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Read&Write GOLD Software:

How Does Its Use Effect Middle School Student Writing

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Introduction

Previous Research

The skill of writing is very complex (Beck, 2003) and is used constantly throughout life. Difficulties with writing are often experienced by students with special needs especially by those with learning disabilities (Newcomer & Barenbaum, 1991). While struggling with handwriting, erroneous spelling, and baffling mechanics, thinking processes are inhibited (McCutchen, 1995). Reducing the pressure of handwriting and spelling through the tools found in word processing and assistive technology, students are free to develop higher level thinking skills. Although giving students access to technology will not automatically create better writers (MacArthur, 1996), if reluctant students are given a combination of technology and effective writing instruction, they can experience writing success and increased self-confidence.

Hetzroni (2004) studied three junior high students, who had been formally diagnosed with learning disabilities. They were allowed to use word processing for written assignments in an inclusive setting with typically developing peers. Although these students had appropriate reading abilities, their writing skills were poorly developed. His conclusion was that access to technology can positively affect the quality of written products of student with writing deficits.

In the Technology for Learning Disabilities Project Evaluation Report (2007), Lewis described a two-year study on student and teacher use of technology. To assess students' ability to use components for organization and accepted writing conventions, a pretest – posttest design was used. When students diagnosed with learning disabilities consistently used assistive technology, they scored significantly ($p<.001$) higher on

thirteen assessed areas than the comparison groups. Individual progress on the evaluated components was also significant ($p<.001$) with the pretest – post test comparison. Teachers were even more impressed with the impact on student attitude about writing when using assistive technology (Lewis).

MacArthur (2000) described positive benefits found in a number of studies when students were trained and had access to technology with special software including spell check, grammar check, speech synthesis, and word predication. He also mentioned that research on student use of assistive technology for writing is limited.

Statement of Purpose

A small urban district on the east coast purchased Read&Write GOLD, a software program with Universal Design for Learning (UDL). It contains many features that can decrease frustration for students with writing difficulties. Some features included are audio spell checker with definitions, homophone identifier, auditory dictionary, and text to speech for revising written work with audio feedback. Any middle school student in this district with an Individual Education Program (IEP) and who struggles with handwriting, grammar, spelling, revising, and word usage will have access to this software while writing. This study will help determine the effectiveness of this software when used with students who have difficulty with the writing process. A description of the software features is in Appendix A and the budget considerations and rationale for purchase are in Appendix B.

Research Questions

1. Is there a difference in the decrease of error rates between the first writing sample and subsequent samples of the treatment and comparison groups?
2. Is there a difference in the Criterion holistic gain score between pretest writing sample and subsequent samples? How do the gain scores of students who use Read&Write GOLD with Criterion compare with those who use Criterion only?
3. Will the pretest scores, use of features, and the number of hours per week used; predict an increase in the post writing scores?

Method

Participants

The students in this study attend one of the two middle schools each with an enrollment of around 1,000 students. The populations of the two schools vary, but when combined, approximately 46% of the students are African American, 26% are Hispanic, 6% are Asian Pacific, and 22% are Caucasian. 5% of the students at these schools have been diagnosed as having learning disabilities (LD). These schools are in a small historic city that is within a large metropolitan area. Recent statewide assessment percentages in the 8th grade writing portion at this school were as follows:

Table 1.1

8th Grade Writing Assessment	Adv	Prof	Pass	Fail
All students	3%	75%	78%	22%
Students with disabilities	0	43%	43%	57%

Design

During the Language Arts classes for the last several years, the students at these schools have used a web based service that provides immediate specific

feedback on their writing products. The students use this software for one writing sample, at least, several times a year. Recently, an Assistive Technology software program, Read&Write GOLD, that provides read aloud and word prediction features was added to all of the computers in one of the computer labs in each school. Students in the Special Education classes will also have access to the Read&Write GOLD software program on 3 classroom computers in each Language Arts and Social Studies resource room.

Several district wide informational meetings were held for all of secondary teachers in the district. The software was demonstrated and questionnaires were filled out by most of the participants. Several teachers persisted with their interest and when the software was purchased attended two- three hour training sessions in the summer. Those teachers who attended were given the software so they could practice using it for the rest of the summer. The 4 special ed teachers, 2 sixth grade teachers and 2 seventh grade teachers, who specialized in Language Arts, were told about the possibility of the study. Each participant chose one of her self-contained classes to be the treatment group and one to be the comparison group with the assurance that by the end of the year all of their students would have access to the software. In September each student entered their first writing piece in the Criterion web based writing evaluation application. This was used as the beginning benchmark for each student.

