The use of self-managed proofreading for detecting and correcting mechanical errors by students with a learning disability

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The purpose of this study was to explore the use of a learning strategy involving self managed proofreading by seven students with specific learning disabilities on their detection and correction of capitalization errors, punctuation errors, and spelling errors. Specifically, this study investigated whether using self managed proofreading involving a visual prompt and written cues increased the number of errors detected and the number of errors corrected on experimenter prepared writing samples during a one minute counting period. During a no-practice sheet condition, students were asked to circle all the errors they could find. During a practice sheet condition, the experimenter modeled how to proofread for mechanical errors on experimenter prepared practice sheets and provided students the opportunity to complete the practice sheet. The self managed proofreading condition followed the same sequence described above with self managed proofreading instruction added. An examination of the no practice sheet and practice sheet data for the students indicated that providing students practice sheets did not make a difference for six of the seven students in the number of mechanical errors they were able to detect. However, the results suggest a functional relationship between self managed proofreading and improvement in the count of errors students detect. That is, marked improvements in the median count of errors detected by students with learning disabilities and improvements in celeration were shown for each of the seven students in the study.

DESCRIPTORS: Frequency, Self-Managed, Proofreading, Error Detection

Over the last decade (1993-2003), the educational system in the United States has taken its share of criticism. Indeed, the American public has expressed concern in recent years that public education has lost touch with the priorities of the public and should focus on academic learning (that is, student achievement in basic skills) as a major goal (Committee for Economic Development, 1995). Reading and writing, two major components of literacy, are regarded as essential and basic skills that all children need to function in today's society. To a large degree, children's success in school depends on what many associate with literacy (Howell, Fox, & Morehead, 1993).

Gee (1990) maintains that in today's society, reflective of a highly technological culture, people engage less in face to face interactions; they rely more and more on written types of communication. Consequently, being able to read and write cannot be underestimated as an integral part of socializing and life- long learning in general. Indeed, higher level of literacy will be expected and demanded as changing economic conditions further decrease the number of jobs for workers with low level literacy skills, while jobs will increase for better educated workers (Davidson & Koppenhaver, 1993).

Literacy in schools has been viewed in a variety of ways (Beach, 1995). Among them is the view that literacy involves acquiring a repertoire or set of skills through explicit and systematic instruction. Automaticity of reading and writing words underlines this approach to literacy. Adams (1990) reports an increasing data base that supports such an instructional approach to literacy, particularly for students who experience difficulty.

Brown and Campione (1990) suggest that many students with learning disabilities do not acquire strategies to improve effectively their writing skills unless detailed and explicit instruction is provided. Furthermore, self management strategies have been advocated as an approach to promote the acquisition of academic skills for individuals with disabilities (Glomb & West, 1990). Martin and Manno (1995) acknowledged the effectiveness of a self-management procedure used to improve adolescent students' story compositions. Self-management procedures have also accounted for improved writing skills for students with learning and behavior problems in terms of

completeness, accuracy, and neatness of creative writing homework assignments (Glomb & West, 1990). An error monitoring strategy known as COPS, developed in the learning disability institute at the University of Kansas (Schumaker, Deshler, Alley, & Warner, 1983), proved beneficial to students with learning disabilities in the detection and correction of mechanical errors. Other writing research that indicated self management an effective tool in helping students improve their writing skills include Shannon and Polloway's study (1993) in the COPS error monitoring strategy, which proved beneficial to sixth grade students participating in the study by helping them focus on the mechanics of writing. Thus, using an error monitoring strategy, such as COPS, to help students with learning disabilities become successful and acquire the necessary skills to become competent writers is of great interest.

The advancement of monitoring teacher effectiveness has been enhanced by Precision Teaching. Precision Teaching is a precise and systematic method of evaluating the effects of instruction. One of the basic elements of precision teaching is the use of number of responses per unit of time to monitor the development of fluency (that is, speed plus accuracy and quality) of a learner's work to a performance standard (for example, 20 to 25 words per minute for free writing) (Binder, 1990). Frequency (number of errors/unit of time and number of corrects/unit of time) indicates how well a student can do a task. In addition, fluency facilitates generalization and maintenance of skills, and often has functional implications as well (for example, reading a map).

Precision Teaching uses frequent assessments of learner performances and displays those assessment data on Standard Celeration Charts (Pennypacker, Koenig, & Lindsley, 1972) to allow teachers to evaluate the effectiveness of instruction (Binder, 1990). Many precision teachers and their students use one-minute counting periods when counting and charting performance (Binder, Haughton, & Van Eyk, 1990).

Although gains have been made in the effectiveness of instructional methods for other writing aspects (for example, composing, style) for students with a learning disability, there is limited knowledge of the strategies needed to assist students to improve their proofreading skills. Self management combined with specific precision teaching qualities (that is, one-minute assessments, Standard Celeration Chart) should offer great potential for helping students with a learning disability acquire proofreading skills.

The purpose of this study was to determine the effects of self managed proofreading on the detection of capitalization errors, punctuation errors, and spelling errors. Specifically, this study investigated whether using self managed proofreading involving a visual prompt and written cues affected the number of mechanical errors detected and the number of errors corrected by students with a learning disability.

The following questions were the focus of this study: (a) What effect will practice sheets have on students' detecting mechanical errors on experimenter- prepared writing samples? (b) What effect will practice sheets have on students' error correction on experimenter-prepared writing samples? (c) What effect will self managed proofreading have on students' detecting mechanical errors on experimenter prepared writing samples? (d) What effect will self managed proofreading have on students' error correction on experimenter prepared writing samples? (e) What effect will self managed proofreading have on students' maintaining proofreading skills on experimenter prepared writing samples after instruction has been terminated? (f) What effect will the use of experimenter-prepared writing samples have on the type of mechanical errors detected by students with learning disabilities over the course of the study?

METHOD

Participants

The experimenter selected seven students with specific learning disabilities. The specific learning disabilities were documented by school records (such as grades, performance in class) and diagnostic testing in accordance with state guidelines for student eligibility for special education services. Criteria for participant selection included: (a) teacher identification of students who had experienced difficulty in the mechanics of writing, (b) teacher recommendation that these students would benefit from error monitoring instruction and self managed proofreading, and (c) students' willingness and parental permission to participate in the study. All students participating in the study were eleven-year old males. Two students were in fourth grade and five students were in the fifth grade. Two students were African-American and five students were Caucasian.

Setting and Materials

The study was conducted in an urban elementary school with an approximate enrollment of 400 students in grades K-5 located in the midwest. The individualized assessment and instructional sessions were held in either of two separate, quiet, well lit rooms equipped with a table and three chairs. The rooms were large enough to

comfortably accommodate the student, the experimenter, and one observer. All sessions were conducted during the regular school day in one of the two rooms, depending upon room availability.

