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Abstract

The purpose of this study was to investigate how the use of a word processor for writing composition differed in the number of words and sentences when compared to handwriting composition samples. In addition, the study compared the types of words and sentences used in the writing samples. There is a need for empirical evidence on the effect of a word processor on children's writing. The subjects (N = 38) in the study were sixth-grade students at North Tama Elementary School, Traer, Iowa.

A COMPARATIVE STUDY OF COMPOSITION ELEMENTS BY ELEMENTARY STUDENTS USING COMPUTER TECHNOLOGY

A Graduate Research Paper

Submitted to the

Department of Curriculum and Instruction

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of the Requirements for the Degree

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Mary Streich

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This Research Paper by: Mary Elizabeth Streich

Titled: A Comparative Study of Composition Elements by Elementary

Students Using Computer Technology

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ABSTRACT

The purpose of this study was to investigate how the use of a word processor for writing composition differed in the number of words and sentences when compared to handwriting composition samples. In addition, the study compared the types of words and sentences used in the writing samples. There is a need for empirical evidence on the effect of a word processor on children's writing. The subjects (N = 38) in the study were sixth-grade students at North Tama Elementary School, Traer, Iowa.

Each subject turned in four writing samples; two from the word processor and two handwritten. For each student, the number of sentences, different types of sentences, words, and different types of words were counted in the samples.

The numbers were compared from the writing samples collected; the numbers increased in the word processor writings. The numbers were, however, not significantly different enough to determine whether or not the computer had an impact in the writing of elementary students.

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A Comparative Study of Composition

Elements by Elementary Students

Using Computer Technology

Introduction

Some studies have shown that computer word processing

is an effective tool for the teaching of writing and a significant

resource for the improvement of writing for some students

(Dalton & Hannafin, 1987; Etchison, 1985). Differences of

opinion exist as to the effectiveness of computers in the

teaching of writing and the improvements that are made

 by students when using a word processor (Hawisher &

Fortune, 1989; Schanck, 1986). However, when researchers

talk about the effects of computers on writing, many of their

studies are not referring to the same topic. Some studies refer

to the quality of the writer's composition, while others focus on

style or structure of the composition.   Studies also differ in

subjects, methods, and analysis of the data. Schramm (1991)

points out that because of the variations in studies, educators

become confused by the conflicting results. Many of the

researchers agreed that further studies are needed in order to

determine the effects of computers in the instructional and the

writing phases of writing. Educators who teach composition need reliable research on the effectiveness of computers when teaching writing.

Studies on the effect of word processing upon the quality of elementary students' writings seems to be lacking. Cochran-Smith (1991) states, "we have the least information about the effects of word processing on the writing of elementary school age children" (p. 138). In addition, she feels that this age group is a particularly important group of writers to focus on because they are just beginning to develop these skills.

Purpose

There is little research to support empirically the effect of a word processor when an elementary age student is writing. The purpose of this study was to determine if using the word processor influenced the students' writing in a significant way when compared to paper and pencil writing samples. The study focused on the number and types of words and sentences used in the writing of sixth-grade students. Differences between the handwritten and word processed writing samples were noted.

The results of this study will be useful to composition teachers because there is a lack of research regarding the effect of word processors in written compositions of

elementary age students. There are differing views on the effectiveness of using a word processor when writing composition. There is a need for studies to determine whether or not computers have an impact on the writing of elementary students. This study provides a descriptive analysis of students' writing in an effort to clarify the computer's effectiveness.

Problem

What is the effect of computer technology upon the written compositions of students in sixth grade? Selfe and Wahlstrom (1988) recommend studies in the following areas, "When authors use computers to produce text, is their writing different in some linguistic sense? In the number, types, or frequency of words? In the syntactic structure of phrases, clauses, or sentences?" (p. 61). In this study, the researcher focused on the number and types of words and sentences used in the writing samples from elementary age students.

Research Questions

1. Will computer-drafted writing samples of elementary age students contain different applications of the traditional parts of speech than handwritten samples?

2. Will the use of a computer change the number of words and types of words in the students' writing?

3. Does the use of the computer change the number of

sentences and/or the types of sentences used by children when they write?

Limitations

1. The sample of this study was limited to the 38 sixth grade students at North Tama Elementary School, Traer, Iowa.

2. An equal number of handwritten and word processed writing samples were analyzed.

3. The study analyzed only the final-draft writing samples.

4. All writing samples were produced in 45 minute class periods.

5. All students were assigned similar topics for their writing tasks.

Operational Definitions

The following basic definitions and concepts are clarified for the readers of this study:

Final draft: the last writing sample collected.

