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The Relationship Between
the Amount of Time Spent Writing with Computers
and the Quality of Written Work

A Field Project
Presented to the
Department of Educational Administration
and the
Faculty of the Graduate College
University of Nebraska
at Omaha

In Partial Fulfillment
of the Requirements for the Degree
Specialist in Education
University of Nebraska at Omaha

By
MaryAnn Green Bragg

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Field Project Acceptance

Accepted for the faculty of the Graduate College, University of Nebraska at Omaha, in partial fulfillment of the requirements for the Specialist in Education degree, University of Nebraska at Omaha.

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This writing is dedicated to the memory of my late husband, Douglas K. Bragg, without whose confidence and urging, I would never have attempted this program. My children, Adam and Sarah, also deserve thanks for their patience, encouragement and expectations.

MaryAnn Green Bragg

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
Statement of the Problem	3
Hypothesis	4
Methodology	5
Significance of the Problem	7
Definition of Terms	7
Limitations	8
Assumptions	8
II. REVIEW OF RELATED RESEARCH AND LITERATURE	10
Process Writing	10
Program Elements	12
Microcomputer Usage with Process Writing	13
III. METHODOLOGY	20
Subjects	20
Variables	21
Instrumentation	21
Design	22
Procedure	22
Statistical Analysis	24
IV. PRESENTATION AND ANALYSIS OF DATA	25
Descriptive Data	25
Correlation Data	26
Third Grade Spearman Rank	28
Scattergram for Third Grade Students	33
Fifth Grade Spearman Rank	34
Scattergram for Fifth Grade Students	40
Conclusion	41

V.	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	42
	Summary	42
	Conclusions	44
	Synthesis	45
	Recommendations	45
	REFERENCES	47
	APPENDIX	50
	Writing Activity	51
	Decriptors of Scores	52
	Cover Sheet	53
	Dinosaur Days Sample	54
	Writing Activity Sample	55

Chapter 1

INTRODUCTION

The decade of the 80's witnessed the introduction of a new method for teaching language arts called "Whole Language". A whole language approach provides language instruction as the simultaneous, integrated teaching of reading, writing, speaking, and listening in a context that is both meaningful and purposeful for the learner. A new paradigm emerged, demonstrating that "knowledge is internal and subjective, learning is constructing meaning, and teaching is a dynamic combination of coaching and facilitating" (Hiebert, 1989, p. 62). The whole-language movement appears to embody this new paradigm in its most advanced development.

Teaching writing as a process is one element of the whole language approach. Hiebert (1989) observed that "students in whole language classes spent more time on literacy tasks, especially writing tasks and, more importantly, that their literacy tasks were larger and more cognitively complex when compared to tasks in the skills-oriented classes". (p. 62)

During this decade, technology has also become a more integral part of most elementary classrooms. Integration of technology within the curriculum in appropriate ways is a challenge faced by teachers and administrators. Use of

word processors is one way to integrate technology into the whole language classrooms while providing students with a vehicle that can help them improve their writing. Irwin (1987) views word processing programs as useful and versatile software in language classrooms. Changes are easy to make in the text if the child decides to use a different word, add a sentence, or delete material. Children tend to watch the computer screen as teachers record dictated text with more concentration than when teachers write by hand. Talking word processors provide younger children with immediate feedback for analyzing errors. Spell checkers help children identify and correct misspelled words. Children view the computer as an impartial reviewer of their work. Research provides valuable information regarding the effects of using computers with word processing software in the writing process, but the overall conclusions do not present a clear cut picture of the advantages and disadvantages of such usage.

Integration of computers into the curriculum, as well as continued support for their use should be based on research (Sommers, 1985, p.9). A need exists to document the value of computer usage in the whole language component of process writing.

Whole language classrooms that incorporate the writing process as an integral facet are the paradigm in many of the nation's elementary schools. In

1989-90 the Council Bluffs Community School District adopted a whole language approach for teaching language arts. The Council Bluffs Schools began infusing all facets of technology, especially computers, into their classrooms. This technology project is expanded by adding technology to additional buildings each year. The integration of computers into the whole language area, particularly, the writing process, is providing new opportunities for students to improve the quality of their writing. The students seem more engaged during writing, more willing to write, they write longer themes and are more likely to make revisions. As the technology project spreads to other buildings, it is necessary to document whether this infusion is making a difference in the education of our students.

The purpose of this study was to examine the relationship between writing quality and technology as technology is incorporated into whole language classrooms.

Statement of the Problem

Is there is a significant relationship between the amount of time third and fifth grade students spend using computers for writing and the quality of their writing on an holistically scored writing sample?

Sub problem 1

Is there a significant relationship between the amount of time third grade students spend using computer for writing and the quality of their writing on an holistically scored writing sample?

Sub problem 2

Is there a significant relationship between the amount of time fifth grade students spend using computer for writing and the quality of their writing on an holistically scored writing sample?

Statement of the Hypothesis

There is no significant relationship between the amount of time third and fifth grade student spend using computers for writing and the quality of their writing on an holistically scored writing sample.

Sub-hypotheses 1

There is no significant relationship between the amount of time third grade students spend using computers for writing and the quality of their writing on an holistically scored writing sample.

Sub-hypotheses 2

There is no significant relationship between the amount of time fifth grade students spend using computers for writing and the quality of their writing on an holistically scored writing sample.

Methodology Employed

To test the hypothesis that there is no significant relationship between the amount of time students spend using computers for writing and the quality of their writing on an holistically scored writing sample, 96 third grade and 115 fifth grade students were selected from two elementary schools in Council Bluffs, Iowa. The third and fifth grade students were considered as two separate samples and were not compared with each other. The same data collection methods were applied to both groups.

1. The students in these schools come from similar socioeconomic strata as determined by number of free/reduced lunch applicants. The schools are located relatively close to each other and are similar in class size.

2. Records were kept on the amount of time the third and fifth grade students in these schools actually spent doing writing activities using computers through the IBM Classroom Management System (ICLAS). Logging records were recorded for use of the following word processing types of programs:

- a. Primary Editor Plus
 - b. Children's Writing and Publishing Center
 - c. Microsoft Works
 - d. Linkway
3. Writing samples were obtained from the third and fifth grade students in each of these schools.
 4. The samples were obtained under the following protocols:
 - a. Students were allowed to choose from two story starter pictures for their writing.
 - b. Teachers instructed the children to make a choice.
 - c. Students wrote for a thirty minute timed period.
 5. Samples were collected during the first week of May 1992.
 6. Samples were holistically scored by a team of trained teachers for quality of ideas expressed.
 7. Scores were tabulated, ranked and tested for significant difference.