The writing samples used in the study consisted of 200 to 220 words and contained ten experimenter-selected capitalization errors, ten experimenter-selected punctuation errors, and ten experimenter-selected spelling errors. Practice sheets consisted of 90 to 100 words and contained five experimenter-selected capitalization errors, five experimenter-selected punctuation errors, and five experimenter-selected spelling errors. In both the writing samples and practice sheets, the number of errors per sentence ranged from a high of two errors to a low of zero errors. Specific errors were randomly inserted in the materials. Table 1 provides a summary of specific errors targeted in the writing samples. Each writing sample and practice sheet was adapted from a set of reading materials at a third grade reading level. Each text was typewritten and double spaced on 8.5" x 11" paper using 12 point New York font.

Dependent Variables

The primary dependent variables were the count of capitalization, punctuation, and spelling errors correctly and incorrectly detected and corrected per minute by each student on experimenter prepared materials.

Detected mechanical errors (capitalization, punctuation and spelling). Detected mechanical errors were defined as the frequency of capitalization, punctuation, and spelling errors identified correctly by the student. An answer key was used to determine the frequency of mechanical errors detected correctly by the students. To be considered correct, student marks for a given error matched exactly with the experimenter's answer key.

Types of *capitalization* errors students were able to detect include: (a) capital letters not used in the first letter of a sentence (b) capital letter not used for the pronoun "I", (c) capital letters not used for names of people, (d) capital letters not used for titles of people, (e) capital letters not used for the days of the week (f) capital letters not used for holidays, (g) capital letters not used for months of the years (h) capital letters not used for the names of streets, (i) capital letters not used for the names of cities, and (j) capital letters not used for the names of states. All other types of capitalization errors (that is, names of countries, oceans, rivers, mountains, landmarks, titles of books) were excluded from this study.

Types of *punctuation* errors students were able to detect include: period not used after (a) a statement, (b) an initial, (c) an abbreviation, (d) question mark not used after a question, (e) exclamation point not used after an exclamation or a command that exclaims, (f) comma not used to separate names of cities and states, and (g) comma not used to separate day numbers and years. All other types of punctuation errors (that is, commas in a series, commas to set off words in dialogue, apostrophes in all forms) were excluded from this study.

Types of *spelling* errors students were able to detect include (a) omission of letters (for example, "mes age" for "message"), (b) reversal of letters (for example, "recieve" for "receive"), and (c) insertion of letters (for example, "tommorrow"

Table 1
Specific Errors Targeted

Capitalization	Punctuation	Spelling
Beginning of sentence	Period at end of sentence	Omission of letter(s)
Names of people	Period after abbreviation	Reversal of letter(s)
Pronoun "I"	Period after an initial	Insertion of letter(s)
Days of week	Question mark after question	
Months of year	Comma between date and year	
Special days	Comma between city and state	
Names of streets	Exclamation point after command	
Names of cities		
Names of states		
Titles of people		

for "tomorrow").

Misidentified mechanical errors (capitalization, punctuation, and spelling). Misidentified mechanical errors were defined as the frequency of capitalization, punctuation, and spelling errors misidentified by the student. A misidentified error was considered as such when the student identified an error when in fact there was not one. The same answer key used to determine detected mechanical errors was used to determine the frequency of errors misidentified by the students.

Errors corrected and not corrected. Student error corrections were defined as the total count of mechanical errors per minute the student accurately corrected after proofreading for capitalization, punctuation, and spelling errors. An answer key was used to determine the accuracy of corrected mechanical errors by the students. To be considered correct, student corrections for a given error matched exactly the experimenter's answer key.

Student errors not corrected were defined as the count of mechanical errors per minute the student failed to correct accurately after proofreading for capitalization, punctuation, and spelling errors. If the student correction for a given error did not match exactly with the experimenter's answer key, the student's response was considered as a failure to correct a detected error.

Measurement of the Dependent Variables

Experimenter prepared writing samples. A new experimenter prepared writing sample for students to proofread for capitalization, punctuation, and spelling errors was distributed to students for each day of the study. The same new passage was used by all the students in attendance for any given day. Each writing sample was developed from stories below or equal to the student's current reading level. The readability level was controlled to uphold findings that students' proofreading performances may be a function of exposure to self-managed proofreading instruction, rather than limited reading skills. Each writing sample consisted of 200 to 220 words and contained 10 experimenter selected capitalization errors, 10 experimenter selected punctuation errors, and 10 experimenter selected spelling errors. Each passage contained more errors than the student could possibly detect in a one minute timing period as determined by adult proofreaders. The adult proofreaders used in this study (two graduate students) detected a count of 19 and 21 errors per minute.

Students were given a new writing sample each day to proofread for each type of mechanical error. In a one minute timing, the students were required to proofread for errors in the writing sample and indicate (by circling) all the errors detected. After the one-minute timing, the students then had the opportunity to correct the errors detected.

Inter-observer Agreement and Accuracy of Measurement

Before the start of the study, the experimenter trained an independent observer to obtain interobserver agreement. The training sessions consisted of the experimenter describing the purpose of the study, explaining and giving examples of the definition for detected and misidentified mechanical errors and detected errors corrected and not corrected, practicing with the independent observer the marking and scoring procedures, and conducting several pilot sessions using samples from two students not participating in the study. The experimenter and observer independently checked each student's permanent product on the dependent variables. The trained observer independently scored and recorded the dependent variables a minimum of 20% of all sessions. Student products were randomly selected by the trained observer for scoring and recording. The experimenter was not informed of which days the trained observer selected for interobserver agreement. Percentage of agreement for each dependent variable measurement ranged from 97-100 % for all students. An answer by answer comparison of the scored products with discrepancies by the experimenter and observer to the true value answer keys was conducted for the assessment of accuracy measurement of the dependent variables (Johnston & Pennypacker, 1993). All inaccurate measurements were corrected and the correct counts reported in the results.

Procedural Integrity

To assess the consistent application of the procedures for each phase of the study, procedural checklists containing the scope and sequence of the experimental design were developed and used to verify the implementation of the procedures. An observer completed the checklist for 20% of all sessions. If discrepancies arose between the checklist and the observed procedures, the observer discussed the discrepancies with the experimenter. Before beginning the study, the experimenter conducted two pilot sessions so the observer would have an opportunity to practice using the form. Procedural integrity was reported as the percentage of adherence to each of the procedural checklists. During the no practice sheet condition, the experimenter adhered to the procedural checklist for all students 100% of the time. During the prac-

tice sheet condition, the experimenter adhered to the procedural checklist 97-100%. During the self managed proofreading condition, the experimenter followed established procedures 100% of the time for all students.

Experimental Design and Procedures

A multiple baseline design across students (Cooper, Heron & Heward, 1987) was employed to analyze the effects of self managed proofreading on the frequency of mechanical errors detected and misidentified by the student, and the frequency of errors corrected and not corrected by the student. Implementation of each experimental change was based upon charted data and its relation to an established decision rule. A visual analysis of the data charted on the Standard Celeration Chart (Pennypacker, Koenig, & Lindsley, 1972) was used to determine when a phase change would be made. In this study, the criterion used was four consecutive days of data where the minimum celeration line multiplied by less than xl.25.