Revised draft: the first revision of the writing sample submitted by the student.

Parts of speech: refers to the eight major parts of speech: noun, pronoun, adjective, verb, adverb, preposition, conjunction, and interjection.

Types of sentences: refers to three kinds of sentences: declarative, exclamatory, and interrogative.

Word processing: in this study it refers to the use of the computer application, AppleWorks, used by the sixth-grade students.

Writing process: a model of writing defined by the stages: prewriting (brainstorming), drafting, revising, and post-writing (presentation of the paper to an audience).

Writing samples: compositions written by the subjects, either by hand or with use of a word processor.

Summary

Although there are testimonials from teachers that students write more when they are at the computer, little is known about whether the practice is making a difference or having an impact on the writing of elementary students. This study was conducted to determine if the computer helps facilitate the writing process for sixth-grade students. The study attempted to determine if elementary students, when allowed to use the word processor for writing, increased the number of words and the number of sentences they wrote as compared to traditional paper and pencil techniques. In addition, the study compared the different types of words and sentences used in the assigned writing samples. More research is necessary in order to find out if the computer encourages students to write more and to use a wider variety of

words and sentences in their writing.

CHAPTER II

Review of Literature

Bridwell, Nancarrow, and Ross (1984) emphasize the need for research concerning the effect of computers on writing. Teachers need to know whether differences occur in written compositions when the computer is used as the word processing device. Hawisher (1989) notes that there may not be enough evidence to suggest that computers do improve a child's writing; many of the studies were not conducted over a long enough period of time to allow the researchers to measure the differences in writing. Sommers (1985) states that "if microcomputers are to become permanent writing tools in our classrooms, . . . we need to integrate them into classroom instruction based upon research" (p. 9).

The process approach of writing is a method which emmploys an ongoing multi-stage procedure. The stages usually include prewriting, composing, revising, editing, and publishing (Schaeffer, 1987; Howie, 1989; Nash & Schwartz, 1987). Howie (1989) feels that the first step of the writing process is a crucial and difficult step. Webbing, brainstorming, mapping, and outlining are some of the approaches commonly used to prepare students to write. Writing involves taking an idea that the student has created and expressing it in words on

paper (Solomon, 1986). In the early steps of the writing process, students are encouraged to write as much as possible and not to worry about the errors. Sequencing, mechanics and form can be changed later and revised at a later time. In the revising step, students can make the necessary changes in their compositions (Howie, 1989). At this stage the writers critique their composition to see if they are communicating their ideas in a clear and concise manner (Solomon, 1986). Sommers (1985) states that "revision is the key to good writing" (p. 4). The editing stage allows the students and teacher to focus on the mechanics of his or her writing (Howie, 1989). In this step the student begins to shape the ideas for an outside audience. Publishing allows the student to present the paper to an outside audience (Schaeffer, 1987). Students have a sense of accomplishment and ownership in their published papers.

Howie (1989) feels that using a word processor is beneficial for students and their writing. In addition, a word processor "facilitates discovery of their ideas and sharpens their thinking in ways that paper and pencil cannot" (p. 87). Schaeffer (1987) states that "Word processors can be a powerful catalyst for turning a generation of students into competent writers and when they are used in classrooms where the process of writing is taught, their power is multiplied many fold" (p. 39).

Bickel (1985) found that her junior high school students wrote more while using a word processor. Also students were more willing to work with their writing and their motivation increased. Womble (1985) also found that her high school students were more willing to work with their compositions when they were using a word processor to write. Furthermore she feels that composing with a word processor makes students more aware of their own process of writing.

Daiute (1984) expressed the concern that even though students made more changes when using a computer, often, these changes were not as detailed or as extensive as changes made when having to rewrite the text by hand. Daiute posited that the computer's effect may depend upon the writing ability of the student. Bridwell and Ross (1984) agree with the notion that the effectiveness of the word processor depends upon the composing ability of the writer. They found that in their studies writers, at all levels, approached composition in a variety of ways and the differing styles affected how the writer adapted to the computer as a tool for writing.

Nash and Schwartz (1987) found that college students using a word processor in a composition class made improvements in the coherency of the sentences in their compositions and consequently their writing was more fluent

and more relevant. Computers were used at each stage of the writing process. The number of sentences and paragraphs written by the students in their study also increased significantly. The researchers also felt that the computer was highly effective during the revising-phase of the composition. High school teachers, Lindemann and Willert (1985), also feel that computerized word processing helps students make a more coherent writing piece. They state that "Word processing encourages language play because it's easy for students to add, move, and delete text. They become much more willing to experiment with alternative phrases and words" (p. 49).