Significance of the Problem

This study has significant implications for continuation of the Technology Transformation Project of the Council Bluffs Community School District. First, it provides data regarding the relationship between computer usage for writing and the quality of the writing. Second, information was gained that is relevant to the support or rejection of the expansion of computer usage for writing. In addition, the study provides information to be considered for its implications regarding further teacher training in computer usage. Lastly, it provides information for others who are questioning whether more computer usage in writing yields significant results.

Definition of Terms

1. Computer/microcomputer: a programmable electronic device that can store, retrieves and process data.
2. Word processing software: the general term for software packages that permit the writing, editing, storing, and printing of text.
3. Process Writing: writing referred to as a series of stages usually encompassing prewriting, writing, revising, editing, and publishing.

4. Whole/Integrated Language: instruction in language that is a simultaneous, integrated teaching of reading, writing, speaking and listening in a context that is meaningful to the learner.

5. Holistic Scoring: a method of scoring writing that accounts for quality and quantity of writing as displayed by number of ideas and words or sentences measured on a 4 or 5 point scale.

Limitations

There are no indicators of the students' writing skills prior to this study so there can be no comparison between before and after writing.

This study only considers students in the Council Bluffs Schools.

The students in this study all come from similar socio-economic backgrounds.

Assumptions

Whole language and computers are compatible means for improving the education of students.

There is a commitment by teachers and administrators to make use of computers in the best educationally sound ways to improve education.

The people employed to perform the holistic scoring have been trained to provide an objective, similar ranking for the writing samples.

The sample is not representative of the entire population as it was only derived from two local elementary schools.

Chapter 2

REVIEW OF RELATED RESEARCH AND LITERATURE

The review of literature will define process writing and its objectives, discuss program elements of process writing, and explore the usage of microcomputers to improve students' writings.

Process Writing

Whole language classrooms are mushrooming around the country, bringing with them a process writing approach. Vukelich (1981), Graves (1981) and Daiute (1982) (cited in Hoot, 1988) explored activities that encourage children to become good writers and suggest that good writers are proficient in three major processes: (a) prewriting (thinking through the tasks at hand), (b) composition (actual writing as well as making decision about what goes where, stopping and starting, and re-reading), and (c) rewriting (editing and massaging ideas in formal form) (p. 4). Durr (1989) suggests that children be given instruction in developing their writing based on the steps of prewriting, writing a first draft, revising, proofreading, and publishing a product. Other authors listed similar steps in process writing, varying in number and detail.

Purpose determines the prewriting activities that occur and may take the form of brainstorming for a topic, deciding upon specific questions to be

answered, making notes for the chosen topic, and/or researching information to be included in the article. Students then write a first draft using the ideas gathered or generated in the prewriting stage. During the revision stage, students may revise their own papers, exchange papers with other students for clarification and revision, or conference with other students and/or the teacher to gather suggestions for improving their piece. Students make revisions and proofread to correct any lingering errors. The final stage is publishing the paper in a suitable format and sharing the accomplishment with an appropriate audience.

Teachers of writing must move toward developing the thought processes that occurs as one writes and away from writing focused on the mechanical elements, the form and the handwriting. Piazza (1988) relates that research findings indicate that writing is a conceptual act starting with construction of meaning rather than an abstract set of skills or isolated elements of language. Writing is a process of 'selecting, combining, arranging, and developing ideas in effective sentences, paragraphs, and ... longer units of discourse [NCTE Standards, 1979]'(Piazza, 1988, p. 197). Writing includes all preparation, beginning with the intention to write, the planning and organization of thoughts, generating ideas for composition, and revising and editing ideas based on feedback. This recursive process places primary emphasis on children's sequencing and meanings in learning to write and on the problem solving strategies used to control language.

Program Elements

Writing is a major skill students should master as they progress through school. Assessments of the writing skills of students have caused grave concern about the writing proficiencies of our nation's students. Pressure is increasing to rectify the lack of writing skills being evidenced by our youth. Past educational policies, concerning the writing curriculum, have focused on the form of the written work while often overlooking the communication and expression that should occur through the written word.

Several processes working at the same time in writing programs include writing as a process, writing as a social process, writing as a linguistic process, and writing as a growth and development process. Piazza (1988) described the program elements found in each of these processes.

Writing as a process would include writing tasks that allow concentration on meaning before attending to sound/symbol relations, instruction devoted to all aspects of the writing process, opportunities to do extended prose in which emphasis is on how context influences the structure and uses of language, and instruction that emphasizes writer's strategies for composing.

Writing as a social process would include opportunities for students to write for a variety of audiences, to write in many forms, to write for a wide range of purposes, and to experience environments that allow the observation of how written language functions in everyday settings.

Writing as a linguistic process would include opportunities for children to use language for various social purposes and opportunities to use talk throughout the writing process.

Writing as a growth and development process would include opportunities for children to make connections between talk and print while using their own conventions, emphasize problem-solving strategies for developing concepts of print and meaning, opportunities for children to use their own resources for writing.

Microcomputer Usage with Process Writing

As teachers struggle with changing their methods of teaching writing, ironically, they also need to incorporate a tool into their curriculum that may be a valuable adjunct to their writing curriculum. They face a need to integrate microcomputer usage into their regular curriculum. Microcomputers appear in our schools in ever increasing numbers. Cochran-Smith (1990) reported that "almost every elementary school in America also has a computer (Office of Technology Assessment, 1988) and, in some of these, beginning writers are offered the opportunity to use word processing as one of their earliest tools" (p. 235). Sommers (1985) stated that preliminary research supported benefits to writers from microcomputer usage while cautioning us to bear in mind four points:

1. The writing teacher is indispensable as collaborator and audience, as facilitator and assignment-maker....

2. Writers learn best when writing is taught as a process in decentralized classrooms....the conference method of instruction is most valuable as a primary mode of instruction....
3. The microcomputer is most valuable as a writing tool enhancing our writers' abilities to explore, to articulate, and to reshape....teachers should be aware that writers learn to write holistically, and microcomputer uses should enhance this holistic sense of discourse.
4. Microcomputers are counter-productive when used in a theoretical vacuum. We need to employ great care when we integrate microcomputers into our classrooms (p. 9).

Microcomputers should present teachers and students with exciting possibilities when integrated into the process writing curriculum.

