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Effects of Fourth- and Second-Grade Cross-Age Tutoring
on Spelling Accuracy and Writing Fluency

Rebekkah J. Mitchell

A thesis submitted to the faculty of
Brigham Young University
in fulfillment of the requirements for the degree of
Master of Arts

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ABSTRACT

Effects of Fourth- and Second-Grade Cross-Age Tutoring on Spelling Accuracy and Writing Fluency

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Master of Arts

A quasi-experimental study determined the effects on students' spelling accuracy when cross-age tutors focused on fixing spelling in writing with their tutees. Fourth-grade tutors, both trained and untrained, helped second-grade tutees fix spelling mistakes in their writing using two strategies: visual memory and word parts. A control group of second and fourth graders were instructed to independently use these two strategies to fix mistakes in their writing. Second graders overall had significant gain scores on measures of spelling accuracy and writing fluency. Regression analyses showed that these gains were not due to a student's participation in either cross-age tutoring or the control group. No significant gain scores were found for fourth graders. These results seem to indicate that cross-age tutors may not be academically beneficial for either tutors or tutees. However, descriptive statistical analyses and informal observations made during cross-age tutoring sessions imply that cross-age tutors can be a valuable educational tool.

Keywords: Cross-age Tutors, Writing, Spelling Accuracy, Writing Fluency, Elementary Students

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TABLE OF CONTENTS

	Page
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES	vi
LIST OF FIGURES.....	vii
DESCRIPTION OF STRUCTURE AND CONTENT.....	viii
Introduction.....	1
Review of Literature.....	3
Spelling Strategies.....	4
Visual memory.....	4
Word parts.....	4
Writing Fluency.....	5
Cross-age Tutors.....	6
Methodology.....	7
Design.....	8
Procedures.....	8
Intervention and control groups.....	8
Mini-lessons.....	9
Tutor training.....	10
Cross-age tutoring sessions.....	10

Implementation fidelity.....	11
Data Sources.....	11
Defining Variables.....	12
Outcome/dependent variables.....	12
Background/independent variables.....	13
Data Analysis.....	15
Results.....	15
Dictated Writing.....	15
Free Writing.....	19
Discussion.....	22
Reflection on Results.....	22
Dictated writing.....	22
Free writing.....	25
Potential limitations.....	26
Future research.....	26
References.....	27
APPENDIX A: EXPANDED REVIEW OF LITERATURE.....	30
APPENDIX B: METHODOLOGY.....	38
APPENDIX C: RESULTS.....	60
THESIS REFERENCES.....	62

LIST OF TABLES

	Page
Table 1: <i>Research Participants' Demographics</i>	7
Table 2: <i>Correlations between Student Background Variables</i>	14
Table 3: <i>M Scores of Second-Grade Pre-Assessment and Post-Assessment Scores on Dictated Writing</i>	16
Table 4: <i>M Scores of Fourth-Grade Pre-Assessment and Post-Assessment Scores on Dictated Writing</i>	16
Table 5: <i>Second-Grade Dictated Writing Paired-Sample t Scores</i>	18
Table 6: <i>Fourth-Grade Dictated Writing Paired-Sample t Scores</i>	19
Table 7: <i>M Scores of Second-Grade Pre-Assessment and Post-Assessment Scores on Free Writing</i>	20
Table 8: <i>M Scores of Fourth-Grade Pre-Assessment and Post-Assessment Scores on Free Writing</i>	20
Table 9: <i>Second-Grade Free Writing Paired-Sample t Scores</i>	21
Table 10: <i>Fourth-Grade Free Writing Paired-Sample t Scores</i>	22
Table 11: <i>Correlations between Pre-Assessment and Post-Assessment Scores</i>	61

LIST OF FIGURES

Page

Figure 1: *Pre- to Post-Assessment Correlation Scatter Plot for Second Graders with Scores of 301-350 on the Pre-Assessment*.....61

INTRODUCTION TO THE STRUCTURE AND CONTENT

On the pages that follow you will find first a manuscript ready for submission to *Literacy Research and Instruction* (LRI), an international refereed professional journal that publishes articles dealing with research and instruction in literacy education and allied fields. It is published by the Association of Literacy Educators and Researchers (ALER), a professional organization that has been in existence for over 50 years. LRI is indexed in the ERIC system and articles are reported in *Research in Education*. It is published quarterly with a circulation of approximately 1,500. The audience is primarily researchers, teacher educators, and those interested in college and adult literacy and clinical practices.

The research detailed in the manuscript contributes to recent literature about cross-age writing tutors, which indicates that tutors show significant academic improvement whereas tutees do not improve as much (Hubbard & Newell, 1999; Paquette, 2009). The current study sought to determine whether both tutors and tutees could show significant academic gains if tutors focused on one specific writing trait: using accurate spellings. It is a modified replication of a study conducted by Paquette (2009) and published in LRI.

After the references for the manuscript I included some appendices: a more extensive literature review, a more extensive methodology section, and a more extensive results section. The extended literature review and methodology sections include ideas already in the manuscript with additional information. If I included only information not already in the manuscript it would not flow or make sense. By imbedding new information within that already included, I ensured that the appendices could stand alone. I chose to include a more extensive results section because there were findings that I did not include in the manuscript. At the end you will find references for all works cited in the appendices.

Introduction

One method used by elementary teachers to teach writing is the 6+1 Traits Writing Model—ideas, organization, voice, word choice, sentence fluency, conventions, and presentation (Education Northwest, 2011a). Although these qualities were originally created to assess specific elements of writing, some suggest that teaching about these traits can improve student writing (Coe, Hanita, Nishioka, & Smiley, 2011; Smith, 2003). Many agree that conventions of writing are a very important piece of writing instruction (Cunningham & Cunningham, 2010; Gentry, 1984; Gentry, 1987; Graves, 1983; Jacobs, 2011; Marten, 2003). Conventions of writing deal with spelling, punctuation, capitalization, grammar, and paragraphing (Education Northwest, 2011a) and are receiving renewed emphasis in the new Common Core State Standards (Council of Chief State School Officers, 2010). This study focused on the use of conventional spellings and also investigated students' writing fluency.

Many teachers and researchers stress the importance of teaching elementary students to use conventional spellings in their writing (Cunningham & Cunningham, 2010; Education Northwest, 2011b; Gentry, 1987; Marten, 2003). Similar to this call for conventional spellings, the new Common Core State Standards (Council of Chief State School Officers, 2010) require elementary students to demonstrate basic knowledge of letter-sound correspondences, associate long and short sounds with common spellings for the five major vowels, including vowel digraphs and final-e patterns, know the spelling-sound correspondences for common consonant digraphs, and identify high-frequency words with irregular spellings.

Students should use conventional spellings in order to produce writing that others will be able to read easily (Cunningham & Cunningham, 2010; Marten, 2003). While awareness of correct spelling should not be allowed to overshadow written composition and content (Gentry, 1984; Graves, 1983; Jacobs, 2011), effective teachers stress the value of correct spelling when students create a final draft in preparation for publication (Cunningham & Cunningham, 2010; Gentry, 1987).

Writing fluency, defined as how quickly one writes (Heller, 2010), is also an important aspect of students' writing because fluent writers tend to produce better writing. Hudson, Lane, & Mercer (2005) explain that "without automatic and effortless writing of letters and words, developing writers are unable to focus on the higher-level processes of planning, text generation, and revision" (p. 475). Furthermore, students' writing fluency can be an indication of their spelling proficiency. The more words they know how to spell the quicker they can write and, as a result, the more words they can write in a given amount of time. Therefore, writing fluency is not only a gauge for how well students write but also for their spelling ability.

One way teachers have attempted to help students improve their writing is by implementing cross-age tutoring programs. Cross-age tutors are older students who coach younger students and help them improve writing abilities. Studies that have used cross-age tutors to instruct younger students in writing have shown that doing so improves students' writing abilities, though sometimes the tutors' writing abilities have improved more than the tutees' (Hubbard & Newell, 1999; Paquette, 2009).

Although a number of studies of cross-age tutoring have been conducted, no research to date has specifically considered how cross-age tutors affect younger students

when they help them use spelling strategies to edit their writing. Little is known about how such interactions might impact both tutors' and tutees' use of accurate spellings as well as their writing fluency.

