, especially because cursive differs from print in letter formation and in the connected strokes used within words.

Prior reviews of handwriting instruction have focused much more heavily on print than on cursive (Datchuk & Kubina, 2013; Ray et al., 2022; Santangelo & Graham, 2016). As a result, most of what is currently known about effective handwriting instruction and its influence on related writing outcomes comes from the print handwriting literature. Therefore, the Iowa Reading Research Center (IRRC) chose to conduct a systematic review of experimental research on cursive handwriting instruction.

This systematic review examines whether the differences between print and cursive call for distinct instructional practices and whether cursive instruction affects related writing outcomes.

In 2024, the IRRC launched the Literacy LIFTER (Letter Identification and Formation for Transcription and Early Reading), a free tool and eLearning module designed help educators and caregivers support students' handwriting and early reading skills. In response to the reintroduction of cursive requirements in Iowa, the center developed Cursive LIFTER, or CLIFTER, extending these resources to include cursive handwriting instructional materials. This review, then, aims to synthesize the findings of research on cursive instruction in order to refine CLIFTER and develop further cursive handwriting instructional materials that are grounded in research.

Key Findings

This systematic review examined 26 studies of cursive handwriting instruction for students in PK–12 and identified the following key findings:

- Studies in this review generally align with previous research showing that handwriting instruction can support students' transcription and writing development.
- Effective cursive instructional practices appear to be similar to those found in print:
 - Explicit instruction
 - Memory retrieval
 - Repeated practice
 - Visual cues
 - Integration of technology

However, cautious interpretation of results is warranted, due to varying methodological study quality and a relatively small number of studies within different instructional types.

This review also highlights several areas where more research on cursive handwriting instruction is needed. Analyses of factors that might influence outcome (e.g., age, disability type) were not possible due to a limited number of studies in each category. In addition, more than half of the studies in this

sample were completed outside the U.S., so contextual factors such as educational policy (e.g., in some countries, cursive is taught prior to print) and language of student writing, should be considered when comparing results across the included studies.

Method

Search Procedures

This systematic review followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses procedures (PRISMA; Page et al., 2021) and used multiple search methods to identify relevant studies, including electronic database searches, hand searches, and ancestral and forward citation searches. In September 2024, we searched EBSCOHost, Education Source, APA PsycInfo, and ProQuest Dissertations using terms related to cursive handwriting, literacy, and instruction. The search initially produced 2,564 records; after removing duplicates and screening titles, abstracts, and full-text articles, 21 studies met inclusion criteria through the electronic search. Five additional studies were identified through ancestral and forward searches, resulting in 26 studies included in the final review.

A percentage of studies were reviewed by a third reviewer throughout the screening process (33% of excluded studies at the abstract stage and 20% of all included studies at the full-text review stage) to ensure that no relevant studies were missed.

Inclusion Criteria

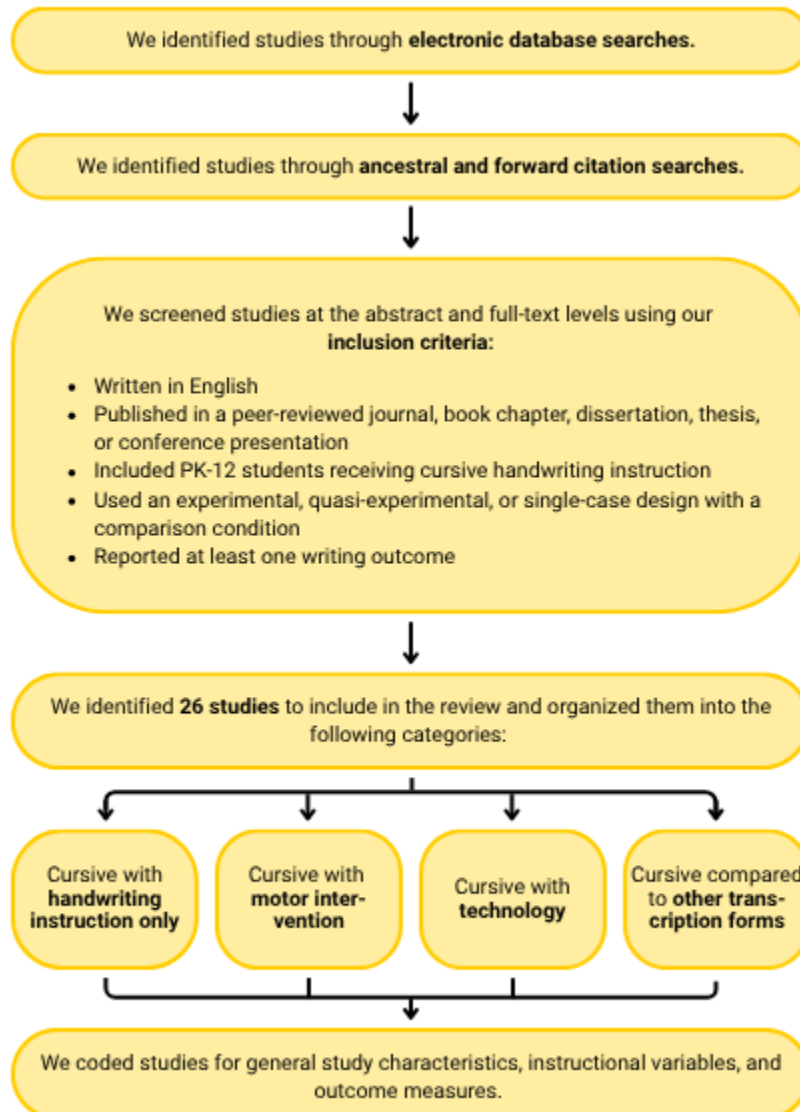
Studies were included only if they were written in English and published in a peer-reviewed journal, book chapter, dissertation or thesis, or conference presentation. Participants had to be PK–12 students, and the study had to involve cursive handwriting instruction explicitly delivered by an agent such as a teacher, peer, or computer. In addition, studies were required to use an experimental, quasi-experimental, or single-case design with a comparison condition and to report at least one writing outcome.