Pre-Baseline Instruction. During the pre baseline instruction phase, the experimenter provided individual instruction in the mechanics of writing (that is, capitalization, punctuation, and spelling) for each student participating in the study. The objectives of the instruction were for each student to orally recall ten rules for using capital letters, to orally recall seven rules for correct punctuation (including when to use a period, a question mark, an exclamation point, and commas), and to orally recall three types of common spelling errors. Each instructional session was conducted within a 15 minute period, and began with a two to three 3 minute warm up/rapport building discussion.

No Practice Sheets. Sitting next to the student at the table, the experimenter prepared the student for a one minute counting period. The experimenter prepared in advance the day's writing sample. During the one minute counting period, the student proofread the experimenter prepared writing sample for mechanical errors. At the beginning of each one minute counting period, the experimenter set the timer and gave scripted directions to the student. At the end of the counting period, the experimenter asked the student to mark the place in the passage where he stopped proofreading and the experimenter then terminated the proofreading session by providing the appropriate cue. The student was then permitted to detect and correct new errors after the assessment was completed, although these data were not reported. When the student finished, the experimenter provided the student nonspecific praise as well as commented on the number of correct errors detected and the number of errors corrected accurately. The experimenter ended the session for the day by thanking the student and returning him to class.

Practice Sheets. Sitting next to the student at the table, the experimenter instructed the student in exactly the same way as described in the no practice sheet condition, except that specific practice sheet instruction was added. During instruction, the experimenter followed a script. Once the student signaled that he had completed the practice sheet, the experimenter instructed the student to correct all the errors detected in the practice sheet. The experimenter then provided nonspecific feedback to the student upon completion (for example, good job, well done, thanks). In addition to nonspecific feedback, the experimenter commented on the number of correct errors the student detected and the number of errors corrected accurately. Next, the experimenter prepared the student for a one minute counting period as outlined in the no practice sheet condition.

Self Managed Proofreading. After four consecutive days of data where the minimum celeration line multiplied by less than x1.25, a self management strategy was introduced. The experimenter instructed the student in exactly the same manner and sequence as described in the practice sheet condition with the self management strategy added. The experimenter reminded the student to use the self management strategy each time he was asked to proofread the experimenter prepared practice sheets and the experimenter prepared writing samples.

The self management strategy included two steps. First, the student was instructed to write the letters CPS (for capitalization, punctuation, spelling) at the top of each practice sheet/writing sample once the practice sheet/writing sample had been distributed. The student was then told that each letter was to help remind him of the types of errors to look for when proofreading each sentence.

Second, the experimenter instructed the student to write at the end of each sentence the corresponding letters for the types of error (C for capitalization, P for punctuation, and S for spelling) he was proofreading. The experimenter provided corrective feedback to the student on his use of the self management strategy only if he failed to implement the self management strategy correctly.

Generality Probe. In order to assess the affect of the intervention procedure to students' own writing assignments, the classroom teacher collected writing samples from each student two

times a week. As part of their seatwork, students had as much time as they wanted in class to proofread their own completed stories for mechanical errors.

Maintenance. Following intervention, maintenance measurements were collected on the count of mechanical errors detected, the count of misidentified mechanical errors, the count of mechanical errors corrected accurately, and the count of failures to correct detected mechanical errors by asking students to proofread experimenter prepared writing samples. Definitions and procedures for the maintenance probes were identical to those used during the no practice sheet condition.

RESULTS

Assessment of Errors Detected

Charts one through seven depict the error detection data for each student in the study. During the no practice sheet and practice sheet conditions, the individual median scores for the number of errors detected in the one-minute counting period by a student ranged from zero errors to three errors. For six of the seven students, the practice sheet made little difference in the number of errors the students detected. For Tray, the practice sheet did appear to have some effect. His median score for the number of errors detected increased from zero mechanical errors detected in a one-minute counting period to three detected in a minute. Following instruction in self-managed proofreading, all students showed improvement in the number of errors they were able to detect. Individual median scores for the number of errors detected by a student ranged from six to nine errors. The individual median scores during the maintenance phase differed little from the self-managed proofreading condition. The individual median scores ranged from five to nine errors detected.

Assessment of Misidentified Errors

Charts one through seven also display the misidentified error data for each student in the study. For five out of the seven students, the individual median scores for the number of misidentified errors in the one-minute counting period remained the same throughout all conditions of the study. The individual scores of these five students ranged from zero to two errors misidentified. For Winston, the median score for the number of misidentified errors in the one-minute counting period (that is, one) was slightly higher during the no practice sheet condition than during the other conditions of the study. Otherwise, Winston's median score remained constant during the other conditions. Winston's misidentified errors ranged from zero to three. For Kent, the median score for the number of misidentified errors increased from two during the no practice sheet condition to the median score count of three in the practice sheet condition. The median count of misidentified errors decreased to zero as a result of introducing self-managed proofreading.

Celerations of the Errors Detected

Celeration courses are indicated on the students' charts to describe how rapidly students improved (that is, the amount of learning) in the numbers of errors detected in each condition. During the no practice sheet condition, the celeration multiplied by 1.0 for all students. During the practice sheet condition, the celeration multiplied by 1.0 for all students except Tray. The celeration for Tray multiplied by 2.3. During the self-managed proofreading condition, the celeration multiplied by 1.2 for Mark, 1.9 for Jesse, 2.3 for James, Tray, and Winston, 2.6 for Ali, and 15.0 for Kent. During maintenance, the celeration multiplied by 1.0 for all students.

Jumps and Turns with Errors detected and Misidentified Errors

Charts one through seven show two students jumped up in count of errors detected when experimental conditions changed from no practice sheet to practice sheet. A no turn celeration pattern emerged for Winston's count of errors detected. A turn up celeration pattern developed for Tray's count of errors detected. The remaining five students produced a no jump and no celeration pattern in the count of errors detected as compared in the no practice sheet condition to the practice sheet condition.

All students jumped up in counts of errors detected when experimental conditions changed from practice sheet to self-managed proofreading. Six of the seven students' celeration courses turned up. Tray's celeration course produced a no turn celeration.

In terms of the count of misidentified errors, five of the seven students produced no jump and no turn patterns across all changes in experimental conditions. Two of the students, however, had changes in performance and learning in the count of misidentified errors. Winston produced a jump down and Kent produced a jump up pattern when experimental conditions changed from the no practice sheet condition to practice sheet condition. During the change from practice sheet to self-managed proofreading, Winston's count of misidentified errors remained the same (that is,