The purpose of this study was to determine how implementation of cross-age tutoring sessions could impact spelling accuracy and writing fluency scores of selected fourth- and second-grade students. The study is a modified replication of a study carried out by Paquette (2009) in which students focused on various traits of writing. Fourth graders in the current study focused only on editing for spelling errors when they worked with second graders.

The following questions guided this study:

- A. What are the differences in spelling accuracy and writing fluency scores, as measured by total words correct, a phonological coding system, and number of words written, for students in this study?
- B. Did participation in cross-age tutoring sessions significantly predict spelling accuracy scores for second-grade students?
- C. Did participation in cross-age tutoring sessions significantly predict spelling accuracy scores for fourth-grade students?

Review of Literature

Students' ability to spell is generally considered developmental (Bear & Templeton, 1998; Gentry, 2000; Graves, 1983). Second graders can be expected to use correct initial and final consonants, know certain blends and digraphs, and discriminate between long and short vowel sounds. Two years later as fourth graders, they can be expected to know

various long vowel patterns and diphthongs, correctly use prefixes, suffixes, and past-tense endings, and spell two- and three-syllable words (Bear & Templeton, 1998).

Spelling Strategies

Researchers have suggested the use of several spelling strategies when editing one's writing (Cunningham, 2012; Graves, 1983; Griffith & Leavell, 1995; Marten, 2003; Miller, 2002; Smith, Peet, & Coomber, 2001). Two of these strategies, visual memory and word parts, were used in this study.

Visual memory. Visual memory refers to the ability to remember how a word is spelled and what it looks like when it is spelled correctly. Sometimes words in the English language (e.g., *is*, *was*, and *should*) are not spelled in ways that follow predictable grapho-phonemic patterns, in part because the English language has borrowed words from many other languages and maintained original spellings. Students have to learn such words as sight words, meaning they know what they look like and how to spell them without relying on letter and sound patterns. Students need a good visual memory in order to spell such words (Marten, 2003; Smith et al., 2001).

Visual memory is important because students should know how to automatically spell words they use often (Cunningham, 2012). One hundred words account for approximately 61% of all the words used in student writing (Smith et al., 2001). Not all of these words follow consistent letter and sound patterns, so students must memorize how they are spelled. If students can learn how to quickly and accurately spell these words, their overall spelling accuracy will usually increase.

Word parts. Spelling using word parts refers to the ability to use known letter-sound patterns to spell a word. Knowing letter-sound patterns helps when editing for

spelling errors (Griffith & Leavell, 1995; Smith et al., 2001). Second graders should know the short vowel consonant-vowel-consonant (CVC) pattern, like *cat*, as well as blends and digraphs, such as *br* and *ch*. Fourth graders can be expected to know long vowel patterns like CVC-silent e, CVVC, and CVV, in addition to diphthongs, prefixes, and suffixes (Bear & Templeton, 1998).

Students should use generalizations about words with similar beginning or ending sounds to spell unknown words. For example, if students have to correctly spell the word *bright*, they can use what they know about how to spell *bread* (i.e., a similar beginning consonant blend, *br*) and what they know about how to spell *light* (i.e., a similar ending cluster, *ight*) (Cunningham, 2012; Griffith & Leavell, 1995; Miller, 2002). Graves (1983) wrote about a similar strategy, recommending that students think of words with a similar base word as the word they are trying to spell. For example, they might use their knowledge of how to spell *mistake* to help them spell *retake*.

Writing Fluency

In addition to spelling accuracy, writing fluency is another important skill students should develop. Writing fluency can be defined as how quickly a person can write (Heller, 2010) and contributes to students' ability to compose high-quality written work. As students' fluency improves, their ability to produce better writing also tends to improve (Hudson et al., 2005). This is because the more quickly students can write the more they are able to attend to the composing process. One way to assess students' writing fluency is to measure how many words they write in a given amount of time (Leal, 2005).

Cross-age Tutors

It is beneficial for students to have someone model and help them perform tasks they cannot yet do on their own (Griffith & Leavell, 1995; Vygotsky, 1978), like the task of using accurate spellings. Students should expect to have someone else check their written work for correct conventions, including correct spelling, before publishing it (Cunningham & Cunningham, 2010; Graves, 1983). One way to provide this modeling and help students consult before publishing their writing is to use cross-age tutors. Cross-age tutoring, when an older student is tutoring a younger student, is different from peer tutoring in which students of the same age are helping one another.

Studies using cross-age reading and writing tutors show both tutors and tutees increased in academic performance. Tutors and tutees involved in these studies also showed increased self-esteem and feelings of belonging. Most reported enjoying working with one another. Another positive outcome of cross-age tutoring programs is that the tutors provided the tutees with exclusive one-on-one help (Block & Dellamura, 2000; Hubbard & Newell, 1999; Paquette, 2009).

In a study by Paquette (2009), fourth-grade students tutored second-grade students during one hour-long session per week for ten weeks on various writing traits. Prior to each session, each tutor chose a trait on which he/she would focus. Before any of these tutoring sessions occurred, the researcher trained the fourth graders for three 45-minute sessions. These training sessions helped fourth graders know exactly what was expected of them, as tutors, during the cross-age tutoring sessions. The training also helped fourth graders know how to plan what they would do during each tutoring session with the second graders.

Student writing samples that were completed after the tutoring intervention were scored using the 6+1 traits rubric (Education Northwest, 2011b). After the ten-week intervention the fourth-grade tutors' scores showed a significant academic difference when compared to fourth-grade students who did not participate as tutors. No significant difference in scores were found between second graders who participated in the tutoring program and those who did not (Paquette, 2009).

Methodology

This study, similar to the Paquette study, was conducted at a Title 1 Elementary school in the Intermountain West. Participants were 43 fourth-grade students and 42 second-grade students, with a total of 39 boys and 46 girls. There were 63 Caucasian students and 22 Hispanic students, for a total of 85 students participating in this study. Participants' demographics are found in Table 1.

Table 1

Research Participants' Demographics

Demographics	2 nd Grade Classrooms				4 th Grade Classrooms			Total Students
	1	2	3	Total	1	2	Total	
Boys	5	7	8	20	8	11	19	39
Girls	9	7	6	22	12	12	24	46
Caucasian	11	11	10	32	15	16	31	63
Hispanic	3	3	4	10	5	7	12	22
Total Students	14	14	14	42	20	23	43	85

Design

This study followed a pre-/post-assessment quasi-experimental design. The classes involved in this study were two fourth-grade classes and three second-grade classes. One-third of the fourth graders who had been trained as tutors and one of the intact second-grade classes comprised the trained-tutors intervention group. The untrained-tutors intervention group included one-third of the fourth graders who had not been trained but participated as tutors to students in another intact second-grade class. The wait-list control group consisted of the remaining fourth graders and the final second-grade class.

Procedures

Specific procedures were followed to carry out this study. Included among the procedures were selection of intervention and control groups, mini-lessons, tutor training, cross-age tutoring sessions, and implementation fidelity.

Intervention and control groups. The researcher, who was also one of the second-grade teachers in this study, had her students participate in the wait-list control group, which did not participate in cross-age tutoring sessions during the study because they worked independently. After the study her second graders and the fourth graders in the control group were able to participate in cross-age tutoring sessions. In this way the researcher did not deny any students the opportunity to participate in cross-age tutoring sessions. At the same time she reduced the bias that might come from having her students participate in the method believed to be most beneficial, namely cross-age tutoring sessions. In addition, the researcher trained the fourth graders in the trained-tutors intervention group. If the trained fourth graders had worked with her class she may have

had a bias in favor of their success. In order to reduce this bias, she did not have the trained fourth graders work with her students.

The other two second-grade classes were blindly assigned to participate in either the trained-tutors intervention group or the untrained-tutors intervention group. The fourth-grade students were blindly assigned to participate in either the trained-tutors intervention group, the untrained-tutors intervention group, or the wait-list control group. Each fourth grader participating as a tutor in cross-age tutoring sessions was paired up with one second-grade student. Second- and fourth-grade teachers met together to pair students based on their perceptions of which personalities would work well together. In the Paquette (2009) study, students were matched based on their academic level. However, in order to make this study as close to a typical school environment as possible, teachers paired students based on personality.