The introduction of microcomputers into elementary schools consisted of single stand-alone units in classrooms. These stand-alone units became grouped into class sized labs available for use on a weekly schedule. Networked computer labs made their presence felt in elementary schools as computers became more available. Distributed networks connecting a main computer lab and three to five station mini-labs in classrooms throughout the building appear to be the next step on the computer scene. This infusion of technology, welcomed by some teachers, rejected by others.

Teachers and administrators need to be aware of the effects that using computers with word processing software can have on students' writing skills.

Schramm (1991) did a meta-analysis of studies that experimentally compared the quality of students' writing samples using word processors versus students using traditional writing methods. He reviewed "writing quality, revision time, quantity of revisions, length of writing, attitudes toward writing, and various other related outcomes of the writing process" (p. 7). He found no clear cut conclusions in the research concerning the advantages and disadvantages of using word processing equipment in writing classrooms. The diversities of the design, setting and type of application caused different studies to draw conflicting conclusions, thus blurring the picture:

... studies by Collier (1983), Balkena (1984), Greenland (1986/87) and Pollock (1986) concluded that word processing does not affect the quality of students' writing. Similarly, Bultler-Nalin (1986), Duling (1986), Gredja (1989), S. Miller (1985) and Piper (1983/84) found no significant differences in writing skills of students using pen and paper versus those using word processing equipment. *In contrast*, [italics added] Daiute and Taylor (1981), Feldman (1984), Koenig (1985), Moore (1987), Pernia (1988). Pivarnick (1985) and Shimanoff (1988) reported that students using word processing equipment produced a significantly better written product than students using pen and paper (Schramm, 1991).

Schramm's meta-analysis of studies produced the following summary statistics regarding the effects of word processing on writing skills:

1. There is a small, but significant improvement in the writing quality of

those students using word processing equipment when compared to those students using traditional writing methods.

2. There is no significant difference in the effects of using word processing equipment on writing quality among inexperienced and experienced student writers.
3. There is a small, significant, and positive effect in the length of essays produced by students using word processing equipment and those using traditional methods of writing.
4. There is a large, significant and positive effect on the attitude of students toward writing when using word processing equipment as compared to students using traditional writing methods (p. 10).

Teachers need to have a clear understanding of the relationship of computer usage with process writing. Withey (1983) stated that "real writing means focusing on process rather than product and making use of both the new writing models and the new technology (p. 26). Withey described using computers as an aid in teaching composition not a replacement. The writing classroom might contain the computer as a tutor, the computer and student using interactive programs, or the computer as a blank page on which the student can write, revise, and edit (p. 25).

As students use the computer for the writing process, teachers are observing improvement throughout the writing. Hiebert (1989) in a study of Apple Classrooms of Tomorrow (ACOT), reported teacher claims of more student

revision both structurally and mechanically with computer usage that frees the writers to focus their energy on thinking organizing, revising and refining ideas. The teachers also reported that the students were more confident and found writing more enjoyable (p. 5). Student quality and quantity of writing was investigated. The ACOT students wrote "more and better" (Hiebert, 1989, p. 11) when they used computers. The ACOT students did almost twice as much writing; their papers rated slightly higher; stories had more complicated plots; and they used more dialogue than non-ACOT students. A conclusion to be drawn is that objectives of any sound writing curriculum "can be facilitated to a far greater degree when children write with computers than when they use paper and pencil or have limited access to computers" (p. 14). Effective instruction was also highlighted as a critical component for success. Oates (1987) stressed the interaction and involvement of teachers in the instructional process as an important element for student success.

Practice makes perfect is a saying that has been around forever. Dalton (1989) concurs with this philosophy when he recommends the use of computers, during all phases of writing, at least three times a week. Used occasionally the computer will have minimal effect of the development of writing skills.

The effect of computers in the writing curriculum is substantiated in several articles. Tone (1988) recounted that most reports in the ERIC database found "computer-assisted writing instruction has some effect - if not a dramatic impact - on both the quantity and quality of writing (e.g., Stine, 1987)". While

most of the evaluations came from informal teacher observations and reviews of written products, endorsements occurred with such frequency that the differences should be considered reliable.

Holistic scoring methods are often employed with student writing. Use of the holistic scoring technique evaluates the paper as a whole. Scorers are trained in holistic scoring methods and then choose model papers as references for each level on the holistic scale. Norris (1990) reported on pretest and post test paragraph samples for students involved in a ten week writing and telecommunication project. The paragraphs were scored on a scale of one to six. The holistic scores for two of the three classes raised an average of three holistic points from the pretest to the post test. The third class's scores rose an average of two holistic points from the pretest to the post test. The third class had missed several computer writing times during the project. Other positive outcomes of the project included increased usage of computers, increased enjoyment of writing using a computer, and increased self confidence in writing for communication.

Nash (1987) evaluated 24 basic writers enrolled in a writing program in the fall of 1984. The students wrote a thirty minute in-class essay at the beginning of the semester and wrote another on a similar topic at the end. Analysis of the essays showed dramatic increases in three categories. The number of sentences and paragraphs more than doubled; the connectedness of each sentence rose sharply and there was a marked rise in the coherence of the samples. Students also used more extensive evidence to support their points.

The research presented in this paper supports the use of microcomputers with the writing process curriculum. The authors report that growth occurs in writing quality and quantity when students use computers and word processing equipment. Further investigation needs to occur before a clear understanding is reached regarding the most effective methods for using computers in the writing classroom. This study takes a further look at the impact of computers on student writing.

CHAPTER III

METHODOLOGY

The purpose of this study was to analyze data that will examine the relationship between the amount of time students spent using computers for writing and the quality of their writing on a holistically scored writing sample. The time students spent using computers for writing or writing related activities from January through May of 1992 was logged, tabulated and ranked. A writing sample done by the students in May was holistically scored and the scores were ranked.

Subjects

The subjects for this study involved the third and fifth grade students from two elementary schools in the Council Bluffs Community School District. The students in both schools came from comparable socio-economic backgrounds as determined by the number of free/reduced lunch applications. The students lived and attended school in adjacent neighborhoods. The two schools chosen for this study were Franklin Elementary School and Walnut Grove Elementary School. Each school had three third and three fifth grade classes. Franklin Elementary School has a computer lab that was used on an average of twice weekly by the students plus mini-labs available in the classrooms that were used on a daily basis.

Walnut Grove Elementary School also has a computer lab that was used on an average of twice weekly by most of the students and approximately half of the classrooms had mini-labs that were used on a daily basis.