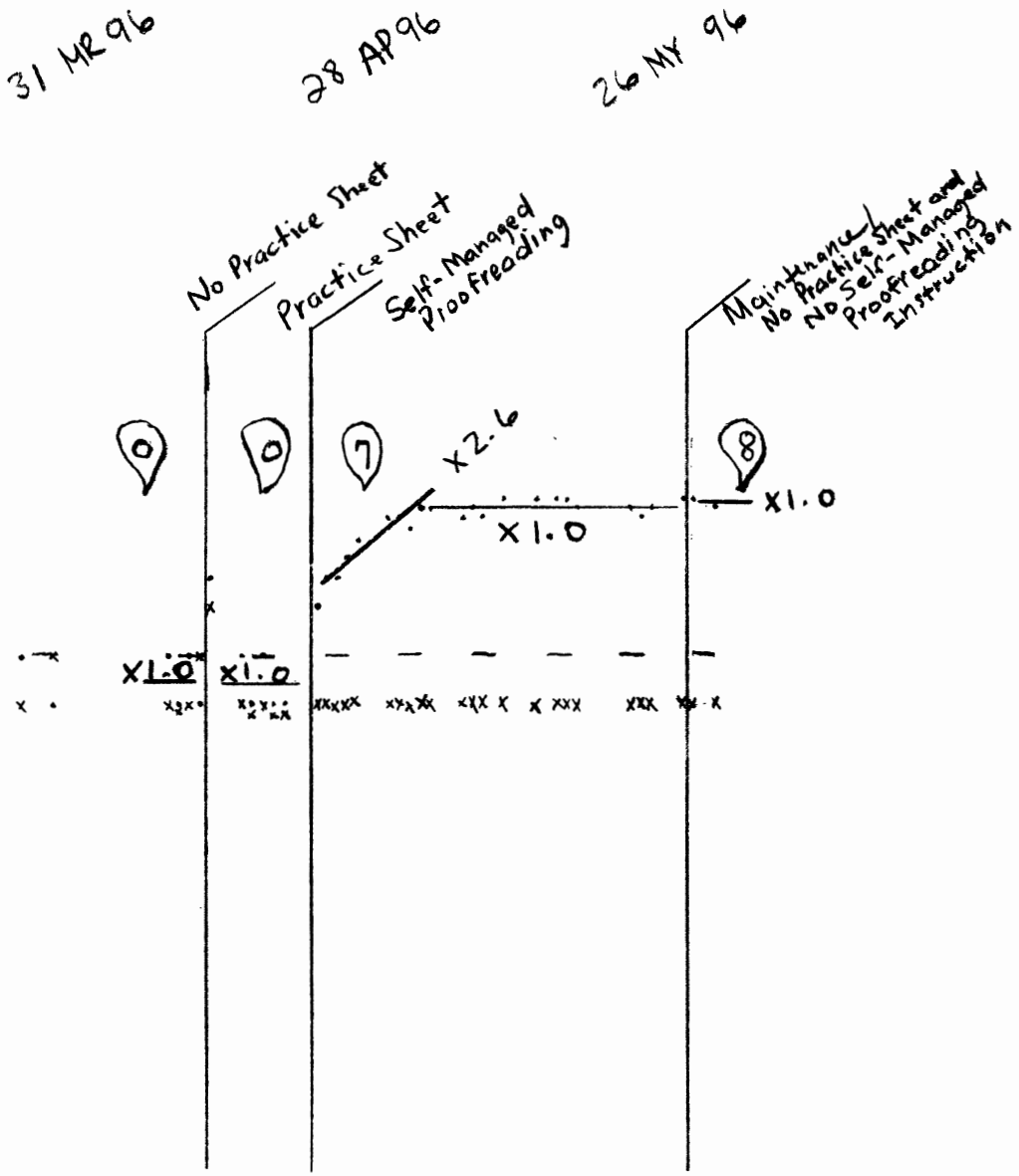

Chart 1

Capitalization, Punctuation, & Spelling Errors Detected

Cooper Seevers Ali 11 SLD

Cooper Reagan Elementary School Seevers Seevers Seevers

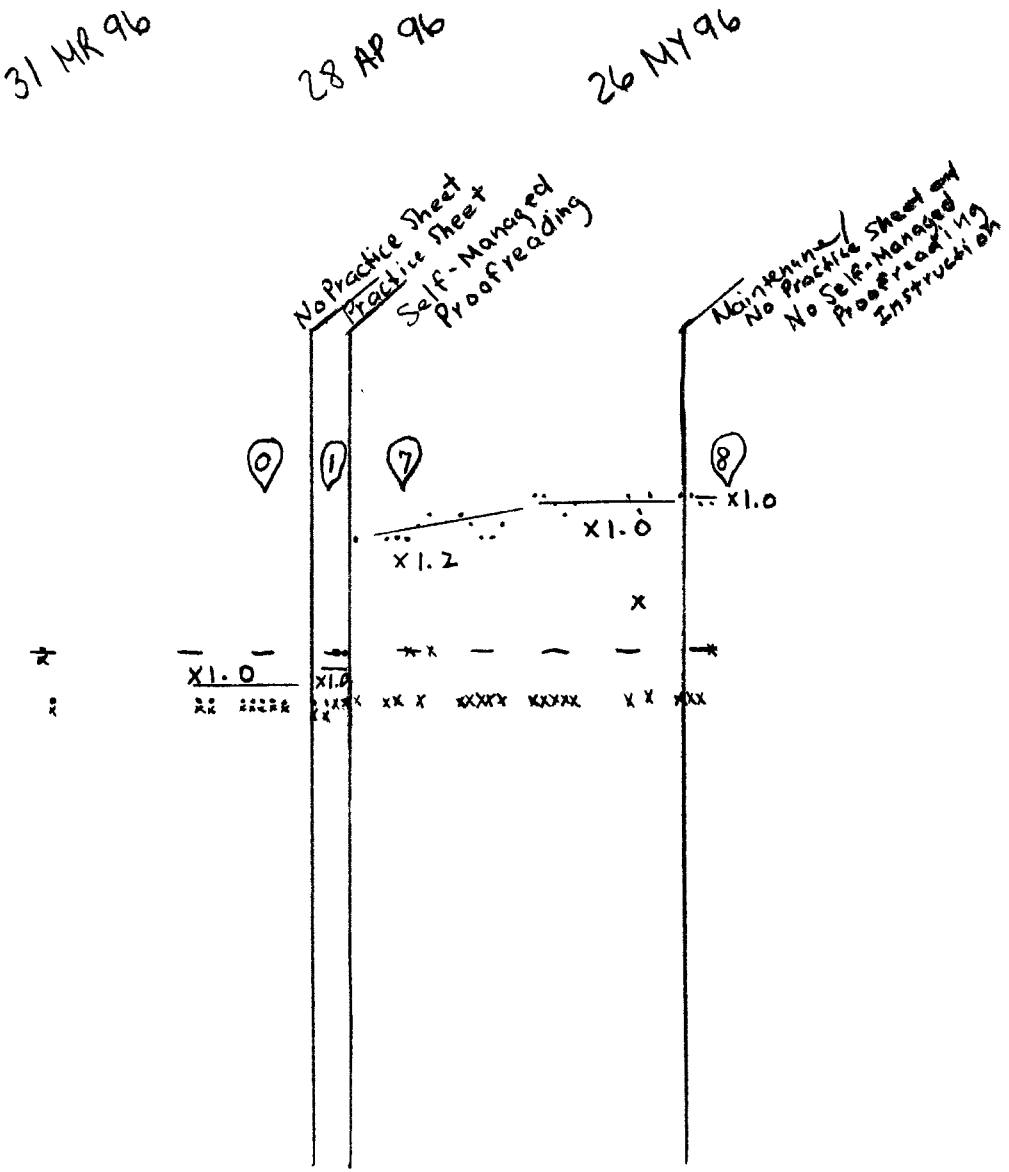

Chart 2

Cooper Seevers Mark 11 SLD Capitalization Punctuation & Spelling Errors Detected