Mini-lessons. Before the cross-age tutoring sessions occurred, the researcher taught three mini-lessons to all students involved in the study. Each of the first two mini-lessons focused on one spelling strategy that was used during the cross-age tutoring sessions (i.e., visual memory and word parts). The third mini-lesson reviewed both spelling strategies. The mini-lessons ensured that all students were somewhat familiar with the strategies before they were expected to use them during the cross-age tutoring sessions. The mini-lessons also provided continuity between the two intervention groups and the control group. All three groups were to use the same strategies. The intervention groups used the strategies with a cross-age tutor while those in the control group were expected to use the strategies by themselves. Only the researcher taught these mini-lessons so that they were taught as consistently as possible.

Tutor training. Prior to the cross-age tutoring sessions, the researcher trained the selected fourth-grade tutors during three 20-minute training sessions. The fourth graders were taught to let their second-grade tutee do as much of the editing as possible. They were instructed that they should let second graders try to find the misspelled words in their writing and try to fix them on their own using two strategies: “Visual Memory” and “Word Parts.” If second graders did not see misspelled words or could not fix them on their own, then fourth graders could help. If second graders fixed words but they were still misspelled, then the fourth graders could show them how to spell them conventionally.

Fourth graders were also taught that when they stepped in to help their tutee they should give clues and suggestions rather than tell them the correct spelling right away. In addition to being told how to help their tutees, fourth graders also practiced conducting tutoring sessions with other fourth graders acting as second-grade tutees. The researcher supervised at this time to ensure the fourth graders were conducting the tutoring sessions correctly.

During the nine weeks that the cross-age tutoring sessions occurred, the researcher met with the trained tutors during the second, fourth, sixth, and eighth weeks for 15 minutes each time. During these meetings the researcher answered any questions the fourth-graders had and the fourth graders continued to practice conducting cross-age tutoring sessions with other fourth graders.

Cross-age tutoring sessions. Over the course of a nine-week period, the two classes of second-grade students participating in cross-age tutoring sessions met their fourth-grade tutors once each week for 20 minutes each session in the school library. Thus, a total of nine cross-age tutoring sessions were held. During each session, fourth graders

assisted second-grade students as they identified misspelled words in their writing and attempted to use the two spelling strategies taught in the mini-lessons to fix spelling errors. The trained fourth-grade tutors used a checklist to keep track of how often each strategy was used.

On days when the intervention groups participated in cross-age tutoring sessions, the wait-list control group of second and fourth graders also came to the library and worked independently on editing their own writing for spelling errors. The meaning of the two spelling strategies used were written on two posters and displayed in the library where all students could see them. The researcher reminded all students to refer to these posters and use the strategies.

Implementation fidelity. Two approaches were used to ensure implementation fidelity. First, the researcher tracked what actually occurred during the cross-age tutoring sessions with trained fourth graders by using a checklist. This ensured that the fourth graders were conducting the tutoring sessions the way they practiced in training sessions. Second, the trained fourth-grade tutors tracked on a checklist the number of times second graders used each spelling strategy. The checklists were gathered at the end of each cross-age tutoring session by the researcher.

Data Sources

To answer the research questions, several data sources were used—pre-assessment and post-assessment spelling accuracy and writing fluency scores from both dictated and free writing. Students wrote one paragraph as the researcher dictated it. This was called “dictated writing.” Second graders wrote one paragraph from a Level 2 passage in the *Qualitative Reading Inventory* (Leslie & Caldwell, 2011). The paragraph has second-grade

high-frequency words (Fry et al., 2000) and academic words (Johnson, 2009). Fourth graders wrote one paragraph from a Level 4 passage in the *Qualitative Reading Inventory* (Leslie & Caldwell, 2011). The paragraph has fourth-grade high-frequency words (Fry et al., 2000) and academic words (Johnson, 2009). Students wrote the same dictated paragraph before and after the intervention.

Students also wrote for five minutes in response to a prompt. This writing was called “free writing.” Before the intervention, fourth graders wrote for five minutes about their favorite things to do at recess and second graders wrote about their favorite foods for lunch. After the intervention fourth graders wrote about their favorite field trip and second graders wrote about their favorite vacations.

Defining Variables

To prepare for the data analysis I first delineated the outcome/dependent variables. Then I determined what background/independent variables would be used in the regression analyses. Dependent and independent variables are discussed below.

Outcome/dependent variables. Students’ pre- and post-assessment free writing score was the total number of words students wrote because this measured students’ writing fluency (i.e., how quickly they can write). Students’ pre- and post-assessment dictated writing score was determined by how many words were spelled correctly (referred to as “number-of-words-correct”) and with a phonological coding system (referred to as “phonics”) similar to that used in The Names Test (Duffelmeyer, Kruse, Merkley, & Fyfe, 1994).

The phonological coding system used in this study assigned a value of one, two, or three points to word parts such as beginning consonant blends, vowel digraphs, and

controlled vowels. Word parts that tend to be more difficult to spell were assigned more points. If students misspelled word parts then those points were deducted from the total possible score. The researcher and a colleague not involved in the study each scored pre-assessment dictated writing of ten randomly chosen students using this phonological coding system. Inter-rater reliability of the phonics scoring had a correlation of .980.

Background/independent variables. Pearson correlation statistics were used to determine the relationships between various student background variables (i.e., grade, teacher, gender, ethnicity, whether they attended resource classes, whether they received English Language Learner [ELL] services, whether they were tutors or not, and which intervention group they belonged to). These background variables were chosen and then correlated in order to determine which ones should be controlled for in the regression analyses. Correlations are found in Table 2.

Several variables were highly correlated, suggesting potential collinearity that would threaten the assumption of independence needed for linear regression analyses. In particular, grade and teacher were correlated at $-.885$ ($p < .01$). Since students' teacher was not expected to make a difference in gain scores this variable was eliminated. Intervention group and whether students were tutors or not was also highly correlated at $.746$ ($p < .01$). Due to the fact that students' placement in a particular intervention or control group determined whether they were a tutor or not, the intervention group variable was kept but not whether students tutored.

Whether students received ELL services was correlated with ethnicity at $-.461$ ($p < .01$) and correlated with whether students attended resource classes at $.231$ ($p < .05$). The number of students who were in resource classes or ELL services was negligible

($n < 15$). Therefore, resource and ELL variables were eliminated whereas the ethnicity variable was not. The final set of student background variables included ethnicity, gender, and intervention group. Pre-assessment scores were also included as a background variable in the regression analyses in order to control for where students started. Grade was still part of the analysis because we ran the regression for only second graders and then again for only fourth graders.

Table 2

Correlations between Student Background Variables

	Grade	Ethnicity	Gender	Teacher	Tutor or Not	Intervention Group	English Language Learner	Resource Services
Grade	1.00							
Ethnicity	-.085	1.00						
Gender	.025	-.111	1.00					
Teacher	-.885**	.138	-.057	1.00				
Tutor or Not	***	.057	-.187	.054	1.00			
Intervention Group	-.069	.149	-.177	.326**	.746**	1.00		
English Language Learner	-.009	-.461**	.103	.032	.032	.034	1.00	
Resource Services	-.114	-.064	.129	.080	.022	-.069	.231*	1.00

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

***Cannot be computed because at least one of the variables is constant.

Data Analysis

To help answer research question A, descriptive statistics were conducted to show dictated and free writing scores for each grade and each intervention group within that grade. A paired-samples t-test also helped answer research question A by determining whether students significantly improved their scores from the pre- to the post-assessment.

Research questions B and C were answered by conducting linear regression analyses to see whether intervention group significantly predicted students' dictated writing scores. The models for these analyses determined whether intervention group significantly predicted post-assessment dictated writing phonics and number-of-words-correct scores, controlling for gender, ethnicity, and pre-assessment scores. Each model was run first for second graders and then again for fourth graders.

Results

Two measures were used to assess students: a dictation assessment to measure spelling ability and a free-writing assessment to measure writing fluency. Data from the dictation assessment will be presented first, followed by results from the free writing assessment.