A meta-analysis of studies on the effect of a word processor, completed by Schramm (1991), compared the writing samples of students using a word processor and writing samples of students using the traditional handwriting methods. There were 14 studies analyzed; they included students ranging in age from kindergarten to college. This meta-analysis suggests that students produce longer essays when using a word processor. Schramm also concluded that students using a word processor had a positive attitude toward writing and that their writing quality improved over time.

The findings in a Developmental Writing Program indicated that students who used a word processor produced a

significantly better quality of writing than students not using word processors (Moore, 1989).

Etchinson (1985) studied whether or not word processors increased the syntactic growth and/or the holistic writing quality of college freshman composition students. The students were randomly split into handwriting and word processing groups. Papers were scored by graduate students in a Rhetoric and Linguistics program. The study revealed that word processing students' gains in holistic quality were more than five times that of the handwriters. Word processing students produced more total words. The study found that there were no significant differences in the syntactic variables.

In a similar study conducted by Dalton and Hannafin (1987) using 80 junior high school students as subjects, a quasi-experimental design was used. The word processing group and the pen and paper group were assigned the same writing activities throughout the year. The study found that low achieving students benefited more from being taught with the use of a word processor than from the traditional methods of instruction. There was no evidence found to indicate that other students benefited from the word processor approach.

Hawisher and Fortune (1989) also did a study comparing student essays written on word processors to essays written by

hand. The writing quality of first year college students was judged by using a holistic instrument. They found that the students' writing did not improve regardless of the writing tool.

<u>Summary</u>

This lack of research on the writing skills of elementary age students makes this study most timely and useful to composition teachers. Most of the studies cited above involved students from the high school level to the college level. Also, the studies did not compare handwriting samples and word processing samples by the same subject. Few of the studies focused on the number of words and sentences. None of the studies involved an analysis of the types of words and sentences students used when composing with paper and pencil or with the word processor.

CHAPTER III

<u>Method</u>

This study examined writing samples of students using a microcomputer word processor and writing samples of students using the traditional handwritten method.

The writing samples were taken from sixth-grade students at North Tama Elementary School in Traer, Iowa. All of the sixth-grade students from the school district were chosen for the study. The students were asked to submit four writing samples, two using the word processor and two using pen and paper. A computer printout of the writing sample was provided for analysis in this study. Each student was asked to turn in a copy of their original draft and a copy of their final draft. The final draft of the students' writing samples were used as the data to be analyzed in this study. Equal numbers of handwritten writing samples and word processed writing samples were collected from each student. The students were assigned the same topics for each of the writing samples. Eight different parts of speech were analyzed. They were: noun, pronoun, adjective, verb, adverb, preposition, conjunction, and interjection. Three different types of sentences were also analyzed. They were: declarative, exclamatory, and interrogative. The number of words and sentences used in the

samples were counted. In addition, the different types of words and sentences were noted and counted.

Participants

Two sections of sixth-grade elementary students were used in the study. There were 38 students included in the study. Keyboarding skills had been taught to all students beginning in the third grade. Keyboarding skills were reinforced in subsequent grades. All students were taught word processing in their self contained classrooms by their regular classroom teacher.

Materials

The computer application used was AppleWorks. Students used an 80 column format. A spellchecker was available.

Research Design and Procedures

Prior to to beginning of the study, permission was obtained from the principal of North Tama Elementary School to use the sixth grade students and their class time for the study. The University of Northern Iowa Human Subjects Review Committee gave its approval for the study. A parent or guardian of each student signed a letter of consent prior to commencement of the study (Appendix A).

North Tama Elementary School is a rural school in eastern Iowa. The school has had a computer lab in existence for the

last three years. Since the second year of its existance, the lab has been used for writing. There are 26 Apple IIe computers in the lab and they are networked so the teacher can view any students' screen. There are 5 Image Writer II dot matrix computers on the network. There are dictionaries in the lab for students to use; fifth and sixth grade students are permitted to use a spellchecker. During this study, the use of the spellchecker was left up to the individual student.

The students in grades kindergarten through grade four at North Tama Elementary School are taught in self-contained classrooms. All students, kindergarten through sixth-grade, are taught the writing process; each teacher teaches writing in his or her classroom. Since fifth and sixth grades are departmentalized, students in those grades all have the same teacher instructing the writing process.

Before going to the computer lab, the students involved in this study did a version of brainstorming in the classroom. During a 45 minute class period they worked on the assigned writing topics. Each student had a computer to work on.