Due to unforeseen circumstances, the software was not ready for student use until December. It took a coordinated effort between the Instructional Technology Team and the Assistive Technology Team to prepare the software for student use. In the interim period all students had writing instruction and practiced writing by hand.

Student training was completed in 2 one hour sessions with the cooperation of the teacher and the Researcher. The Read&Write GOLD Quick Reference card was given to students after the modeling (see Appendix C). One of the district's Literacy Coaches was able to help with some of the sessions. Teachers provided the material for exploration and each of the main features, spell check, text to speech, word prediction, and the dictionary, was demonstrated and practiced. At the end of each session the students typed a sentence or two about the subject and the sentences were read aloud by the software creating a class paragraph. The comparison classes had similar trainings to learn the features of the Criterion application.

In one 60 minute session, with three or four adults, after demonstration and with a little guidance, the six to ten students were able to:

- Log on,
- Navigate,
- Use the software to read information on a web page,
- Check spelling,
- Look up words in the dictionary,
- Access the word prediction feature,
- Type a sentence using text to speech feedback,
- And revise the sentence.

A second training session was held to make sure that the features of the software could be easily accessed. Students were again reminded about the training videos for each feature and assured that they could ask for help. The remaining writing

sessions focused on writing instruction with the software features used as a tool for students to type their writing samples.

On the first session after the two training periods, the sixth session, and the twelfth session a new writing prompt simulating statewide test conditions was given. Students entered a response by typing on a computer either using Criterion only or Read&Write GOLD and Criterion. The first rough draft of each sample was used to graph progress.

Instruments

Student samples were measured on the *Criterion* web-based evaluation service as had been done in the past year. The written work was given a holistic score from 1 to 6 with a specific number of errors in spelling, grammar, and content. After student pieces were typed and printed, a district rubric was used (see Appendix D).

Data Collection Procedures

First, the school system and the University were approached for permission to conduct this study. Administrators, teachers, parents, and students were invited to attend an assembly explaining the study. All student participants were required to return a signed parent informed consent and student version. Teacher consent forms were also required. Any student without signed informed consent forms accepting the conditions as specified under the rules and regulations of the Human Subjects Review Board (HSRB), participated in the activities, but the data was not included in the study.

Challenges

Because the software was purchased in July, the researcher thought the timing for this study was perfect. Anticipating that the software would be in place in the first month of

school, applications for research were submitted to the school district and university in September. By October 13th, the proposed start date, the permission from the university had arrived pending the district approval. Inquiries to the technology department resulted it requests for patience. Many requests for status updates from the district for both the permission to research and the installation of the software had the same disappointing result. By the middle of November the researcher was asked to try the software on an image before all the computers were prepared for the schools. The technicians and researcher worked together to make the final adjustments for the computer image. By the end of November the computers were in place and the software installed. The researcher went to one school, and tried the software. It worked beautifully on the first machine but an error message popped up for each subsequent computer. Messages to the helpdesk and the company were sent without success. The next day the researcher had an insight! Once the first computer was logged off, another worked. Although knowing that only one computer could have the software working was both encouraging and discouraging, it did help determine the resolution. Off to the second school where another error message was encountered.

Then a phone call requested that the researcher meet with the head of Monitoring and Evaluation to discuss the Research Application. During the meeting both positive points and changes that needing to be made were outlined. With changes in place perhaps permission will be granted after all!

Limitations

In middle schools, students have very different exposures to technology. Many students have no computer access at home; others use technology only for its

recreational value. Very few middle school students have adequate keyboarding skills and can actually use computers as the powerful tool it can be! This study did not consider the previous technology skill and/or comfort of students with technology.

Another consideration is the actual availability of classroom computers. Although computers were scheduled to be available to the classrooms in the study, they were not available until several months into the school year. The situation emphasized that limited access to computers restricts student exposure and thus limits familiarity and reduces possible effectiveness.

Future Research

Some topics for future consideration are:

- What effect will long term, regular use of technology have on high stakes writing assessment scores for students with Learning Disabilities?
- What effect would using technology have on other groups of learners:
  - Slow learners?
  - English as a Second Language?
  - Cognitively challenged?
  - Emotionally Disturbed?
- What are the ramifications of having software tools that are available to all students rather than special groups?
- What effect would success in writing with technology have on student attitude about writing?

- What effect would success in writing with technology have on student behavior and achievement in school?
- When using technology, what is the optimum amount of writing time, considering the physical effects on developing fingers, bodies, and minds of young students?
- Could using technology features such as text to speech during practice still have a positive effect on student scores if they were not allowed those features during testing conditions?

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