

Review of Writing Research and Literature

Technology Use in Schools (Technology in Schools: What the Research Says, 2006)

- Researchers find that extracting the full learning return from a technology investment requires much more than the mere introduction of technology with software and web resources aligned with the curriculum. It requires the triangulation of content, sound principles of learning, and high-quality teaching - all of which must be aligned with assessment and accountability.
- Digital Media allows for shorter segments called "learning objects". Video can add rich context to students' learning experiences without increasing cognitive load on working memory, translating into increases in complex, higher-order thinking.
- A meta-analysis conducted by Boston College on writing with word processors across the curriculum found that students using these electronic tools wrote significantly more, received earlier interventions by teachers and wrote higher-quality work than students in comparison groups.
 - The power behind the use of writing using the word processor lies in the timeliness of electronic communication about the students' work by teacher and peers, the ease of online writing and rewriting, the use of writing prompts, and the ease of student revisions.

Goals for IT Use in Writing (ISTE Research)

- PreK-2. Gather information and communicate with other using telecommunications, with support from teachers, family members, or student partners.
- PreK-2. Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audio tapes, and other technologies.
- Grades 3-5. Use keyboards and other common input and output devices (including adaptive devices when necessary) efficiently and effectively.
- Grades 3-5. Use telecommunications efficiently and effectively to access remote information, communicate with others in support of direct and independent learning, and pursue personal interests.
- Grades 3-5. Use telecommunications an online resources (e.g. , email, online discussions, Web environments) to participate in collaborative problem-solving activities for the purpose of developing solutions or products for audiences inside and outside the classroom.
- Grades 6-8. Design, develop, publish, and present products (e.g. Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.
- Grades 6-8. Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.

Motor

- The visual-spatial analysis requirements for letter production are more complex than the visual-spatial requirements for letter recognition in reading words or for letter selection on a computer keyboard (Berninger & Winn, 2006).
- Dictating to a scribe (with practice) can eliminate mechanical difficulties and result in longer, higher quality composition (De La Paz, 1999). It is essential to train scribes to write verbatim and only make changes when directed to by the student.

Cognitive

- Route 66 Literacy is an Internet-based educational service that provides reading and writing instruction to beginning adolescent and adult readers, particularly those with significant disabilities. Route 66 Literacy's distinctive approach relies on a scientifically-proven instructional technique developed by literacy experts at the University of North Carolina, Chapel Hill.
- Visualization Tools (e.g., concept or story maps, presentation software, graphics packages, and desktop publishers.)
 - Emergent research indicates that visuals can serve as a scaffold to deeper, more complex thinking, without causing cognitive overload.

Writing in the Intermediate Grades, 3 - 5

- Technology provides writers a tool in the composing process, the flexible use of texts, and in presenting new knowledge in combination with other media. Equitable access to technology is a key variable in student experience with and use of this tool. (<http://www.ncte.org/prog/writing/research/115617.htm>)
- Middle level educator Gretchen Lee suggests the authentic audience found on the Internet has a profound effect on the quality of student writing in all grades, and that the key to successful technology projects is integrating them into the curriculum so that computers are a means, not an end. She offers ideas for classroom activities and projects using stand-alone computers, and using computers with Internet access. Source: *Voices from the Middle*, Vol.7 No.3, March 2000
- Classroom teachers Cora Lee Five and Marie Dionisio share opportunities to use the World Wide Web to support reading and writing workshop. Source: *School Talk*, Vol. 4 No.3, April 1999

Use of Computers and Spellcheckers

- Cavey (2000) strongly recommends the use of any form of technology that will help overcome(or bypass) a student's difficulties in getting ideas on to paper.
- Robinson(2001) suggests that using a word-processor may be one way of restoring a student's interest and confidence in composing.
- Tompkins (2000) reports that when students compose on computers they write more, and both the quality of their writing and their attitude toward writing improved
- Van der Kaay, Wilton and Townsend (2000) used a word processor with students aged nine to eleven who were mildly intellectually disabled. They found that the students' written work improved significantly in terms of organization and control over the writing process.