9 Cooper Reagan Elementary School Seevers Seevers Seevers

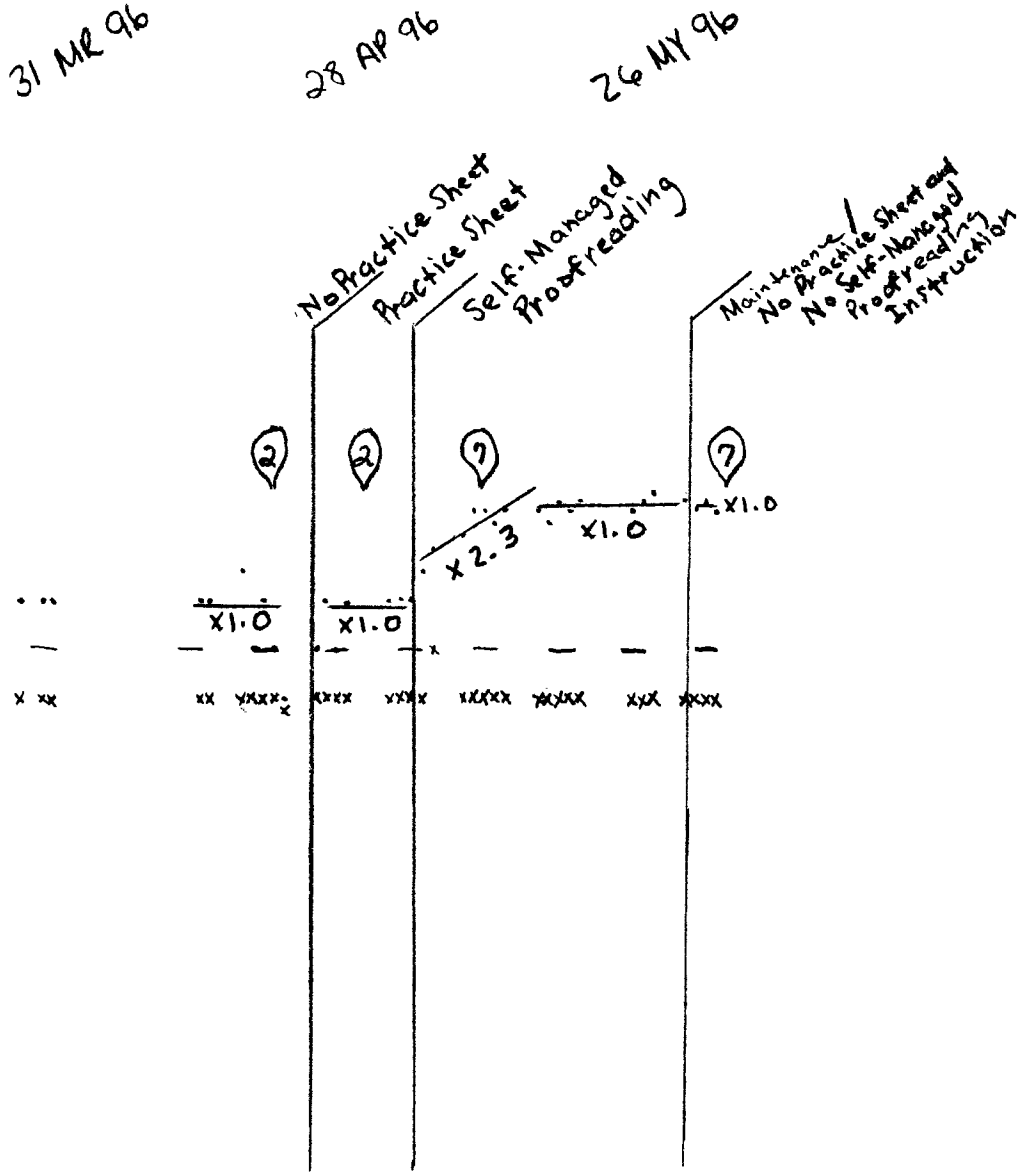

Chart 3

Capitalization, Punctuation & Spelling Errors Detected

Cooper Seevers James 11 SLD Seevers

Cooper Reagon Elementary School Seevers Seevers Seevers

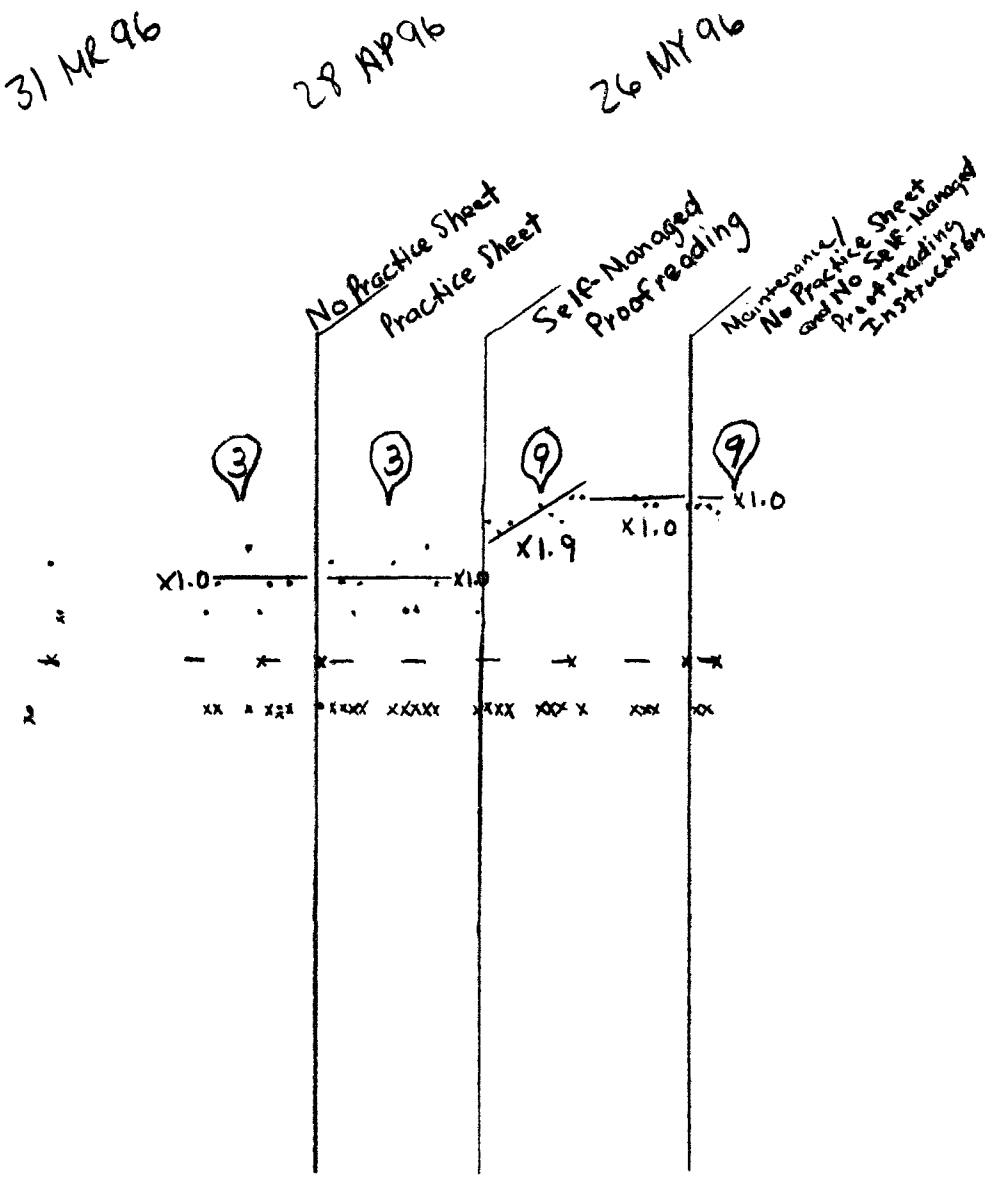