Dictated Writing

Students in each grade level and intervention group, on average, scored higher on the post-assessment dictated writing than on their pre-assessment dictated writing. Tables 3 and 4 show mean dictated writing spelling accuracy scores for each grade level and intervention group. They also show the average gain for each group.

Table 3

M Scores of Second-Grade Pre-Assessment and Post-Assessment Scores on Dictated Writing

	<i>M</i> Pre-Assessment Score (out of 225 possible)	<i>M</i> Post-Assessment Score (out of 225 possible)	<i>M</i> Gain Score from Pre- to Post-Assessment
Trained-Tutors Group (<i>n</i> = 14)	169.5	178.9	9.4
Untrained-Tutors Group (<i>n</i> = 14)	179.0	184.9	5.9
Control Group (<i>n</i> = 14)	180.4	187.4	7.0
All Second Graders (<i>n</i> = 42)	176.3	183.5	7.2

Table 4

M Scores of Fourth-Grade Pre-Assessment and Post-Assessment Scores on Dictated Writing

	<i>M</i> Pre-Assessment Score (out of 315 possible)	<i>M</i> Post-Assessment Score (out of 315 possible)	<i>M</i> Gain Score from Pre- to Post-Assessment
Trained-Tutors Group (<i>n</i> = 17)	290.5	290.5	0.0
Untrained-Tutors Group (<i>n</i> = 12)	287.4	290.5	3.1
Control Group (<i>n</i> = 14)	276.6	286.0	9.4
All Fourth Graders (<i>n</i> = 43)	285.1	289.0	3.9

On average, second graders tutored by trained fourth -grade tutors increased their scores on dictated writing by about nine points. Those second graders tutored by untrained fourth graders increased their scores on average by about six points. Participants who were not tutored in spelling during this study increased their scores on average by about seven points. Therefore, second graders tutored by trained fourth graders on average achieved gain scores higher than students tutored by untrained fourth graders or students in the control group.

Average dictated writing assessment scores of trained fourth-grade tutors made no change from pre- to post-assessment. Scores for untrained fourth-grade tutors increased on average by about three points, and fourth graders who were not tutors increased their scores on average by about nine points. Fourth-grade tutors obtained gain scores that were lower than fourth graders who were not tutors.

Paired-samples t-tests examined pre- and post-assessment dictated writing scores for both the phonics and number-of-words-correct scoring criteria. The analyses show significant gains ($p < .01$) only for second graders. No significant gains were found for fourth graders (see Tables 5 and 6).

Linear regression analyses were conducted for each grade level and examined whether participation in a particular intervention group significantly predicted post-assessment dictated writing phonics or number-of-words-correct scores, controlling for gender, ethnicity, and pre-assessment scores. Participation in a particular intervention group did not significantly predict dictated scores for either grade level ($p < .05$). The lack of significant results from the regression analyses may be due to a small sample size and insufficient variability of student scores.

Table 5

Second-Grade Dictated Writing Paired-Sample t Scores

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> <i>(2-tailed)</i>
Pair 1			-4.1	41	.000*
Pre-Assessment Dictated Writing Phonics Score (out of 170 possible)	136.7	19.5			
Post-Assessment Dictated Writing Phonics Score (out of 170 possible)	141.9	19.5			
Pair 2			-3.6	41	.001*
Pre-Assessment Dictated Writing Number of Words Correct Score (out of 55 possible)	39.6	8.0			
Post-Assessment Dictated Writing Number of Words Correct Score (out of 55 possible)	41.8	7.9			

* $p < .01$

Table 6

Fourth-Grade Dictated Writing Paired-Sample t Scores

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> <i>(2-tailed)</i>
Pair 1			-2.4	42	.019
Pre-Assessment Dictated Writing Phonics Score (out of 234 possible)	213	22.4			
Post-Assessment Dictated Writing Phonics Score (out of 234 possible)	218.8	17.8			
Pair 2			0.5	42	.630
Pre-Assessment Dictated Writing Number of Words Correct Score (out of 81 possible)	72.1	26.8			
Post-Assessment Dictated Writing Number of Words Correct Score (out of 81 possible)	70.2	7.5			

* $p < .01$ **Free Writing**

Students' free writing scores, which show the total number of words they wrote in response to a prompt, provide a measure of writing fluency. These free writing scores (shown in Tables 7 and 8) report student performance by grade level and intervention group and also show how much each group increased from pre-assessment to post-assessment.

Table 7

M Scores of Second-Grade Pre-Assessment and Post-Assessment Scores on Free Writing

	<i>M</i> Pre-Assessment Score (# of words written)	<i>M</i> Post-Assessment Score (# of words written)	<i>M</i> Gain Score from Pre- to Post-Assessment
Trained-Tutors Group (<i>n</i> = 14)	30.1	36.1	6.0
Untrained-Tutors Group (<i>n</i> = 14)	32.5	43.7	11.2
Control Group (<i>n</i> = 14)	26.6	33.8	7.2
All Second Graders (<i>n</i> = 42)	29.8	37.9	8.1

Table 8

M Scores of Fourth-Grade Pre-Assessment and Post-Assessment Scores on Free Writing

	<i>M</i> Pre-Assessment Score (# of words written)	<i>M</i> Post-Assessment Score (# of words written)	<i>M</i> Gain Score from Pre- to Post-Assessment
Trained-Tutors Group (<i>n</i> = 17)	47.1	59.5	12.4
Untrained-Tutors Group (<i>n</i> = 12)	54.8	51.8	-3.0
Control Group (<i>n</i> = 14)	50.2	56.5	6.3
All Fourth Graders (<i>n</i> = 43)	50.3	56.4	6.1

Second graders in the untrained-tutors intervention group increased their free writing scores the most, by about eleven written words on average. Students in

the trained-tutors group on average increased by about six words on average and those in the control group by about five words on average. Fourth graders in the trained-tutors intervention group increased their free writing scores the most, by about twelve written words. Those in the control group increased on average by about six words, while those in the untrained-tutors intervention group actually decreased the number of words they wrote on average by about three.

Paired-samples t-tests were used to analyze free writing scores. Analyses showed significant gains ($p < .01$) from pre- to post-assessment scores only for second graders. No significant gains were found for fourth graders (see Tables 9 and 10).

Table 9

Second-Grade Free Writing Paired-Sample t Scores

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> <i>(2-tailed)</i>
Pair			-4.2	41	.000*
Pre-Assessment Free Writing Score (# of words written)	29.8	11.9			
Post-Assessment Free Writing Score (# of words written)	37.9	16.3			

* $p < .01$

Table 10

Fourth-Grade Free Writing Paired-Sample t Scores

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> <i>(2-tailed)</i>
Pair			-2.1	42	.044
Pre-Assessment Free Writing Score (# of words written)	50.2	18.5			
Post-Assessment Free Writing Score (# of words written)	56.4	20.2			

* $p < .01$

Discussion

This section elaborates on and explains the dictated writing data and then the free writing data. Implications and conclusions that may be drawn from these data are included, as well as potential limitations and ideas for future research.

Reflection on Results

Overall, dictated and free writing scores indicate that cross-age tutoring sessions may not have been as academically beneficial as one would expect. While there was improvement, it did not appear to be the result of using cross-age tutors. But several other factors with regards to the dictated and free writing show that cross-age tutors can be beneficial for students' academic growth and confidence.

Dictated writing. One result of this study was the improvement on dictated writing scores by second-grade tutees, particularly those in the trained-tutors intervention group (see Table 3). The Paquette (2009) study showed improvement in spelling for tutors but

not for their tutees. In the current study, second graders on average improved by about nine out of 225 points. Second graders with trained tutors improved the most, control-group second graders showed less improvement, and second graders with untrained tutors showed the least improvement.

According to other studies (Block & Dellamura, 2000; Hubbard & Newell, 1999; Paquette, 2009), one would expect that tutors involved in cross-age tutoring sessions would show improvement from before the intervention to after the intervention, or that students involved as tutors in cross-age tutoring sessions would increase their scores more than those not involved as tutors. But in this study fourth-grade tutors actually decreased their dictated writing scores from pre- to post-assessment and fourth-graders involved as tutors scored more poorly than control-group fourth graders who were not tutors (see Table 4).