The sample consisted of 96 third grade students and 115 fifth grade students. There were six teachers involved with the students. The teachers possessed varying degrees of knowledge and enthusiasm regarding computer usage.

Variables

The variables of the study comprise the basic components of the design that were utilized. The independent variable of this study was the amount of time students spent using computers for writing. The dependent variable of this study was the score students received on an holistically scored writing sample.

Instrumentation

An holistically scored writing sample was the testing instrument used for this study. Holistic scoring is a method for scoring writing samples that accounts for the quality of writing as evidenced by the ideas expressed. The samples were ranked on a four point scale, with “4” representing the highest rank.

The holistic writing sample was administered to six third grade and six fifth grade classes. The holistic scorers were teachers who had received “trainer

of trainers” instruction and had done training and scoring for the district for several years. The scorers had compiled a packet of model papers from sample writings that were representative of each level on the holistic scale to be used as reference materials when needed.

The amount of time the students spent using computers for writing was tracked by the IBM ICLAS (IBM Classroom) management system. ICLAS tracked the students usage of writing related software by recording the program name, the date and the amount of time spent using the program. The data for each class were printed and tabulated to show the total number of minutes each student spent using the computers for writing.

Design

The Spearman rank order correlation coefficient method was calculated to determine the relationship between the amount of time a student spent using computers for writing or writing related activities and his/her score on an holistic writing sample. The correlation coefficient was then tested for statistical significance.

Procedure

The time the students spent using the computers for writing or writing related activities was logged by the ICLAS computer management system from

January to May. The teachers were assisted in determination of which software programs to be included in the logging system for time usage. Logging records of time used were recorded for the following programs: Primary Editor Plus, Children's Writing and Publishing, Microsoft Works 2.0, and Linkway. Primary Editor Plus is a very basic beginning word processing program with minimal capabilities. It did include a rudimentary spell checker and minimum editing routines. Children's Writing and Publishing is a beginning desktop publishing package which did not include a spell checker. It allows the user to edit through moving, copying, changing fonts and including graphics in a document. Microsoft Works 2.0 is a slightly more sophisticated word processing program. Works provided more elaborate editing, spell checking, a thesaurus and allowed these to be done in an easier manner, but it did not provide for the inclusion of graphics. Linkway is a multimedia presentation tool which allowed the user to compose text, create or import colorful graphics and control outside video sources as features of a finished product. The logging records were collected at each by printing the records and then tabulating the times to provide consistency of collection and tabulation of data. Although times were recorded for different programs, the aggregate time for all programs was used in the statistical analysis.

During the month of May the teachers were asked to administer a writing activity to their students. The samples were returned to the Council Bluffs Community Schools Central Office and were scored as a blind sample by trained district holistic scorers. The scorers had received their training from sources outside the district and were trainers of scorers themselves. The numbers on the samples with the holistic scores were then matched with the logging records from the computer systems for each student.

Statistical Analysis

Data were collected to compare the amount of time students spent using computers for writing activities and their scores on an holistic writing sample. First a simple ranking was done to compare the amount of time with the holistic scores for each student. Second the Spearman rank order method was used to compute the correlation coefficient. Third the amount of time spent using computers for writing activities and the student's score on an holistic writing sample were plotted on a scatter graph.

Chapter IV

PRESENTATION AND ANALYSIS OF DATA

This chapter will analyze, discuss and illustrate the data collected from the study. As stated previously, the purpose of this study was to examine the relationship between the amount of time students spent using computers for writing and the quality of their writing on a holistically scored writing sample. Initially the data were charted using a simple ranking of ascending order from least amount of time using computers for writing to greatest amount of time using computers for writing with the holistic scores listed for each student. The data from the ranking were then examined to determine the coefficient of correlation (r) by applying the Spearman rank correlation coefficient method. This information was then charted on a scatterplot for further analysis in a visual format.

Descriptive Data

The subjects in this study were chosen based on information from the Council Bluffs Community Schools Central Office personnel regarding similarity between the two schools as to socio-economic level. To test the hypothesis at more than one grade level, the third grade and the fifth grade classes were chosen for this study.

Correlation Data

The primary purpose of this study was to test the previously stated hypothesis and sub-hypotheses. The hypotheses stated that there is no significant relationship between the amount of time third and fifth grade student spend using computers for writing and the quality of their writing.

Sub-hypotheses 1

There is no significant relationship between the amount of time third grade students spend using computers for writing and the quality of their writing on a holistic scoring sample.

Sub-hypotheses 2

There is no significant relationship between the amount of time fifth grade students spend using computers for writing and the quality of their writing on a holistic scoring sample.

To test the hypothesis and the two sub-hypotheses, this study utilized the Spearman rank order correlation coefficient. The variables consisted of the amount of time each student spent using computers for writing and the score that same student earned on an holistically scored writing sample.

The initial rank ordering of the amount of time spent using computers for writing and the rank ordering of the holistic writing score supported the

determination of the correlation coefficient r . Table 1 and Figure 1 report the findings for the third grade students. Table 2 and Figure 2 report the findings for the fifth grade students.

Table 1

Third Grade Spearman Rank of Time on Computers and Holistic Writing Scores

Student ID	Holistic Writing Score	Number of Minutes	Score Rank	Minutes Rank	D Difference of Rank	D ² Rank Squared
37lu	1.5	28	2.5	2	-0.5	0.25
28sm	1.5	73	2.5	11	8.5	72.25
33lu	1.5	97	2.5	15	12.5	156.25
17sm	1.5	215	2.5	37.5	35	1225
34lu	2	23	18.5	1	-17.5	306.25
30lu	2	44	18.5	5	-13.5	182.25
16sm	2	75	18.5	12	-6.5	42.25
24lo	2	85	18.5	14	-4.5	20.25
25lu	2	137	18.5	22.5	4	16
8ho	2	187	18.5	31	12.5	156.25
3ho	2	192	18.5	33	14.5	210.25
22sm	2	218	18.5	40	21.5	462.25
27sm	2	220	18.5	41	22.5	506.25
36sm	2	233	18.5	43	24.5	600.25
2st	2	238	18.5	44	25.5	650.25
20sm	2	253	18.5	45	26.5	702.25
33sm	2	254	18.5	46	27.5	756.25