Chart 4

Cooper Seevers Jesse 11 SLD Capitalization, Punctuation, & Spelling Errors Detected

Cooper Reagan Elementary School Seevers Seevers Seevers

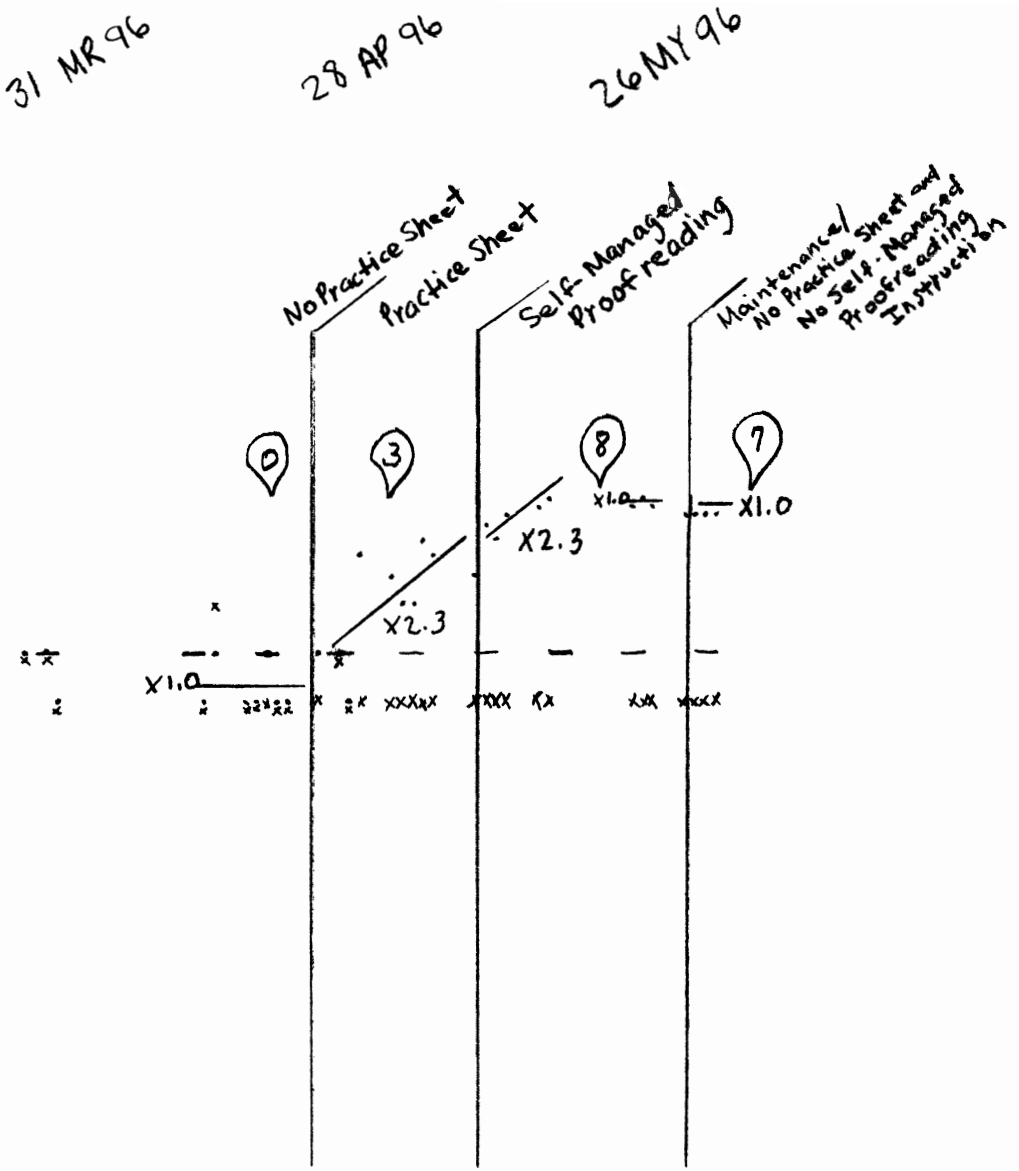

Chart 5

Cooper Seevers Tray 11 SLD Capitalization, Punctuation, & Spelling Errors Detected