Two factors may have contributed to these results for fourth graders. First, fourth graders in this study were already quite competent spellers even before the intervention began. The average score on the dictated writing pre-assessment for all fourth graders was nearly 285 out of 315 points. Since they already had high scores before the intervention there was little room for them to improve. The fact that they did not improve much seems to imply a ceiling effect was at play.

Second, fourth-grade tutors may not have improved as much as fourth graders in the control group because tutors were working on words used by second graders. They were helping second graders fix their spelling mistakes and those second graders were likely not using words employed by fourth graders. Fourth graders in the control group

were fixing spelling mistakes in their own writing, so there is a greater likelihood that the words they were fixing were those used more commonly by fourth graders.

According to the paired-samples t-test analyses, second-grade students made significant improvements from their pre-assessment scores to their post-assessment scores while fourth graders did not (see Tables 5 and 6). Regression analyses indicate that these significant improvements for second graders did not seem to be affected by participation in a particular intervention group.

Despite regression analyses results that seem to show participation in cross-age tutoring sessions was not beneficial, descriptive statistical analyses and informal observations made by the researcher indicate that they were helpful. First, descriptive analyses show that second graders in the trained-tutors intervention group on average gained more than other second graders on the dictated writing. Descriptive analyses also show that fourth graders in the trained-tutors intervention group on average gained more than other fourth graders on the free writing. Second, observations made during cross-age tutoring sessions help confirm the value of using cross-age tutors, particularly for the tutors.

Observations made by the researcher show that tutors took on the role of teacher and expert by underlining misspelled words in their tutees' writing, sounding out words orally, and helping second-grade tutees fix the spelling of certain words after second graders first attempted to fix them. One tutor even brought a paper to a cross-age tutoring session where she had written all the letters of the alphabet to help her tutee form letters correctly as he was spelling them. They worked hard to be facilitators for their tutees by letting second graders lead the tutoring sessions. One indication of this is when one tutor

made the comment, “What do you want to work on now?” Tutors took on the role of coach by spelling a certain word several ways and letting the second grader determine which one looked like it was spelled right. They also offered support when it was asked for and were very encouraging to their tutees, as evidenced by remarks they made such as “Almost right, so close!” and “You had it right!”

Free writing. Descriptive results from the free writing portion of the assessment show that on average the smallest improvement in writing fluency (i.e., the number of words written) was found for second graders in the trained-tutors group (see Table 7). But all second graders on average made significant gains from free writing pre- to post-assessment scores according to the paired-samples t test analysis (see Table 9). Descriptive results of free writing scores show that fourth graders in the trained-tutors intervention group on average showed the most improvement out of all fourth graders in the study (see Table 8). They wrote on average six more words than those in the control group and fifteen more words than those in the untrained-tutors intervention group.

The gains in free writing scores made by fourth graders in the trained-tutors intervention group seem to indicate growth in their writing confidence. As they worked with their second-grade tutees it seemed they internalized their role as the more-skilled tutor. Week by week as they continued to tutor and teach, they grew in their assurance that they were a skilled writer and speller because they had a younger student looking up to them and expecting them to be a skilled writer and speller. Fourth graders from the trained-tutors intervention group likely wrote more on the free writing portion of the post-assessment because they believed they were good writers and good spellers. Free writing

scores imply that cross-age tutoring can be beneficial for tutors because it improves their confidence in their abilities.

Potential Limitations

Several factors may limit the generalizability of the results of this study. First, the study had a small sample size. Only 43 fourth graders and 42 second graders participated in the study. However, the sample size is comparable to the Paquette (2009) study, which involved 50 fourth graders and 35 second graders. Second, the researcher participated as one of the teachers involved in the study. In order to reduce researcher bias, her class participated as a wait-list control group. Students also came from various educational and socio-economic backgrounds, as well as a variety of classroom experiences. To account for these differences, consistent mini-lessons, training, and tutoring sessions under the direction of the researcher were held.

Future Research

Cross-age tutoring research could use more studies investigating what happens when tutors focus on a single skill with tutees. Also, studies with larger sample sizes could help make results more generalizable. But if more students are used it might be most beneficial to split the participants into small groups and work with one group at a time so that they can be monitored and managed more easily. One other way future research could help expand knowledge about this area would be to continue to examine the use of trained versus untrained tutors.

References

- Bear, D., & Templeton, S. (1998). Explorations in developmental spelling: Foundations for learning and teaching phonics, spelling, and vocabulary. *The Reading Teacher, 52*, 222-242.
- Block, C., & Dellamura, R. J. (2000). Better book buddies. *The Reading Teacher, 54*, 364-370.
- Coe, M., Hanita, M., Nishioka, V., & Smiley, R. (2011). *An investigation of the impact of the 6+1 trait writing model on grade 5 students writing achievement*. Portland, OR: National Center for Education Evaluation and Regional Assistance.
- Council of Chief State School Officers (2010). *Common core state standards: English language arts*. Washington D.C.: National Governors Association Center for Best Practices.
- Cunningham, P. M. (2012). *What really matters in spelling*. Boston, MA: Pearson.
- Cunningham, P. M., & Cunningham, J. W. (2010). *What really matters in writing*. Boston, MA: Allyn and Bacon.
- Duffelmeyer, F. A., Kruse, A. E., Merkley, D. J., & Fyfe, S. A. (1994). Further validation and enhancement of The Names Test. *The Reading Teacher, 48*, 118-128.
- Education Northwest. (2011a). *6+1 trait writing*. Retrieved from <http://educationnorthwest.org/traits>
- Education Northwest. (2011b). *5-point beginning writer's rubric*. Retrieved from http://educationnorthwest.org/webfm_send/772
- Fry, E. B., Kress, J. E., & Fountoukidis, D. L. (2000). *The reading teacher's book of lists* (4th ed.). Paramus, NJ: Prentice Hall.

- Gentry, J. R. (1984). Developmental aspects of learning to spell. *Academic Therapy, 20*(1), 11-19.
- Gentry, J. R. (1987). *Spel...is a four letter word*. Portsmouth, NH: Heinemann.
- Gentry, J.R. (2000). A retrospective on invented spelling and a look forward. *The Reading Teacher, 54*, 318-332.
- Graves, D. (1983). *Writing: Teachers and children at work*. Portsmouth, NH: Heinemann.
- Griffith, P. L., & Leavell, J. A. (1995). There isn't much to say about spelling...or is there? *Childhood Education, 72*(2), 84-91.
- Heller, K. W. (2010). Writing instruction and adaptations. In S. J. Best, K. W. Heller, & J. L. Bigge (Eds), *Teaching individuals with physical or multiple disabilities*. 6th Edition (pp. 407-431). Upper Saddle River, NJ: Pearson.
- Hubbard, T., & Newell, M. (1999). *Improving academic achievement in reading and writing in primary grades* (Master's thesis). Available from ERIC database. (ED438518)
- Hudson, R. F., Lane, H. B., & Mercer, C. D. (2005). Writing prompts: the role of various priming conditions on the compositional fluency of developing writers. *Reading and Writing, 18*, 473-495.
- Jacobs, G. E. (2011). *Writing instruction for generation 2.0*. Lanham, MD: Rowman and Littlefield Education.
- Johnson, E. R. (2009). *Academic language! Academic literacy!* Thousand Oaks, CA: Corwin.
- Leal, D. J. (2005). The word writing CAFÉ: Assessing student writing for complexity, accuracy, and fluency. *The Reading Teacher, 59*, 340-350.
- Leslie, L., & Caldwell, J. S. (2011). *Qualitative Reading Inventory 5*. New York, NY: Pearson.

- Marten, C. (2003). *Word crafting: Teaching spelling, grades K-6*. Portsmouth, NH: Heinemann.
- Miller, H. M. (2002). Spelling: From invention to strategies. *Voices from the Middle*, 9(3), 33-37.
- Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction*, 48(1), 28-38.
- Smith, C. B. (2003). *Successful use of the six traits in writing*. Bloomington, IN: ERIC Publications.
- Smith, C. B., Peet, H., & Coomber, J. (2001). *Spelling for writing: Instructional strategies*. Bloomington, IN: ERIC Publications.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Edited by M. Cole, S. Scribner, V. John-Steiner, & E. Souberman. Cambridge, MA: Harvard University Press.