6ho	2	256	18.5	47	28.5	812.25
37st	2	267	18.5	50	31.5	992.25
40st	2	277	18.5	52	33.5	1122.25
6st	2	290	18.5	54	35.5	1260.25
17st	2	293	18.5	55	36.5	1332.25
12llo	2	312	18.5	58	39.5	1560.25
3st	2	323	18.5	59	40.5	1640.25
31sm	2	374	18.5	61	42.5	1806.25
9ho	2	383	18.5	62.5	44	1936
6gi	2	676	18.5	75	56.5	3192.25
7lo	2	695	18.5	77	58.5	3422.25
17lo	2	738	18.5	79	60.5	3660.25
15lo	2	751	18.5	82	63.5	4032.25
13gi	2	843	18.5	87	68.5	4692.25
9gi	2	974	18.5	92	73.5	5402.25
38lu	2.5	49	46.1	6	-40.1	1608.01
40lu	2.5	50	46.1	7	-39.1	1528.81
31lu	2.5	59	46.1	8	-38.1	1451.61
30sm	2.5	80	46.1	13	-33.1	1095.61
32lu	2.5	101	46.1	16	-30.1	906.01
15st	2.5	117	46.1	18	-28.1	789.61
35lu	2.5	120	46.1	19	-27.1	734.41
23sm	2.5	121	46.1	20	-26.1	681.21

27lu	2.5	136	46.1	21	-25.1	630.01
5st	2.5	137	46.1	22.5	-23.6	556.96
14st	2.5	159	46.1	24	-22.1	488.41
11st	2.5	167	46.1	26	-20.1	404.01
36lu	2.5	177	46.1	27	-19.1	364.81
26lu	2.5	183	46.1	28.5	-17.6	309.76
29lu	2.5	185	46.1	30	-16.1	259.21
19sm	2.5	197	46.1	34.5	-11.6	134.56
18sm	2.5	211	46.1	36	-10.1	102.01
2ho	2.5	259	46.1	48	1.9	3.61
26sm	2.5	278	46.1	53	6.9	47.61
35sm	2.5	339	46.1	60	13.9	193.21
14ho	2.5	383	46.1	62.5	16.4	268.96
13ho	2.5	398	46.1	64	17.9	320.41
1ho	2.5	401	46.1	65	18.9	357.21
10lo	2.5	664	46.1	74	27.9	778.41
23lo	2.5	741	46.1	80	33.9	1149.21
6lo	2.5	956	46.1	89	42.9	1840.41
7gi	2.5	987	46.1	93	46.9	2199.61
16lo	2.5	1077	46.1	96	49.9	2490.01
5lu	3	41	77.1	3	-74.1	5490.81
3lu	3	72	77.1	9.5	-67.6	4569.76
28lu	3	163	77.1	25	-52.1	2714.41

1st	3	188	77.1	32	-45.1	2034.01
7ho	3	197	77.1	34.5	-42.6	1814.76
4st	3	215	77.1	37.5	-39.6	1568.16
9st	3	216	77.1	39	-38.1	1451.61
10ho	3	229	77.1	42	-35.1	1232.01
16st	3	266	77.1	49	-28.1	789.61
12st	3	273	77.1	51	-26.1	681.21
24sm	3	306	77.1	56.5	-20.6	424.36
34sm	3	306	77.1	56.5	-20.6	424.36
10st	3	427	77.1	66	-11.1	123.21
39st	3	429	77.1	67	-10.1	102.01
0sm	3	440	77.1	68	-9.1	82.81
12ho	3	552	77.1	69	-8.1	65.61
4ho	3	573	77.1	71	-6.1	37.21
20lo	3	597	77.1	72	-5.1	26.01
22lo	3	634	77.1	73	-4.1	16.81
12gi	3	694	77.1	76	-1.1	1.21
9lo	3	732	77.1	78	0.9	0.81
11lo	3	750	77.1	81	3.9	15.21
13lo	3	781	77.1	83	5.9	34.81
21lo	3	788	77.1	84	6.9	47.61
11ho	3	823	77.1	85	7.9	62.41
14lo	3	842	77.1	86	8.9	79.21

8lo	3	966	77.1	90	12.9	166.41
19gi	3	1001	77.1	94	16.9	285.61
16gi	3	1018	93	95	2	4
39lu	3.5	42	93	4	-89	7921
2lu	3.5	72	93	9.5	-83.5	6972.25
1lu	3.5	104	93	17	-76	5776
15ho	3.5	183	93	28.5	-64.5	4160.25
5ho	3.5	553	93	70	-23	529
19lo	3.5	846	93	88	-5	25
18lo	3.5	970	93	91	-2	4
				r = .23		