Cooper Reagan Elementary School Seevers Seevers Seevers

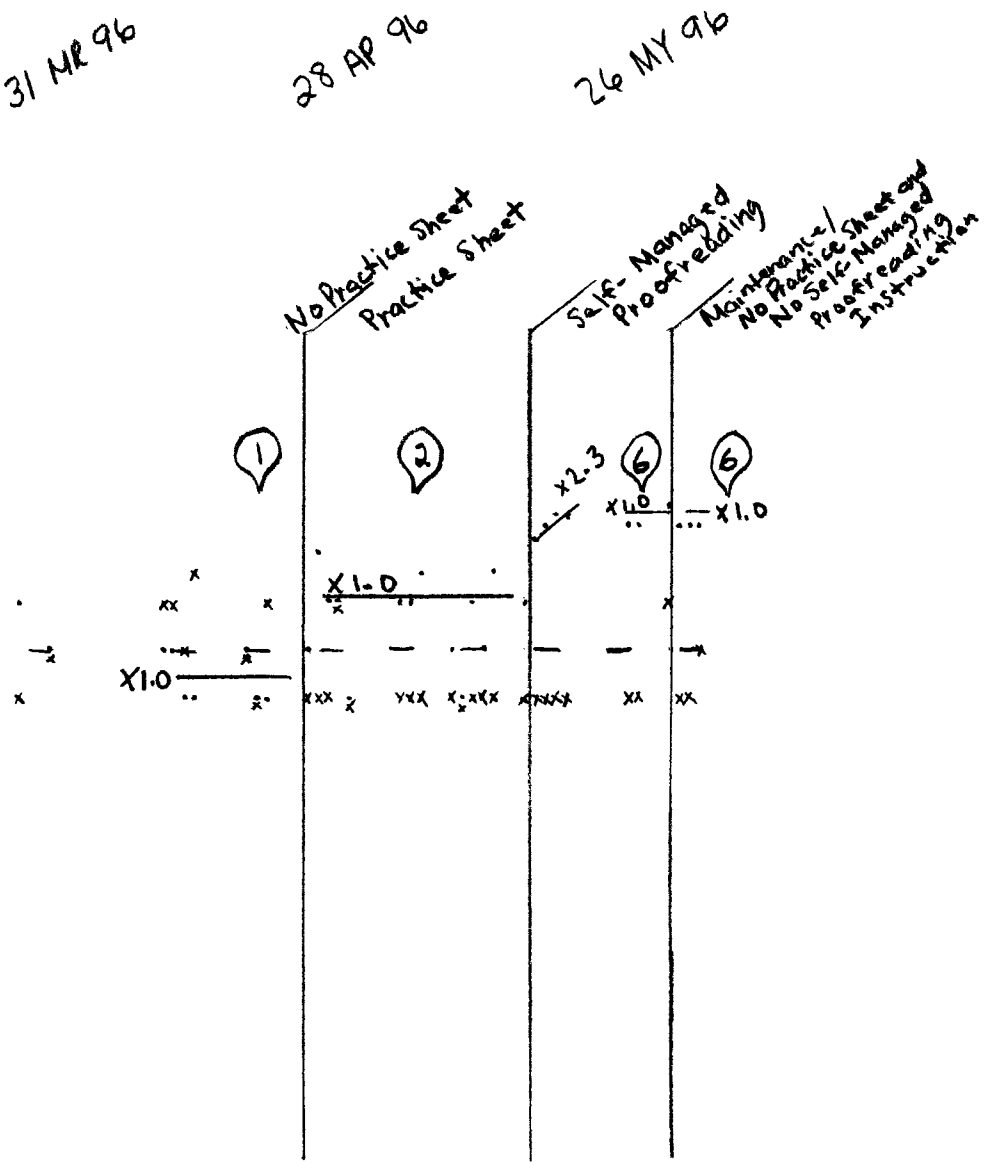

Chart 6

Cooper Seevers Winston 11 SLD Capitalization, Punctuation, & Spelling Errors Detected

13 Cooper Reagan Elementary School Seevers Seevers Seevers

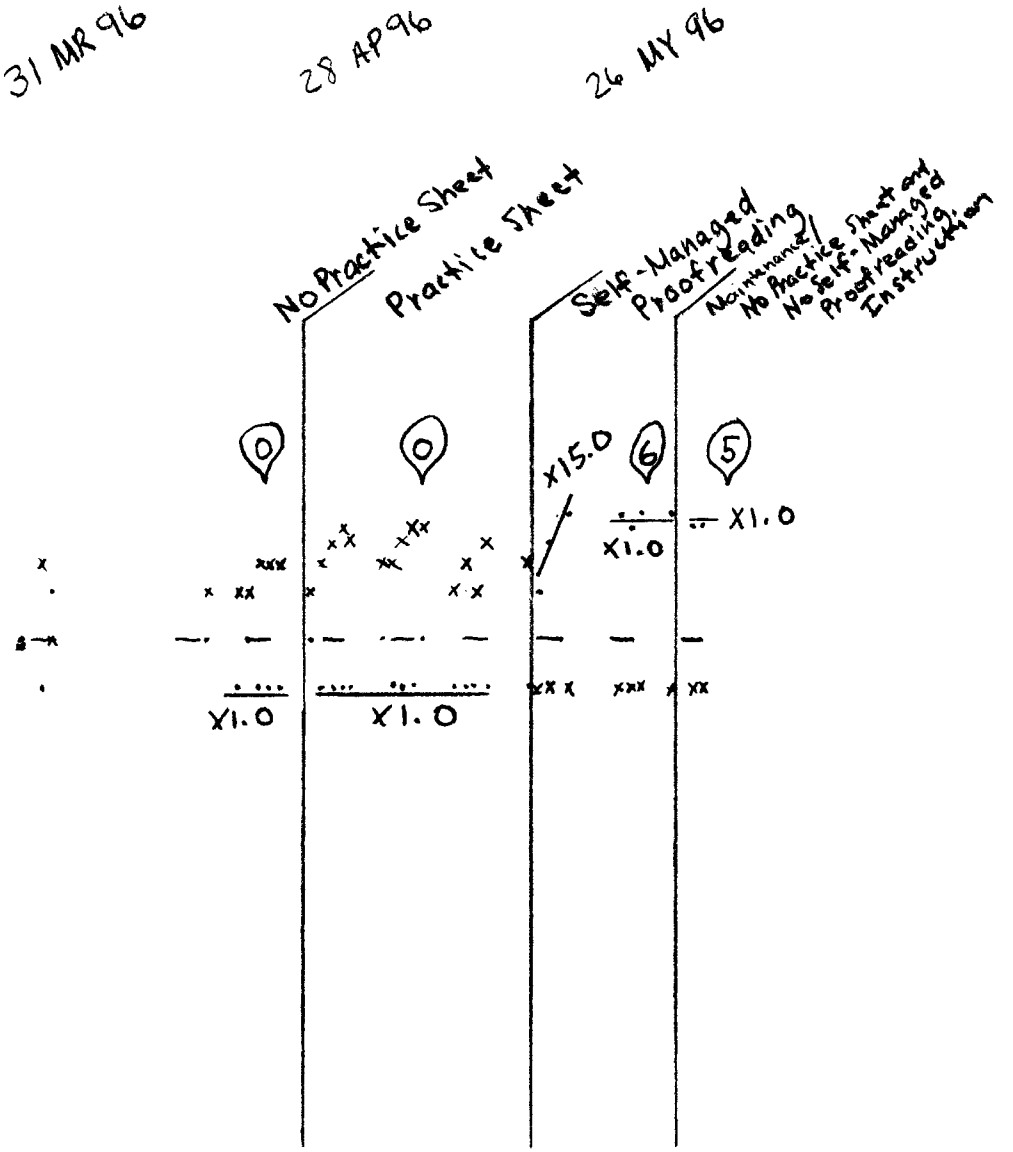

Chart 7

Cooper Seevers Kent 11 SLD Capitalization, Punctuation, & Spelling Errors Detected

Cooper Reagan Elementary School Seevers Seevers Seevers

showing a no jump pattern) while Kent's count of misidentified errors produced a jump down pattern.

DISCUSSION

An examination of the no practice sheet and practice sheet data for the students indicates that providing students practice sheets did not appear to make a difference for six of the seven students in the number of mechanical errors they were able to detect in a minute. For these six students, the median count of errors detected showed little variability as compared between the two experimental conditions. Further evidence that the introduction of practice sheets did not improve students' performances was indicated by the celeration lines for each of these six students. A x1.0 celeration was reported for each of these six students, indicating no changes in learning. Although there was a slight jump up for Mark and Winston in the number of errors detected between the two conditions, it was not seen as an important difference and there was no turn up in celeration. For Tray, however, there was a change in learning as a function of introducing practice sheets. Tray exceeded his median score of the number of errors detected in one minute by 3. Further, a x2.3 celeration was produced, indicating Tray did indeed more than double his learning, before reaching a plateau. It is not clear, however, what produced this change since there was no opportunity for verification (that is, practice sheets were introduced to all students except Ali at the same time, thus the practice sheet condition served as a baseline condition).