APPENDIX A: EXPANDED REVIEW OF LITERATURE

Students' ability to spell is generally considered developmental (Bear & Templeton, 1998; Gentry, 2000; Graves, 1983). Second graders can be expected to use correct initial and final consonants, know certain blends and digraphs, and discriminate between long and short vowel sounds. Two years later as fourth graders, they can be expected to know various long vowel patterns and diphthongs, correctly use prefixes, suffixes, and past-tense endings, and spell two- and three-syllable words (Bear & Templeton, 1998). Gentry (2000) explained that at first children have no letter-sound correspondences but soon learn that letters match certain sounds. They can then represent every sound with a letter/letters, and can use visual and morphological strategies to determine correct spellings. The final stage children reach is the ability to use conventional spellings. The words they can spell correctly continues to grow throughout their lives.

According to Graves (1983), students progress in their ability to spell a word, *grass*, for example, by first using the initial/final consonants (e.g., the letters *g* and *s*). Next they add interior consonants (*grs*), then add a placeholder vowel (*gres*), and finally demonstrate better vowel discrimination (*gras*). By the end of first grade children reach the "age of convention" where they want to conform to conventions of spelling, although the age at which children can conform to conventions of spelling varies (p. 187).

Many teachers and researchers stress the importance of teaching elementary students to use conventional spellings in their writing (Cunningham & Cunningham, 2010; Education Northwest, 2011b; Gentry, 1987; Marten, 2003). Similar to this call for conventional spellings, the new Common Core State Standards (Council of Chief State School Officers, 2010) require elementary students to demonstrate basic knowledge of

letter-sound correspondences, associate long and short sounds with common spellings for the five major vowels, including vowel digraphs and final–e patterns, know the spelling-sound correspondences for common consonant digraphs, and identify high-frequency words with irregular spellings.

Students should use conventional spellings in order to produce writing that others will be able to read easily (Cunningham & Cunningham, 2010; Marten, 2003). While awareness of correct spelling should not be allowed to overshadow written composition and content (Gentry, 1984; Graves, 1983; Jacobs, 2011), effective teachers stress the value of correct spelling when students create a final draft in preparation for publication (Cunningham & Cunningham, 2010; Gentry, 1987).

Students need to be conscious of who will later read their writing and make it accessible to those readers (Gentry & Gillet, 1993; Glazer, 1994). Spelling is a form of etiquette that shows the writer’s concern for the reader (Bodycott, 1993; Graves, 1983). When students use conventional spellings, they make it easier for their readers to decipher what they wrote. When readers do not have to struggle to decode they can more fully attend to the meaning of what was written. Students should understand that learning to spell is important because it enables them to communicate effectively with others (Griffith & Leavell, 1995; Routman, 1993).

Editing for Conventional Spellings

Students can improve in their ability to use conventional spellings by editing their own writing. But simply asking students to self-edit does not mean they will use correct spellings. Sometimes as students edit their writing to include conventional spellings, they have a difficult time transferring knowledge of conventional spellings gained during

spelling instruction (Bodycott, 1993; Cunningham & Cunningham, 2010). Students may spend time editing their written work for spelling errors but even after editing, words that students learned previously during spelling instruction may still be misspelled. This problem may be addressed in several ways: teaching students to use spelling strategies, implementing peer tutors, and implementing cross-age tutors.

Spelling strategies. Researchers have suggested the use of several spelling strategies when editing one's writing (Cunningham, 2012; Graves, 1983; Griffith & Leavell, 1995; Marten, 2003; Miller, 2002; Smith et al, 2001). Two of these strategies, visual memory and word parts, were used in this study.

Visual memory. Visual memory refers to the ability to remember how a word is spelled and what it looks like when it is spelled correctly. Sometimes words in the English language (e.g., *is*, *was*, and *should*) are not spelled in ways that follow predictable grapho-phonemic patterns, in part because the English language has borrowed words from many other languages and maintained original spellings. Students have to learn such words as sight words, meaning they know what they look like and how to spell them without relying on letter and sound patterns. Students need a good visual memory in order to spell such words (Marten, 2003; Smith et al., 2001).

Visual memory is important because students should know how to automatically spell words they use often (Cunningham, 2012). One hundred words account for approximately 61% of all the words used in student writing (Smith et al., 2001). Not all of these words follow consistent letter and sound patterns, so students must memorize how they are spelled. If students can learn how to quickly and accurately spell these words, their overall spelling accuracy will usually increase.

Several studies offer suggestions to help students improve visual memory. When trying to correct a misspelled word, Smith et al. (2001) suggested writing the word a second time to see if the second spelling looks more correct. Students might also write down two or three alternative spellings of a word in order to determine which one seems to look the most correct (Miller, 2002).

Word parts. Spelling using word parts refers to the ability to use known letter-sound patterns to spell a word. Knowing letter-sound patterns helps when editing for spelling errors (Griffith & Leavell, 1995; Smith et al., 2001). Second graders should know the short vowel CVC (consonant-vowel-consonant) pattern, like *cat*, as well as blends and digraphs, such as *br* and *ch*. Fourth graders can be expected to know long vowel patterns like CVC-silent e, CVVC, and CVV, in addition to diphthongs, prefixes, and suffixes (Bear & Templeton, 1998).

Students should use generalizations about words with similar beginning or ending sounds to spell unknown words. For example, if students have to correctly spell the word *bright*, they can use what they know about how to spell *bread* (a similar beginning consonant blend, *br*) and what they know about how to spell *light* (a similar ending cluster, *ight*) (Cunningham, 2012; Griffith & Leavell, 1995; Miller, 2002). Graves (1983) wrote about a similar strategy, recommending that students think of words with a similar base word as the word they are trying to spell. For example, they might use their knowledge of how to spell *mistake* to help them spell *retake*.

Peer tutors. Another way to improve students' use of conventional spellings, as well as other academic skills, is to use peer tutors. Peer tutors are students of the same age who tutor one another. Two studies (Topping, 2001; Diab, 2010) examined the use of peer

tutors for academic skills besides the use of conventional spelling. Topping (2001) found that the use of college-aged peer tutors improved students' acquisition of academic knowledge and skills. Diab (2010) conducted a study with 40 freshman-aged university students. An intervention group of 22 peer tutors who edited their writing in pairs produced writing with significantly fewer grammatical errors than the control group who self-edited their writing.

Peer tutors can also be helpful when editing writing for spelling errors. Mullen (2003) conducted a study in which 23 fifth-grade students participated in peer editing with the assistance of a checklist. The checklist helped students determine whether they had attended to things like proper capitalization, correct punctuation, correct spelling, and other writing conventions. At the conclusion of the six-week study, students corrected about five more errors in a teacher-written paragraph that purposefully included conventional errors than they had corrected prior to the intervention. Students corrected 13.21 mistakes on average at the conclusion of the intervention as compared to only 8.47 mistakes corrected on average prior to the intervention.

Stemper (2002) conducted a study in which sixth-grade students participated in peer editing. Student writing before and after the intervention was scored using a rubric that measured grammar, spelling, punctuation, capitalization, and sentence structure. For spelling in particular, students received four points on the rubric if they made no more than two spelling errors. They received three points if they made one to two spelling errors per page. They received two points if they made three to six spelling errors per page, and they received one point if they made seven or more spelling errors per page. Stemper found a

23% increase in the number of students who received four points on each of the conventional writing skills as measured by the rubric (p. 73).

Cross-age tutors. It is beneficial for students to have someone model and help them perform tasks they cannot yet do on their own (Griffith & Leavell, 1995; Vygotsky, 1978), like the task of using accurate spellings. Students should expect to have someone else check their written work for correct conventions, including correct spelling, before publishing it (Cunningham & Cunningham, 2010; Graves, 1983). One way to provide this modeling and help students consult before publishing their writing is to use cross-age tutors. Cross-age tutoring, when an older student is tutoring a younger student, is different from peer tutoring in which students of the same age are helping one another. Studies that have used cross-age tutors to tutor younger students in writing have shown that this improves students' writing abilities, though sometimes only the tutors' writing abilities have improved whereas the tutees' did not improve as much (Hubbard & Newell, 1999; Paquette, 2009).