Writing Time and Holistic Scores

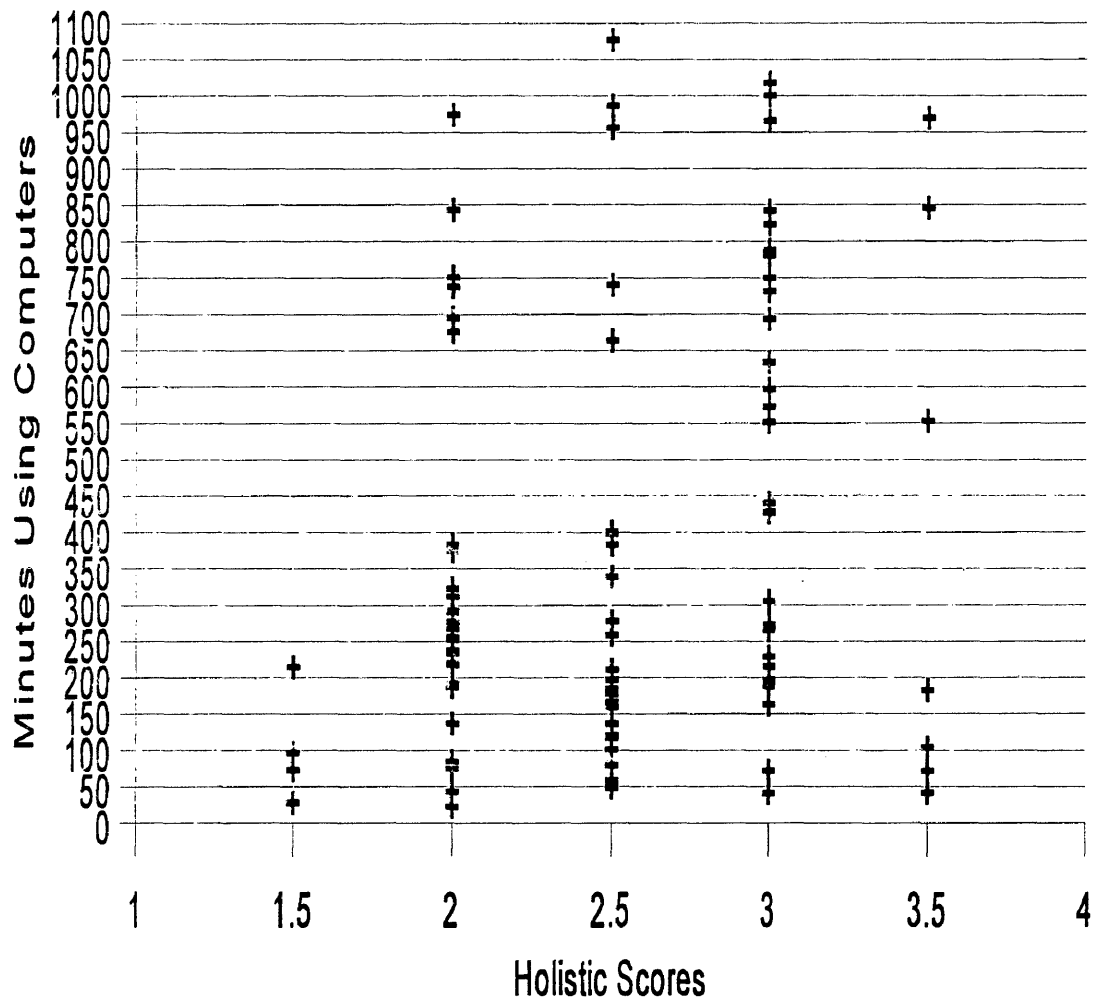


Figure 1

Scattergram for Third Grade Students

Table 2

Fifth Grade Spearman Rank of Time on Computers and Holistic Writing Scores

Student ID	Holistic Writing Score	Number of Minutes	Score Rank	Minutes Rank	D Difference of Rank	D2 Rank Squared
9vi	1.5	79	2	1	1	1
36jw	1.5	568	2	80	-78	6084
25jw	1.5	592	2	84	-82	6724
40ge	2	128	9.5	4	5.5	30.25
18v	2	189	9.5	9.5	0	0
14v	2	189	9.5	9.5	0	0
34wi	2	240	9.5	15	-5.5	30.25
42ge	2	315	9.5	27	-17.5	306.25
37wi	2	330	9.5	36.5	-27	729
28jw	2	343	9.5	38	-28.5	812.25
30jw	2	381	9.5	52	-42.5	1806.25
29jw	2	513	9.5	74	-64.5	4160.25
39jw	2	580	9.5	82	-72.5	5256.25
22wi	2	598	9.5	86	-76.5	5852.25
23b	2	639	9.5	88	-78.5	6162.25
12vi	2.5	82	34.5	2	32.5	1056.25
34b	2.5	112	34.5	3	31.5	992.25

37v	2.5	174	34.5	7	27.5	756.25
38v	2.5	201	34.5	11	23.5	552.25
34ge	2.5	213	34.5	13	21.5	462.25
21v	2.5	246	34.5	16	18.5	342.25
31wi	2.5	252	34.5	17	17.5	306.25
33ge	2.5	277	34.5	19	15.5	240.25
25b	2.5	300	34.5	25	9.5	90.25
4vi	2.5	320	34.5	28.5	6	36
35wi	2.5	320	34.5	28.5	6	36
42wi	2.5	322	34.5	31	3.5	12.25
27jw	2.5	345	34.5	39	-4.5	20.25
43ge	2.5	351	34.5	42.5	-8	64
36ge	2.5	355	34.5	44.5	-10	100
37ge	2.5	355	34.5	44.5	-10	100
4wi	2.5	358	34.5	46	-11.5	132.25
31ge	2.5	376	34.5	48	-13.5	182.25
44ge	2.5	378	34.5	50.5	-16	256
3wi	2.5	400	34.5	55	-20.5	420.25
26wi	2.5	408	34.5	56	-21.5	462.25
35jw	2.5	409	34.5	57	-22.5	506.25
5jw	2.5	443	34.5	60	-25.5	650.25
32ge	2.5	477	34.5	67.5	-33	1089
33jw	2.5	502	34.5	71	-36.5	1332.25

10vi	2.5	541	34.5	77	-42.5	1806.25
11mc	2.5	625	34.5	87	-52.5	2756.25
20mc	2.5	689	34.5	92	-57.5	3306.25
26b	2.5	800	34.5	98	-63.5	4032.25
30b	2.5	812	34.5	101	-66.5	4422.25
35b	2.5	845	34.5	104	-69.5	4830.25
36b	2.5	853	34.5	105	-70.5	4970.25
31b	2.5	874	34.5	106	-71.5	5112.25
8mc	2.5	878	34.5	107	-72.5	5256.25
12mc	2.5	886	34.5	108	-73.5	5402.25
9br	2.5	909	34.5	109	-74.5	5550.25
28b	2.5	910	34.5	110	-75.5	5700.25
22b	2.5	1025	34.5	113	-78.5	6162.25
11vi	3	131	70.5	5	65.5	4290.25
7vi	3	142	70.5	6	64.5	4160.25
6vi	3	229	70.5	14	56.5	3192.25
19v	3	255	70.5	18	52.5	2756.25
21mc	3	286	70.5	22	48.5	2352.25
33wi	3	298	70.5	24	46.5	2162.25
39v	3	307	70.5	26	44.5	1980.25
16v	3	321	70.5	30	40.5	1640.25
46ge	3	326	70.5	32	38.5	1482.25
29wi	3	327	70.5	34	36.5	1332.25

40wi	3	327	70.5	34	36.5	1332.25
35ge	3	330	70.5	36.5	34	1156
25wi	3	347	70.5	40.5	30	900
30wi	3	377	70.5	49	21.5	462.25
1wi	3	378	70.5	50.5	20	400
30ge	3	397	70.5	54	16.5	272.25
38ge	3	446	70.5	62	8.5	72.25
40jw	3	451	70.5	64	6.5	42.25
24mc	3	471	70.5	65	5.5	30.25
24wi	3	474	70.5	66	4.5	20.25
29ge	3	477	70.5	67.5	3	9
1vi	3	483	70.5	69	1.5	2.25
38jw	3	504	70.5	72	-1.5	2.25
38wi	3	508	70.5	73	-2.5	6.25
31jw	3	517	70.5	75	-4.5	20.25
4jw	3	532	70.5	76	-5.5	30.25
19mc	3	547	70.5	78	-7.5	56.25
32jw	3	592	70.5	85	-14.5	210.25
25mc	3	674	70.5	91	-20.5	420.25
27b	3	733	70.5	94	-23.5	552.25
22mc	3	743	70.5	95.5	-25	625
17mc	3	744	70.5	97	-26.5	702.25
27mc	3	834	70.5	103	-32.5	1056.25