In general, the number of errors students corrected during the practice sheet condition did not vary from the no practice sheet condition. In addition, the performance of six of the seven students showed celerations of x1.0 for both conditions of the study, indicating no improvement. For Mark and Winston, the median count of errors corrected did jump up slightly between the two conditions, but it was not an important difference and there was no turn up in celeration.

The results of this study suggest a functional relationship between self managed proofreading and improvement in the count of errors students detect. For all seven students, the median count of errors detected was substantially higher during the self managed proofreading condition. Initial celerations from a low of x1.2 to a high of x15.0 were obtained before student performances leveled out. These data clearly indicate that instruction in self managed proofreading improved the count of error detections by students with a learning disability. The overall effectiveness of self managed proofreading lends support to research suggesting that verbally-mediated strategies employing a self management component (Danoff, Harris, & Graham, 1993; MacArthur, Schwartz, & Graham, 1991) are effective in improving the academic behaviors of students with learning disabilities. The results support other studies that demonstrated that self instruction and providing extra prompts may help students with learning disabilities focus attention on what has to be accomplished (Graham, Harris & Reid, 1992; Schunk, 1985). That is, writing CPS at the top of the paper and after each sentence serves as a reminder of what the student is to do. Furthermore, self managed proofreading provides students guided practice and requires that students apply known rules, perhaps explaining in part the overall effectiveness of the instruction.

Results from the present study also document a low frequency of incorrect responses (that is, opportunities for students to misidentify an error) for the majority of students. Indeed, the frequency of misidentified errors rarely exceeded 1 or 2 per minute for all students except Winston and Kent across all conditions. For Winston, the frequency of misidentified errors exceeded three during the no practice sheet condition but decreased in subsequent conditions. For Kent, however, the frequency of misidentified errors was an influential variable during the no practice sheet and practice sheet conditions of the study, and the number of misidentified errors significantly decreased with the introduction of self managed proofreading.

The collection of data on student performances suggests a functional relationship between self managed proofreading and the count of error corrections. Marked improvements in the median count of errors detected by students with learning disabilities and improvements in celeration were shown for each of the seven students in the study. Such findings are consistent with earlier studies (Reynolds, Hill, Swassing, & Ward, 1988; Shannon & Polloway, 1993) that describe some monitoring procedures as effective strategies to revise and correct writing mistakes.

The data from this study are inconclusive regarding the effect of self-managed proofreading and students maintaining proofreading skills. There was not sufficient time in the study to collect more than three days of data during the maintenance condition, thus there were not enough data to make a projection on the effects of self-managed proofreading and students maintaining proofreading skills. All participants, however, continued to use self managed proofreading to detect

and correct mechanical errors in the experimenter prepared writing samples after all intervention procedures had been terminated.

Actual changes in the type of errors detected over the course of the study were assessed by analyzing the percentage of each error type detected in each condition. The types of error with the highest percentage of detection for each condition were then compared to one another. Results reveal there were changes across conditions for four of the seven students in the type of errors detected, that is, no patterns emerged. Two students consistently detected a higher than or equal to percentage of punctuation errors across all three conditions, while one student detected a higher percentage of capitalization errors across all three conditions.

Several limitations of this study need to be addressed. First, the participants in this study were seven male students with specific learning disabilities. Two of the students were African American and the other five were Caucasian; two of the students were fourth graders and the other five were fifth graders. All of the students received part of their instruction in a resource room designed to meet their individual needs in a large urban elementary school. It is not known to what extent the generality of effects of the error detection and error correction results would be across students of different ages and skill level, of different gender, of different races, and of different socioeconomic levels.

Second, students were taken out of their resource or regular classes to work individually with the experimenter in a separate area of the school in one of two rooms. To what extent the academic environment and the occasional special events (e.g., field trip, school assembly, classroom party) influenced the outcomes is unknown.

Third, the study was conducted over a course of 9 weeks (40 sessions). Consequently, there was not enough time available to collect extended maintenance data. Further, a more stringent evaluation of self managed proofreading may be strengthened by implementing the study at the beginning or middle of a school year, rather than toward the end of one.

Fourth, the writing samples used were selected from supplemental materials and may have some grade level variability. It cannot be assumed that similar results would result if the students used different materials. Since error detection and error correction only required the students to identify three kinds of errors, what students were reacting to is not exactly certain. Moreover, all the writing samples were neatly typed. Further research is needed to determine whether the out comes of this experiment has generality with other instructional materials and with student generated passages.

Fifth, during the course of the study, the classroom teacher made every attempt to collect writing samples from each student two times a week. However, other classroom demands, special events, and time constraints did not always permit the teacher to follow through on collecting the weekly writing samples for each student. In addition, the teacher did not follow a standard procedure when instructing students to proofread their papers. Sometimes students were given the assignment as part of their seatwork, other times it was done one on one with the teacher. For the most part, students were given as much time as they wanted in class to proofread their own completed stories for mechanical errors, therefore no record of frequency counts were obtainable.

Finally, only two days of maintenance data for Ali and Kent and three days of maintenance data for each of the other students were collected in the study. The limited number of days with maintenance data made it difficult to draw any meaningful conclusions in regards to maintenance of skills over any extended period of time.

Movement toward integrating students with special problems into regular education classrooms has created a major trend toward classroom based intervention (Gerber, 1993). The effects of self managed proofreading on error detection and error correction were evaluated in a setting that was not like the environment in which the students received their primary instruction. Particularly useful would be effective strategies that could generalize to other settings, thus, the need for this study to be replicated in other environments is warranted. The question of whether self managed proofreading is indeed effective in general education or resource environments is an intriguing one and continued examination of how self managed proofreading can be applied to varied settings will be needed. In addition, all the students in this study received individually administered instructions. Investigations of group administered instructions, typical of general education classrooms, may provide additional insight on the effectiveness of self managed proofreading.

Furthermore, attention should be given to the question of whether self managed proofreading is effective on student generated assignments. Of considerable interest would be the effect of self managed proofreading and the transfer to other types of writing assignments (e.g., journals, science logs, personal correspondence).

In addition, it is not known from this study what performance frequencies could be achieved

if students were to set aims. Further investigations need to explore appropriate aims on detecting and correcting errors and extend the relationship of these performance rates to eventual generalization and subsequent skill development.

Finally, other areas of research that warrant further exploration because of the potential impact for improving error detection and error correction of students with specific learning disabilities include public posting of daily performance scores, self-charting, and various error correction procedures.

CONCLUSION

The results of the study indicate that these seven students with specific learning disabilities were able to increase the count of errors detected and the count of errors corrected on experimenter-prepared writing samples through self-managed proofreading. The medians, celerations, and performance changes suggest that a functional relationship among the count of errors detected and the count of errors corrected and self-managed proofreading instruction occurred for all students.

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