Block and Dellamura (2000) wrote about the use of 100 cross-age reading buddies, where older students tutored younger students in using reading strategies. Results went beyond academic gains. Cross-age reading buddy sessions helped tutors feel a sense of accomplishment and helped them realize their own reading abilities. These tutoring sessions led to growth in other subject areas. For the tutors, the use of targeted reading strategies became more automatic because they verbalized them for their tutees. The cross-age reading buddy sessions improved tutees' feelings of belonging because they had older students who were their friends and mentors. Tutees more deeply internalized the

value of literacy in their life. The buddy sessions also provided tutees with exclusive attention and personalized reading instruction.

Hubbard and Newell (1999) carried out a study in which second-grade students tutored first-grade students in their writing. The students met for three 30-minute tutoring sessions conducted in the context of a process approach to writing. One example of how the second graders tutored the first graders occurred when the second and first graders were told to write a poem together about a farm animal. The second graders were not given any specific training about how to help the first graders. They were just asked to write the poem together. First- and second-grade students' writing samples written before and after the intervention were scored using a six-item checklist: (a) sentence variety; (b) writing at least five sentences (for first graders) or ten sentences (for second graders); (c) correct spelling; (d) necessary capitalization; (e) correct punctuation; and (f) spacing between words. If students accomplished an item on the checklist they received one point for it. If they did not accomplish an item they did not receive that point. Thus, students could receive a maximum score of six points on their writing sample.

At the conclusion of the study, 59% more first graders scored a five or a six on the post-intervention assessment administered in May than on the pre-intervention assessment administered in January. Self-esteem improved in both grade levels and they looked forward to working together. However, spelling was not specifically addressed in this study.

Paquette (2009) conducted a similar study with two important differences. First, she used older students. Second, she provided tutors with more extensive training before they tutored. Fourth-grade students tutored second-grade students on various writing

traits in the context of a process approach to writing. They tutored second graders for one hour per week for ten weeks, and before each tutoring session planned the writing trait on which they would focus. Before any of these tutoring sessions occurred, the researcher trained the fourth graders for three 45-minute sessions. These training sessions helped fourth graders know exactly what was expected of them, as tutors, during the tutoring sessions. They also helped fourth graders know how to plan how they would tutor second graders.

Student writing samples written after the intervention were scored using the 6+1 traits rubric (Education Northwest, 2011b). After the ten-week intervention the fourth-grade tutors' scores on the 6+1 traits rubric showed a significant academic difference when compared to fourth-grade students who did not participate as tutors. No significant difference in scores on the 6+1 traits rubric was found between second graders who participated in the tutoring program and those who did not.

APPENDIX B: METHODOLOGY

Studies have been conducted to examine the effectiveness of cross-age tutoring sessions in writing (Hubbard & Newell, 1999; Paquette, 2009). However, these studies have focused on broad definitions of good writing. Research to date has not yet considered how cross-age tutoring sessions in which older students specifically help younger students use spelling strategies when editing their writing for spelling errors might improve spelling accuracy and writing fluency scores for both tutors and tutees.

This study explained how cross-age tutoring might affect the spelling accuracy and writing fluency of second and fourth graders. Specifically, it found the mean difference from pre-intervention to post-intervention spelling accuracy and writing fluency scores for fourth- and second-grade students who participated in cross-age tutoring sessions after the fourth graders had been trained and how that differed from the mean difference from pre-intervention to post-intervention scores for fourth- and second-grade students who participated in cross-age tutoring sessions with untrained fourth graders. These mean differences were compared to the mean difference from pre-intervention to post-intervention scores for fourth- and second-grade students who did not participate in any cross-age tutoring sessions. The current study was a modified replication of a study carried out by Paquette (2009).

Like Paquette's study in 2009, this study involved fourth-grade tutors and second-grade tutees. They are also similar in that they incorporated training sessions and cross-age tutoring sessions. The number of participants in this study was similar to the number in Paquette's study. The current study involved 85 students, the same number of students in Paquette's study. The time spent during the training sessions and cross-age tutoring

sessions in the current study differed from Paquette's study. Her three training sessions were 45 minutes in length. In the current study the three training sessions were 20 minutes in length.

In the current study, fourth-grade tutors continued to receive training every other week during the nine weeks that the cross-age tutoring sessions occurred. These training sessions lasted for 15 minutes each time and offered fourth graders a chance to ask any questions they had about the tutoring sessions. Fourth graders also practiced conducting cross-age tutoring sessions with other fourth graders acting as second-grade tutees. Paquette held additional training meetings like this once a week for 30 minutes each time.

In Paquette's study, the cross-age tutoring sessions lasted one hour per week for ten weeks. In the current study, the cross-age tutoring sessions lasted 20 minutes per week for nine weeks. These sessions were shorter in the current study because tutors focused only on spelling, not on the various writing traits tutors focused on in Paquette's study.

The major difference between the current study and Paquette's study is that fourth graders in the current study focused only on editing for spelling errors when they worked with second graders, while in Paquette's study they focused on various traits of writing. This difference helped shape the focus of the study.

Context

This study was conducted at a Title 1 Elementary school in the Intermountain West. Participants were 43 fourth-grade students and 42 second-grade students, with a total of 39 boys and 46 girls. There were 63 Caucasian students and 22 Hispanic students, for a total of 85 students participating in this study. Participants' demographics are found in Table 1.

Table 1

Research Participants' Demographics

Demographics	2 nd Grade Classrooms				4 th Grade Classrooms			Total Students
	1	2	3	Total	1	2	Total	
Boys	5	7	8	20	8	11	19	39
Girls	9	7	6	22	12	12	24	46
Caucasian	11	11	10	32	15	16	31	63
Hispanic	3	3	4	10	5	7	12	22
Total Students	14	14	14	42	20	23	43	85

Design

This study followed a pre-/post-assessment quasi-experimental design. The classes involved in this study were two fourth-grade classes and three second-grade classes. One-third of the fourth graders who had been trained as tutors and one of the intact second-grade classes comprised the trained-tutors intervention group. The untrained-tutors intervention group included one-third of the fourth graders who had not been trained but participated as tutors to students in another intact second-grade class. The wait-list control group consisted of the remaining fourth graders and the final second-grade class.

Procedures

Specific procedures were followed to carry out this study. Included among the procedures were selection of intervention and control groups, mini-lessons, tutor training, cross-age tutoring sessions, and implementation fidelity.

Intervention and control groups. The researcher, who was also one of the second-grade teachers in this study, had her students participate in the wait-list control group, which did not participate in cross-age tutoring sessions during the study because they worked independently. After the study her second graders and the fourth graders in the control group were able to participate in cross-age tutoring sessions. In this way the researcher did not deny any students the opportunity to participate in cross-age tutoring sessions. At the same time she reduced the bias that might come from having her students participate in the method believed to be most beneficial, namely cross-age tutoring sessions. In addition, the researcher trained the fourth graders in the trained-tutors intervention group. If the trained fourth graders had worked with her class she may have had a bias in favor of their success. In order to reduce this bias, she did not have the trained fourth graders work with her students.

The other two second-grade classes were blindly assigned to participate in either the trained-tutors intervention group or the untrained-tutors intervention group. The fourth-grade students were blindly assigned to participate in either the trained-tutors intervention group, the untrained-tutors intervention group, or the wait-list control group. Each fourth grader participating as a tutor in cross-age tutoring sessions was paired up with one second-grade student from his/her assigned group. Second- and fourth-grade teachers met together to pair students based on their perceptions of which personalities would work well together. In the Paquette (2009) study, students were matched based on their academic level. However, in order to make this study as close to a typical school environment as possible, teachers paired students based on personality.