32b	3	1017	70.5	112	-41.5	1722.25
27wi	3.5	187	98	8	90	8100
32wi	3.5	212	98	12	86	7396
39wi	3.5	278	98	20	78	6084
8vi	3.5	283	98	21	77	5929
45ge	3.5	327	98	34	64	4096
3vi	3.5	345	98	40.5	57.5	3306.25
39ge	3.5	351	98	42.5	55.5	3080.25
36wi	3.5	360	98	47	51	2601
9mc	3.5	392	98	53	45	2025
3jw	3.5	438	98	59	39	1521
47ge	3.5	445	98	61	37	1369
2jw	3.5	448	98	63	35	1225
37jw	3.5	553	98	79	19	361
23mc	3.5	592	98	83	15	225
16mc	3.5	648	98	89	9	81
7mc	3.5	655	98	90	8	64
26mc	3.5	727	98	93	5	25
20b	3.5	811	98	99.5	-1.5	2.25
29b	3.5	828	98	102	-4	16
21b	3.5	1014	98	111	-13	169
33b	3.5	1051	98	114	-16	256
14mc	4	295	112	23	89	7921

34jw	4	431	112	58	54	2916
10mc	4	501	112	70	42	1764
13mc	4	570	112	81	31	961
28mc	4	743	112	95.5	16.5	272.25
17v	4	811	112	99.5	12.5	156.25
24b	4	1522	112	115	-3	9
				r = .19		

Writing Time and Holistic Scores

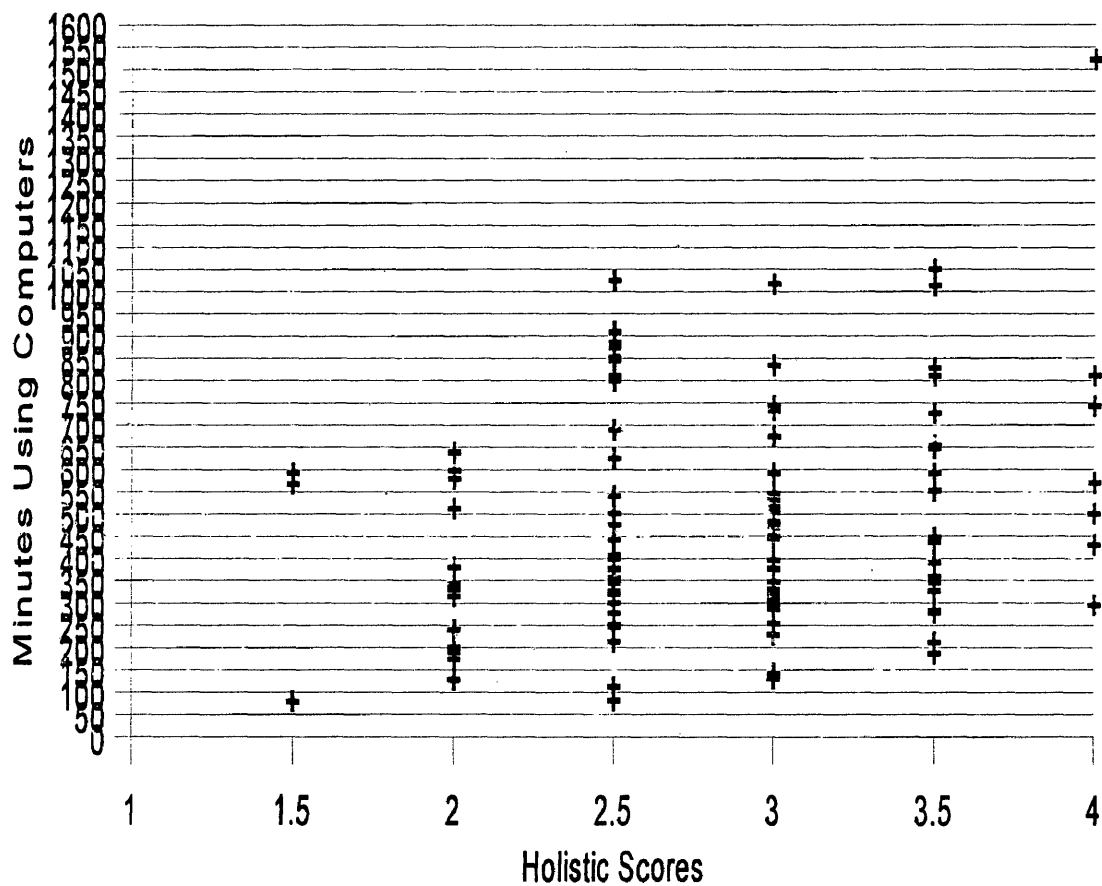


Figure 2

Scattergram for Fifth Grade Students

Conclusion

In this chapter, data were analyzed and illustrated regarding this correlational study. To provide definition for the subjects and the various components of the design, data were collected and illustrated. Data were collected to determine the relationship between the amount of time students spent using computers for writing and their holistic score on a writing sample. The hypothesis and the two sub-hypotheses were tested for significant differences ($p < .05$) utilizing the Spearman rank order correlation coefficient. Finally, to gain a better visual interpretation of the data, the amount of time each student spent using computers for writing was plotted on a scattergram in correlation to the holistic score on their writing sample.

Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This final chapter will summarize the study, discuss conclusions and render recommendations for further investigation. These areas will be addressed separately and synthesized for better understanding.

Summary

The purpose of this study was to compare the amount of time students spent using computers for writing or writing related activities with the score they received on a writing sample that was holistically scored. Specifically, this study utilized the Spearman rank order correlation coefficient design. The independent variable of the study was the amount of time students spent using computers for writing. The dependent variable was the holistic score they received on a writing sample.

The study was designed to test the previously stated hypothesis that there is no significant relationship between the amount of time students spend using computers for writing and the quality of their writing. The hypothesis also had two sub-hypotheses each related to the specific grade level of the students. Data were collected for the purpose of testing the hypothesis and the two sub-hypotheses at the 0.05 level of significance.