Coding

Studies were coded for characteristics such as research design, location, participant demographics, instructional features, dependent variables, effect sizes, and methodological quality. Instructional variables included the dose and duration of instruction as well as whether studies used explicit instruction, memory retrieval, visual cues, technology, or motor integration. Outcome measures included handwriting, spelling, sentence writing, and discourse writing. 40% of all codes were randomly selected and double-coded by an outside coder for reliability. Interobserver agreement was calculated at 91%.

For effect sizes, standardized mean differences (SMDs) for group-design studies and between-case standardized mean differences (BC-SMDs) for single-case studies (Hedges et al., 2012; Pustejovsky et al., 2014; Shadish et al., 2002) were used. Methodological quality was also coded using standards drawn from Santangelo and Graham (2016) for group designs and the What Works Clearinghouse (2022) for single-case studies. All quality codes were double coded by the research team to ensure reliability.

Search Procedures

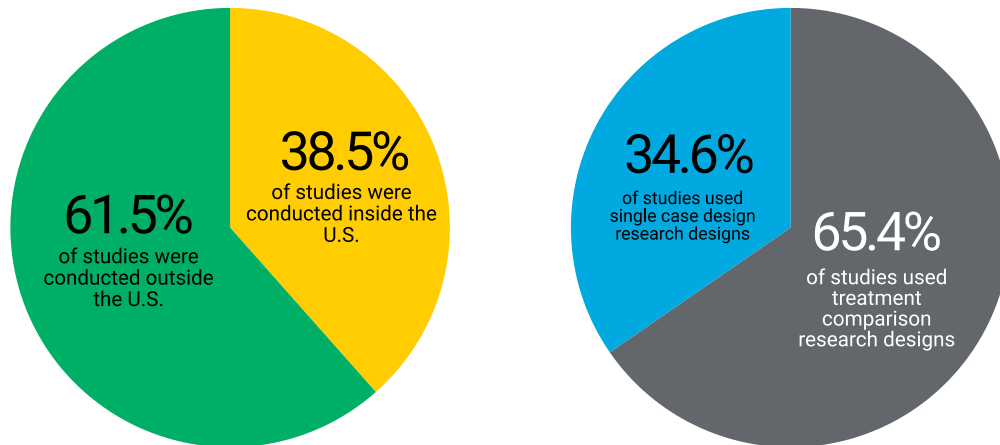


Results

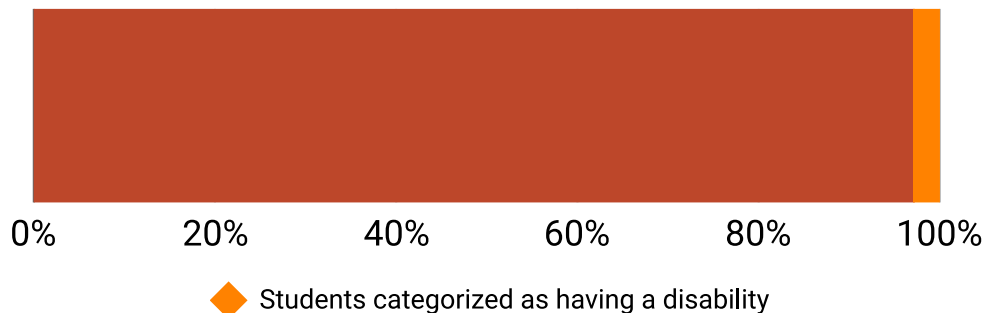
The review included 26 studies published between 1978 and 2024. Most were conducted outside the United States and included 1,826 students ranging in age from 5 to 18. The length and dosage of cursive handwriting intervention varied across studies, so we organized the results into four categories: cursive handwriting instruction only, cursive with motor intervention, cursive with technology, and cursive compared with other forms of transcription.