As part of the study, the classroom teacher received a copy of the first draft, reviewed it, and then followed up with feedback to the student. There was a single consultation from the teacher with comments and questions from the student;

this always happened during the conferencing component of the writing process. After the conference the students had an opportunity to revise their story before writing a final draft. The final copy of the writing samples were turned in for this research project.

For the study, handwriting samples were collected in November and March. Word processed samples were collected in December and April. For the word processor component, students were asked to write on adventures in movies and books. The topics assigned for the handwriting samples were adventures of friendship and family.

Analysis

The writing samples submitted by the students were analyzed to determine: (a) the number of words in each of the writing samples, (b) the number of different types of words used in each of the writing samples, (c) the number of sentences used in each of the writing samples, and (d) the number of different types of sentences used in each of the writing samples.

The analysis also compared the information obtained from the handwritten samples to that of the word processed samples to see if there was any change. Two samples were taken from each group; students turned in the original draft and the final

draft. Differences between the handwritten samples and word processed writing samples were noted. The number of sentences, different types of sentences, number of words, and different types of words were counted from the final draft.

Results

Sentences

The total number of sentences used by the students in the handwritten samples was 1,840. The number of declarative sentences was 1,624, exclamatory 191, and interrogative 25.

The total number of sentences used in the word processed writing samples was 1,974. The number of declarative sentences was 1,881, exclamatory 83, and interrogative 10.

Words

The total number of words used by the students in handwritten samples was 20,451. The types of words used were: nouns 4,181, verbs 4,491, pronouns 2,973, adjectives 3,416, adverbs 2,229, prepositions 2,105, conjunctions 1,013, and interjections 43.

The total number of words used in the writing samples from the word processor was 25,282. The different types of words used were: nouns 6,138, verbs 5,323, pronouns 2,620,

adjectives 4,617, adverbs 2,670, prepositions 2,689, conjunctions 1,199, and interjections 26.

Discussion

The results of the study indicate that these sixth-grade students did write differently when they were allowed to use a computer for word processing. The length of their writing samples increased when they used a word processor; the number of words increased and the types of words increased for each of the eight different parts of speech except for pronouns and interjections. The greatest change in their use of the eight parts of speech was in their use of nouns and adjectives. The number of declarative sentences increased while the number of exclamatory and interrogative sentences decreased.

These results may have occurred for several reasons. One being that the topics assigned were different for each writing sample; students can often find more or less to write about depending upon the topic assigned. The topics chosen for the handwritten samples were based upon personal experiences while the topics for the word processed samples were related to a form of media that they had experienced. This could also account for the differences in the number of nouns and adjectives used in each of the samples collected.

Another reason for the differences found might be the growth in writing skills students naturally make over the course of a school year; the first writing sample was collected in the fall and the last writing sample was collected in the spring. The first sample collected was handwriting, one in the fall and spring. The word processed writing sample was collected later in the fall and spring.

Another possibility to be considered is the number of revisions that the student may have made while working on the computer during the first draft of the writing sample. While composing at the computer, the student may have found it easier to change and add to the composition before turning it in.

Recommendation

The following recommendations are made for further study:

1. Collect samples in a shorter period of time.

2. Replicate the study, but focus more effort on analyzing the students' revisions made between the first and last draft.

Concluding Remarks

This research was undertaken because there was a lack of empirical evidence concerning the effect of computer technology on students' writing. As elementary computer labs

become more adundant, there is a need to understand how computer technology changes or affects the writing of elementary age students.

Summary

The purpose of this study was to examine children's writings to see if the use of a computer makes a difference in the writing of elementary age students. Thirty-eight sixth graders were asked to turn in four writing samples; two from the word-processor and two handwritten samples. The number and types of words and sentences were counted from each sample. The number of sentences and the diffferent kinds of sentences were counted (declarative, exclamatory, and interrogative). The number of words and the eight different parts of speech were counted: noun, pronoun, adjective, verb, adverb, preposition, conjunction, and interjection.

APPENDIX A

PERMISSION FORM

The North Tama Elementary School in conjunction with the
University of Northern Iowa is conducting a study about the
impact of computer technology on the writing process. This
study will be conducted during the 1989-90 school year as a
part of the normal writing curriculum. The students
participating in this study will not be identified individually
when reporting the results of this study. Participation in this
study will not affect the grading process for students.

I give permission for _____(name) to
participate in the writing study. I understand that my child's
name will not be identified in any way outside of that
associated with data collection. There will be no identification
of my child in the reported results. I further understand that I
may withdraw my child from participation in this study at any
time if I wish.

_____   _____
Parent/Guardian   Date

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