There is no significant relationship between the amount of time third and fifth grade students spend using computers for writing and the quality of their writing.

Sub-hypotheses 1

There is no significant relationship between the amount of time third grade students spend using computers for writing and the quality of their writing on a holistic scoring sample.

Sub-hypotheses 2

There is no significant relationship between the amount of time fifth grade students spend using computers for writing and the quality of their writing on a holistic scoring sample.

Students in both third grade and fifth grade show a statistically significant positive relationship between the amount of time they spent using computers for writing and the quality of their writing as shown by a score on sample of work that was scored holistically.

Professional literature related to the use of process writing and the use of microcomputers in classrooms was reviewed. This literature established a foundation by which to initiate the research study.

To test the relationship between the amount of time students spent using

computers for writing and their score on an holistic writing sample, this study utilized the Spearman rank order correlation coefficient design. The study involved third and fifth grade students from two elementary schools which were of similar socio-economic background in adjacent neighborhoods. Both schools had three classes of third and fifth grade students.

Conclusions

The specific findings of the study were presented in Chapter IV. Based on these findings, the following conclusions were formulated.

1. There was a statistically significant positive relationship between the amount of time third grade students spent using computers for writing or writing related activities and the holistic score they received on a writing sample. With a degree of freedom (df) of 95 the correlation of $r = .23$ is statistically significant at the .05 level. ($p < .05$)

2. There was a statistically significant positive relationship between the amount of time fifth grade students spent using computers for writing or writing related activities and the holistic score they received on a writing sample. With a degree of freedom (df) of 114 the correlation of $r = .19$ is statistically significant at the .05 level. ($p < .05$)

Synthesis

A statistically significant positive relationship existed between the amount of time third grade students spent using computers for writing and their holistic scores on a writing sample. A statistically significant positive relationship existed between the amount of time fifth grade students spent using computers for writing and their holistic scores on a writing sample. Both groups were chosen from similar socio-economic backgrounds and attended schools in adjacent neighborhoods.

Recommendations

The following recommendations are made based on the findings and conclusions of this study:

1. Even though this study concluded that the hypothesis and two sub-hypotheses were rejected, complete answers as to why this was so could be further analyzed. One variable not taken into consideration was the fact that the Council Bluffs Community School District was moving toward a whole language approach which included an emphasis on process writing. Another variable not controlled was the extent to which students were producing quality writing pieces while they were using the computers. Pretests and post tests should be used in the future.

2. Further studies of similar design should be completed in other schools and or school districts.

3. Further studies of similar design should be completed at other grade levels. Extending the studies to the junior high or senior high should be considered.

4. Continuation of the Technology Transformation Project should be continued in the Council Bluffs Community School District with the purpose of providing students with more access to computers for writing.

5. Administrators and teachers in the Council Bluffs Community School District should be made aware of the results of this study so they can continue to integrate computers into the writing curriculum in a meaningful manner.

This research establishes that a positive relationship exists between the amount of time students spend using computers for writing and the quality of their writing. The correlation of the data indicates that increased student use of computers for writing will result in improved quality of writing. Teachers need to be supported through staff development to incorporate computers into their curriculum as a means of improving writing.

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APPENDIX

COUNCIL BLUFFS COMMUNITY SCHOOLS

WRITING ACTIVITY

This writing activity is for a study being conducted this year in several of our schools. Students in grades 3 through 6 will be participating.

Procedures:

1. Let the students choose one of the two activities on which to write. (ONE ONLY)
2. The activity will take two sittings.
 - a. 1st sitting: Allow the students 15 minutes to write a rough draft on regular writing paper.
 - b. 2nd sitting: Give students 20 minutes to rewrite and/or edit their writing activity on the paper provided. For some it may be just a matter of recopying.
3. Collect the papers (final version only), put a cover page on with the teacher name, grade and school.
4. Send to Ed Propst at the Central Office.

Thank you very much for your help in the project. All names will be held in strictest confidence. We will code all forms for future reference.

Have a great end-of-year and an even better summer.

DESCRIPTORS
** might need to translate some of the language for lower grade levels, parents, etc.*

CONTENT
 (locus)

The paper has ⁴a single focus. The purpose is clearly stated, and is developed and sustained by supporting statements (facts, details, reasons, examples) which are sufficient, specific, and appropriate to the topic. The conclusion reinforces the purpose.

³The paper has a clear purpose, developed by some supporting statements which may be general but it is related to the topic. The conclusion restates the purpose.

²The paper has a discernible/distinguishable purpose. Supporting statements are somewhat related to the topic. A conclusion is attempted but is vague.

¹The paper has no apparent purpose. Supporting statements are unrelated to the topic or insufficient. A conclusion is missing.

ORGANIZATION
 (structure)

The controlling idea (purpose/ position) is fully developed in a coherent, logical manner. The paper has a strong structural development (beginning, middle, and end.) Paragraphs, if used, are appropriately structured.

The controlling idea is generally developed in a coherent and logical manner. The paper shows clear structural development of at least 2 of 3 elements (beginning, middle, end.) Most of the paragraphs are appropriately structured.

The controlling idea shows a minimum of coherent and logical development. The paper shows minimal structural development (beginning, middle, end) Many paragraphs lack appropriate structure.

The controlling idea is not developed in a coherent and logical manner. The paper shows no evidence of structural development. (beginning, middle, end) Paragraphs are not appropriately structured.

CONVENTIONS
 (mechanics)

The paper shows excellent control over conventions: standard English sentence structure spelling punctuation capitalization
 There are few if any minor errors.

The paper shows satisfactory control over most conventions. There are several minor errors throughout, or one or two major sentence errors.

The paper shows unsatisfactory control over conventions. There are numerous minor errors and major sentence errors.

The paper shows very little control over most conventions.

STYLE
 (The unique method chosen by the writer to develop a response)

The paper shows sustained and controlled:
 vivid, precise, and appropriate language
 original treatment of ideas
 variety in sentence structure and length.

The paper shows evidence of:
 vivid, precise, and appropriate language
 original treatment of ideas
 variety in sentence structure and length.

The paper shows minimal evidence of:
 vivid, precise, and precise language
 original treatment of ideas
 variety in sentence structure and length.

The paper shows no evidence of:
 vivid, precise, & approp. language
 original treatment of ideas
 variety in sentence structure and length.

WRITING ACTIVITY

Cover Sheet

Teacher's Name _____

School _____

Grade _____

Return to Ed Propst at Central Office. Thanks for your help.