- If teachers have available a large-screen monitor in the classroom it provides an opportunity for the teacher to demonstrate the whole process of writing, from the initial planning stage, through draft writing, to editing (with cut-and-pastes, deletions, and additions), and final published form (Tompkins, 2000)
- More information from Meyer, A., Pisha, B., & Murray, E., Rose, D. (2001). More than words: Learning to write in the digital world. In A. Bain, L. Baillet, & L. Moats (Eds) Written language disorders: Theory into practice, 2nd Edition (pp. 137-185). Austin, Texas: PRO-ED.

**Measuring Effectiveness: Technology to Support Writing by Sally Fennema-Jansen
Special Education Technology Practice January/February 2001**

- **Word Prediction**

- Research has demonstrated that the use of word prediction has made significant differences in the spelling and legibility of writing for some students with learning disabilities but not for others (MacArthur, 1999)

- **Word Processors with Speech Synthesis**

- Listening to text allows the student to use their "general language sense" to monitor their writing (MacArthur, 1999, p.152)
- Borgh & Dickson found that students without disabilities did more revising with the use of speech synthesis than without (as cited in MacArthur, 1999)
- MacArthur (1999) found the use of a word processor with speech and word prediction resulted in improved spelling and legibility for four out of five students with learning disabilities.
- Raskind and Higgins (1995) compared three methods of proofreading by college students with learning disabilities. Results indicated that students found the greatest number of errors using the speech synthesizer, the second highest number by having the text read to them, and the smallest number without assistance.

- **Spell Checkers**

- Spelling checkers can assist students with learning disabilities in identifying and correcting spelling errors. MacArthur, Graham, Haynes, & De La Paz (1996) in a study involving 27 students with learning disabilities, found that, without the use of a spelling checker, students identified 27.9% of their errors, and corrected 9.3% of those errors. Using a spelling checker, students identified 63% of their errors, and corrected 36.5% of them.
- Instruction in the use of the program itself as well as in selection strategies may benefit some students (Dalton, et al., 1990; MacArthur, et al., 1996) For example, when the spelling checker is unable to identify the correct spelling for a word, the student can try typing the word phonetically to see if the spelling checker is more successful (MacArthur, et al., 1996)

Case Study: What Works for All Students (Don Johnston, inc., 2006) & The Effectiveness of SOLO on the Writing Outcomes of Students with Learning and Academic Disabilities (Peterson-Karlan, Wojcik, and Parette, (2006).

- In 2005, The National Center for Technology Innovation (NCTI) issued a grant to examine the effects on student outcomes using validated writing strategies paired with an innovative and universally-designed technology program called SOLO. The writing strategies model was based on the self-regulated strategy instruction model by Steve Graham and Karen Harris. Karen Erickson developed the design and implementation model.
 - PLEASE model - Pick a topic, List ideas, Evaluate the list, Activate the paragraph, Supply supporting sentences, End with a concluding sentence.
 - Data suggests significant increases in writing literacy when using SOLO paired with the writing strategy instruction. Average student made a gain of just under 10% while the students who were 1.5 deviations or more below the average made the largest gains at 48%.
- During first draft writing, when using the assistive writing technology, all three grade levels of students with learning disabilities, produced the lowest number inaccurate sentences.
- Students produced longer grammatically correct sentences.

Higher Ed

- Online Writing Labs
 - The OWL Bibliography: A Collection of Scholarly Research on Online Writing Labs
 - This bibliography is separated into three interrelated categories, each focusing on different aspects of OWLS: Issues and Implications, Narratives, and Pedagogy.
<http://owl.english.purdue.edu/internet/owls/owl-bib.html>
- Using Technology to Support Self-Regulation in University Writing

This paper describes an integrated writing support system that includes diagnostic tests, online scaffolding, computer-based coaching, and peer collaboration and feedback tools. The system has been tailored to improve students' self-regulation skills in the domain of writing and to foster their understanding of writing as means for negotiating shared understandings.

"Good writing" not something that comes out of this laptop. My laptop is on the blink. I'll make sure the next one I buy is better. (Deb -Ph.D. students Perth, Australia)

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