Characteristics of Included Studies

The 26 studies included in this review were conducted between **1978–2024**.



Across studies, a total of **1,826** students participated in cursive handwriting intervention studies, **54** of which (3%) were categorized as students with disabilities. Participating students' ages ranged from **5 to 18**.

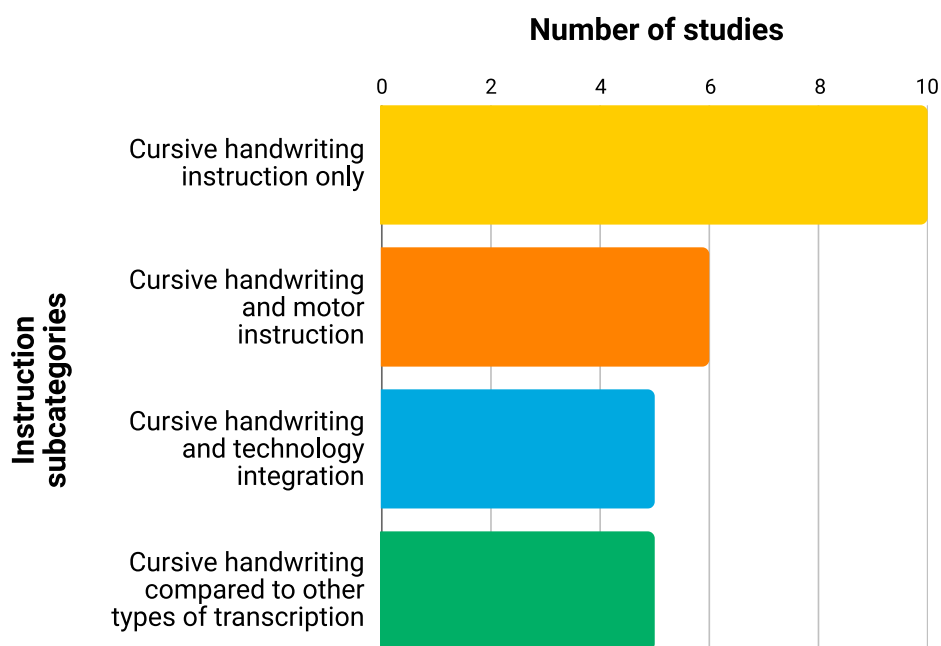


Cursive Handwriting Instruction, Motor Instruction, and Technology

Generally, studies focused on cursive instruction alone showed positive effects on handwriting outcomes, especially legibility and fluency (DeAngelis et al., 1995; Karlsdottir, 1996; Limpo et al., 2018; 2020; Mabee, 1988; Maguire, 1992; Shimel et al., 2009; Sweeney et al., 1993; Trap et al., 1978). Across these ten studies, the most common instructional components were explicit instruction, visual cues, memory retrieval, and repeated practice with self-monitoring. Findings for motor-based instruction from six studies were mixed. In some cases (Bara & Bonneton-Botte, 2018; Lockhart & Law, 1994; Nunez-

Regueiro et al., 2024), embedded movement activities improved some measures of performance, but in others (Chung, 1993; Kaiser et al., 2011; Semeraro et al., 2019), additional handwriting practice without motor exercises produced stronger results. Technology-based instruction also showed promising but still preliminary effects in five studies (Bonneton-Botte et al., 2020; Ecalle et al., 2021; Puyjarinet et al., 2022; Shepard, 1985; Sovik & Teulings, 1983). The use of technology such as tablet and stylus activities, video models, and other digital technology often improved handwriting performance, although results varied across studies and sometimes depended on students' initial skill levels.

