Contents lists available at ScienceDirect

Computers & Education

Touch typing instruction: Elementary teachers' beliefs and practices

Dawn M. Poole [a, *], Monique K. Preciado [b]

[a] California State University, Stanislaus, One University Circle, Turlock, CA 95382, USA
[b] Empire Union School District, 116 N. McClure Rd., Modesto, CA 95357, USA

ARTICLE INFO

ABSTRACT

Writers have a limited number of cognitive resources to allocate to the task. Consequently, searching for keyboard letters restricts them from fully engaging in the writing process. High expectations for writing across all levels of education suggest the need for touch typing skills. This mixed methods study examined the beliefs and practices of elementary teachers related to teaching students touch typing skills. Participants included third through sixth grade teachers from eight California counties. A survey completed by 268 teachers was followed by interviews with 12 participants. Results indicated teachers felt touch typing skills were important and that a lack of touch typing proficiency would negatively impact student performance on standardized tests. Teacher perceptions of the impact of student touch typing skills on their writing was divided. Few respondents indicated they or other school personnel offered touch typing instruction. Discussion centers on how these findings were likely influenced by amount of time for instruction, general beliefs about writing instruction, student access to technology, and teacher awareness of how touch typing skills may influence the writing process. Implications for practice are offered.

Published by Elsevier Ltd.

1. Introduction

Despite limited student access to computers in schools in the late 1980s and early 1990s, a multitude of studies were conducted during that era to examine the impact of word processors on writing. Results generally demonstrated an advantage for word processors over writing by hand with regard to number of words written, number of edits made, and quality of writing (Daiute, 1986; Goldberg, Russell, & Cook, 2003; Hunter, Jardine, Rilstone, & Weisgerber, 1990; Wolfe, Bolton, Feltovich, & Welch, 1993). Other studies found no improvement in writing quality without sufficient instruction in writing or proficiency with the word processor itself (Bangert-Drowns, 1993; Cochran-Smith, 1991; Hunter et al., 1990; Joram, Woodruff, Lindsay, & Bryson, 1990). Christensen (2004) found a positive relationship between keyboarding fluency and writing quality, with use of the word processor actually decreasing writing quality if students could not enter text efficiently. The ability to efficiently touch type—typing without looking at the keyboard—allows writers to free up cognitive resources for the writing task. It has been suggested that writers need the same level of automaticity with a keyboard that they do with handwritten text in order for word processors to provide an advantage in writing quality (Christensen, 2004; Connelly, Gee, & Walsh, 2007).

---

* Corresponding author.
E-mail addresses: dpoole@csustan.edu (D.M. Poole), mpreciado@empire.k12.ca.us (M.K. Preciado).

1.1. Cognitive load, working memory, and transcription

Cognitive Load Theory espouses that learners are capable of attending to a limited number of cognitive tasks at any given time, restricting their capacity to process additional information (Paas & Ayres, 2014; Paas, Renkl, & Sweller, 2004). The theory explains how learners transfer new information, skills, and processes from working memory into long term memory. Cognitive Load Theory applies to the writing process according to Berninger et al. (2002), who purport working memory plays a pivotal role in written compositions. Fig. 1 shows the simple model of writing developed by Berninger et al. (2002). In the model, transcription is the process of generating the letters that form words. Executive functions are strategies writers use in planning their work. These strategies are taught and modeled by teachers in the early stages of writing instruction. Transcription and executive functions form the base of a triangle, tasks drawing upon working memory which appears at the center of the triangle. As such, writers who have deficits in transcription skills cannot allocate sufficient working memory resources to the overall writing task because they, instead, have to use their working memory to formulate letters and words. Writers who are adept at transcription have the potential to use more of their cognitive resources on executive functions and higher-level composition skills at the top of the model's triangle. Research indicates those who have to engage working memory to generate letters and words have less capacity to concentrate on the process of writing regardless of whether text is generated via paper and pencil or keyboard (Berninger, 2000; Bourdin & Fayol, 1994; Connelly et al., 2007; Hayes & Chenoweth, 2006; Olive, Favart, Beauvais, & Beauvais, 2009). It is also likely that skilled use of word processing functions contributes to the quality of writing (Grabowski, 2008).

1.2. Use of digital devices for writing

The number of computers and related devices in schools has increased substantially in recent years, with the ratio of students to internet-ready devices improving from 6.6 to 1 in 2000 to 3.1 to 1 in 2008 (National Center for Education Statistics, 2010) and continuing the trend. Since the new millennium, word processing has been one of the most prevalent uses of computers in schools across all grade levels and subject areas (Becker, 2000; Goldberg et al., 2003) suggesting that the use of the keyboard has increasingly become a mode of text entry in writing tasks. The potential for a much faster transcription rate via keyboard than via pencil and paper provides intriguing possibilities for writing quality if touch typing skills are systematically taught in schools the way handwriting has been a staple within the educational system. Touch typing automaticity combined with a systematic and rigorous writing curriculum can help students become proficient writers.

While the adoption of the Common Core State Standards (CCSS) has been contentious across the United States, few would argue about the importance of developing skilled writers starting at the elementary level and increasing in sophistication in the higher grades. The CCSS specifically mention that students should have sufficient keyboarding skills to type one page at a sitting by grade four, with expectations for page length increasing in grades five and six (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). For states adopting the CCSS, assessments are administered online through the Smarter Balanced Assessment Consortium (SBAC) or Partnership for Assessment and Readiness of College and Careers (PARCC). Although the tests are not timed, student performance on open-ended items and performance tasks requiring them to type responses may be impacted by their ability to efficiently find keys and use word processor functions. Beyond CCSS assessments, writing permeates all levels of education with increasing complexity as students move to higher grades, so it seems plausible that the development of touch typing skills at the elementary level would contribute to higher writing quality through high school and beyond.

It is possible for writers to input text without formal touch typing instruction and even develop a system that results in keyboard efficiency (Grabowski, 2008). However, a systematic instructional process would help students arrive at adequate transcription speeds early enough in their educational careers to benefit from automaticity. Several states and districts have encouraged touch typing instruction in the elementary grades, with some indicating a minimum typing rate by the end of fifth grade (Fleming, 2002; Knox, 2003; North Carolina State Department of Public Instruction, 1995; Utah State Office of
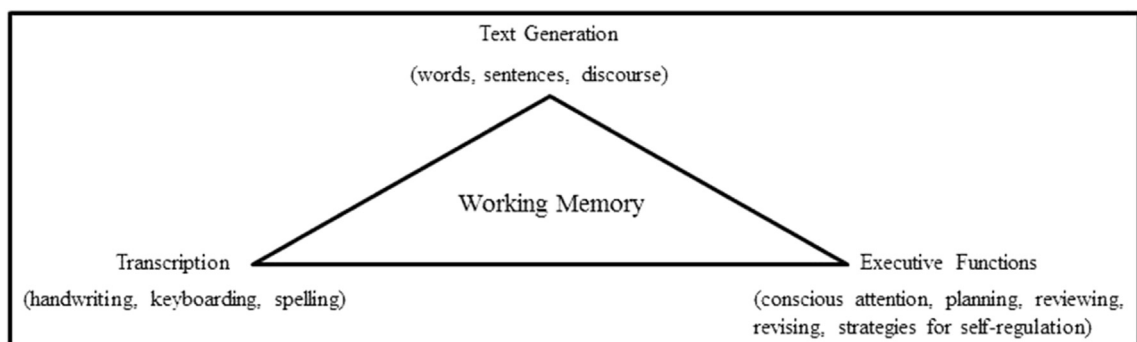

Fig. 1. Simple view of writing (Berninger et al., 2002).