Number of Included Studies by Instruction Type



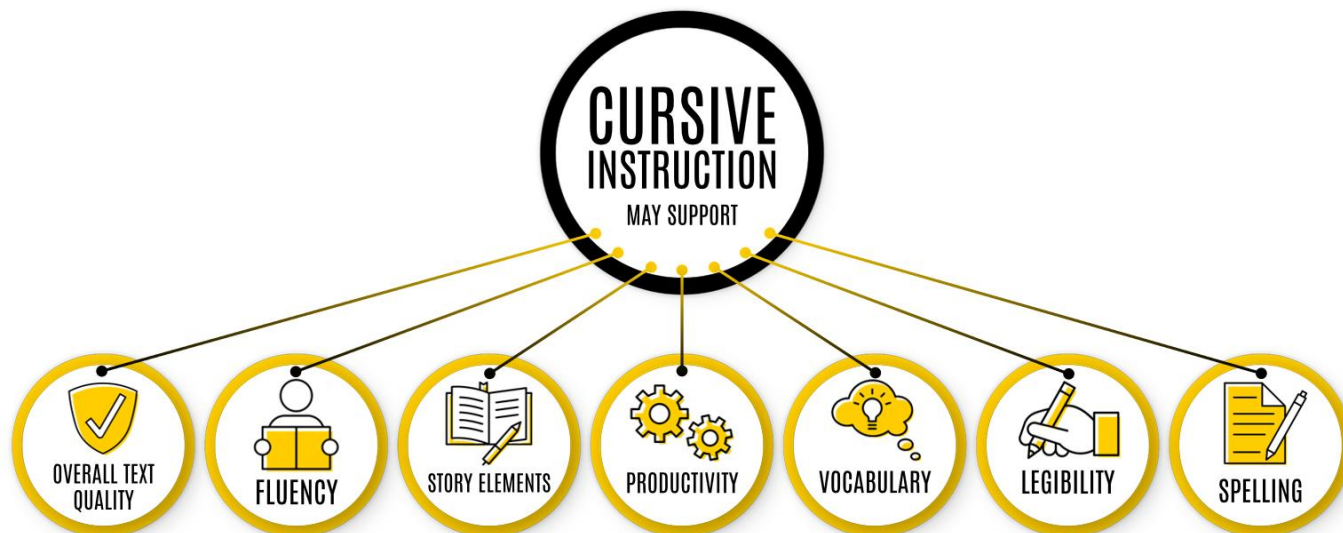
Cursive or Other Types of Transcription

When cursive was compared with print handwriting (Eder, 1983; Hurschler Lichtsteiner et al., 2018; Rock, 1986; Wolf et al., 2017) or keyboarding (Alves et al., 2016), results were inconsistent. Four studies found that students in print conditions outperformed those in cursive conditions on some handwriting, spelling, or writing measures, suggesting that cursive may require more instructional time before it becomes automatic. At the same time, cursive handwriting outperformed keyboarding on handwriting and writing productivity outcomes (Alves et al., 2016). Taken together, the results section suggests that cursive instruction can improve handwriting and may support the development of related writing skills.

Sentence- and Paragraph-Level Writing Skills

Five studies examined whether cursive instruction has an impact on sentence- and paragraph-level writing outcomes. Compared with non-handwriting conditions such as drawing instruction or no-treatment baselines, cursive instruction was associated with stronger holistic quality, longer clauses, and more story elements, although gains in total words written were less consistent (Chung, 1993; Limpo et al., 2018, 2020). When compared with other transcription conditions, results were more variable: Alves et al. (2016) found that cursive instruction outperformed spelling and keyboarding on vocabulary diversity, holistic quality, and story elements, whereas Hirschler Lichtsteiner et al. (2018) found no significant differences in holistic quality across cursive, spelling, reading, and combined cursive-plus-spelling conditions.

Potential Benefits of Cursive Instruction



Discussion

As more schools in the United States expect students to learn both print and cursive handwriting, this review suggests that cursive instruction can improve the legibility and fluency of students' cursive writing. The review also indicates that gains in cursive handwriting may extend to related literacy outcomes, including spelling and the quantity and quality of written compositions.

However, these findings should be interpreted cautiously, given the relatively small number of studies and the uneven methodological quality across the evidence base. In addition, due to the varying contexts that studies were situated in, generalizability of findings may be limited. Specifically, more than half of included studies were conducted outside the United States where participants were writing in a variety of languages, and some studies were conducted in locations where cursive is taught prior to print

instruction. For transparency, additional reporting of the search, screening, and coding procedures will be made available in a subsequent manuscript.

Pertaining to educational practice, the results support providing explicit and sustained cursive instruction to support handwriting outcomes, while recognizing that students may require more time and practice to develop automaticity in cursive than they do in print handwriting. Instructional components similar to print appear to be effective in supporting students' cursive handwriting development (Santangelo & Graham, 2016; Datchuk & Kubina, 2013). Potential areas for future research within the field of cursive handwriting instruction may include investigating the effectiveness of cursive handwriting interventions for students with disabilities and determining appropriate amounts of cursive handwriting instruction for students at different grade levels.

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