Mini-lessons. Before the cross-age tutoring sessions occurred, the researcher taught three mini-lessons to all students involved in the study. Each of the first two mini-lessons focused on one spelling strategy that was used during the cross-age tutoring sessions (i.e., visual memory and word parts). The third mini-lesson reviewed both spelling strategies. The mini-lessons ensured that all students were somewhat familiar with the strategies before they were expected to use them during the cross-age tutoring sessions. The mini-lessons also provided continuity between the two intervention groups and the control group. All three groups were to use the same strategies. The intervention groups used the strategies with a cross-age tutor while those in the control group were expected to use the strategies by themselves. Only the researcher taught these mini-lessons so that they were taught as consistently as possible.

The mini-lesson plans were as follows:

1. Teach about the first strategy, "Visual Memory." Tell students, "Sometimes you may have written your sloppy copy first drafts very quickly without paying close attention to spelling. When it comes time to edit and fix the spelling, sometimes all you have to do is look at a misspelled word and ask yourself, 'Do I know what that word should look like? Can I fix it just by thinking about what it should look like and writing it that way? Can I write the word a couple different ways and decide which one looks right?' This is called the 'Visual Memory' strategy." Have a piece of paper that models a first draft of writing with the misspelled word *pott* (*chooey* for 4th graders) in it. Ask students if they can see a misspelled word in the writing. When they locate *pott* (*chooey*) say "I bet you students know what this word looks like already! Let's fix it. Do you already know this word right

- away without having to figure it out? Do you know what it should look like? Let's try writing it in a couple different ways and see which one looks right. Great, now you've spelled the word *pot!*" Practice twice more with first drafts with the misspelled words *sok* and *wite* (for 2nd graders) and *clapt* and *telifone* (for 4th graders).
2. Teach students about the second strategy, "Word Parts." Tell students, "Sometimes words are very easy to figure out, like *cat* or *cake*. *Cat* has the *at* chunk in it, and you might know that the *ake* part of *cake* is spelled a-k-e. If you are trying to fix a word that can be figured out by listening for parts or chunks, you can use the "Word Parts" strategy." Have a piece of paper that models a sloppy copy first draft of writing with the misspelled word *chy* (*chine* for 4th graders) in it. Ask students, 'Do you hear a part in *chy* (*chine*) that you know? Is there a part of this word that you already know how to spell? How about the *sh* part? Great! It sounds like *shoe* or *should*, doesn't it? Where does *sh* go? At the beginning of the word, that's right. Now you just have to figure out what letter *shy* should end with. What do you think? Ok, great, let's try starting the word with *sh*, and then end it with a *y*. Does that look right to you? Yes? Okay, let's move on to another word." Practice twice more with first drafts with the misspelled words *palane* and *pok* (for 2nd graders) and *helep* and *fraim* (for 4th graders).
 3. Continue teaching students about the second strategy, "Word Parts." Have a piece of paper that models a sloppy copy first draft of writing with the misspelled word *cheak* (*teaepa* for 4th graders) in it. Ask the students if they can

see a misspelled word in the writing. When they locate *cheak* (*tea pea*) say “What do you think we can do to figure out how to spell this word? Should we listen for word parts? What word parts do you hear? You hear the e sound? How do we spell that? Sometimes we spell it with an ea, but what’s the other way to spell it? That’s right, *ee*. Let’s put that in there.” Practice three more times with first drafts with the misspelled words *kape*, *tawp*, and *watr* (for 2nd graders) and *gewel*, *waited*, and *filtr* (for 4th graders).

Tutor training. Prior to the cross-age tutoring sessions, the researcher trained the selected fourth-grade tutors during three 20-minute training sessions. The fourth graders were taught to let their second-grade tutee do as much of the editing as possible. They were instructed that they should let second graders try to find the misspelled words in their writing and try to fix them on their own using two strategies: “Visual Memory” and “Word Parts.” If second graders did not see misspelled words or could not fix them on their own, then fourth graders could help. If second graders fixed words but they were still misspelled, then the fourth graders could show them how to spell them conventionally.

Fourth graders were also taught that when they stepped in to help their tutee they should give clues and suggestions rather than tell them the correct spelling right away. In addition to being told how to help their tutees, fourth graders also practiced conducting tutoring sessions with other fourth graders acting as second-grade tutees. The researcher supervised at this time to ensure the fourth graders were conducting the tutoring sessions correctly.

During the nine weeks that the cross-age tutoring sessions occurred, the researcher met with the trained tutors during the second, fourth, sixth, and eighth weeks for 15

minutes each time. During these meetings the researcher answered any questions the fourth-graders had and the fourth graders continued to practice conducting cross-age tutoring sessions with other fourth graders.

The tutor training sessions ran as follows:

FIRST TRAINING SESSION

1. Explain to students that they will be paired up with one second-grade student. They will get together with that second-grade student once a week for 20-30 minutes each time. When they get together they will be helping the second graders edit their writing for spelling errors. (30 seconds)
2. Establish from the very start that the fourth grade students are NOT to find all the misspelled words and are NOT to fix the words for the second grade students. Their job is to remind second graders to use certain strategies to fix the spelling errors that the SECOND GRADERS find. They are to facilitate the strategy-use process as much as possible without actually giving second-grade students the correct spelling of the word. (30 seconds)
3. Teach fourth graders about the first strategy, "Visual Memory." Tell fourth graders, "Sometimes second graders have written their first drafts very quickly without paying close attention to spelling. When it comes time to edit with you, sometimes all you have to do is ask second graders to look at a misspelled word and ask them, 'Do you know what that word should look like? Can you fix it just by thinking about what it should look like and writing it that way? Can you write the word a couple different ways and decide which one looks right?' This is called the 'Visual Memory' strategy." Have a fourth grader come up to practice being a second grader while you

act as the fourth grade tutor. Have a piece of paper that models the first draft of a second grader's writing with the misspelled word *hott* in it. Ask the fourth grader if he/she can see a misspelled word in the writing. When they locate *hott* say "I bet you know what this word looks like already! You were probably just writing so quickly on this first draft that you weren't paying close enough attention to the spelling, and that's okay. Let's fix it now. Do you already know this word right away without having to figure it out? Do you know what it should look like? Why don't you try writing it down and we'll see if it looks right. Or you could try writing the word a couple different ways and see which one looks right (the fourth grader crosses out *hott* and rewrites it up above). Great, now you've spelled the word *hot!*"

(4 minutes)

4. Tell fourth graders that they do not always have to suggest a strategy. They can wait to see what second graders do to try to fix the word. If they attempt to fix a word, the fourth grader should ask the second grader what strategy he/she used and make note of that on the checklist. Now would be a good time to introduce the checklist.

(30 seconds)

5. Show students an overhead of the checklist and model keeping track of the words that are fixed. In the column for the corresponding strategy, they should write the misspelled word that was fixed and what word second graders rewrote in its place. If second graders rewrote a word in its place but that word was still misspelled, fourth graders should write what word it should have been in parentheses at the very end. For example, choo/shoo (shoe) or hott/hot. (1 minute 30 seconds)

6. Teach fourth graders about the second strategy, “Word Parts.” Tell fourth graders, “Sometimes words are very easy to figure out, like *cat* or *cake*. *Cat* has the *at* chunk in it, and second graders might know that the *ake* part of *cake* is spelled a-k-e. If your second grade student is trying to fix a word that can be figured out by listening for parts or chunks, encourage them to use this strategy.” Have another fourth grader come up to practice being a second grader while you act as the fourth-grade tutor. Have a different piece of paper that models the first draft of a second grader’s writing with the misspelled word *chone* in it. If they are trying to spell *chone*, ask them something like, ‘Do you hear a chunk in *shoe* that you know? Is there a part of *shoe* that you already know how to spell? You know the *sh* part? Great! It sounds like *shy* or *shine*, doesn’t it? Where does *sh* go? At the beginning of the word, that’s right. Now you just have to figure out what letters *shone* should end with. What do you think? The *o* says its name, so that means it’s a long vowel. What silent letter usually comes at the end of the word when there’s a long vowel? *E*, that’s right. Ok, great, let’s try starting the word with *sh*, and then put the *on*, and then end it with an *e*. Does that look right to you? Yes? Okay, let’s move on to another word.” Model again how to fill in the checklist. Also practice fixing the misspelled word *caloud*. (4 minutes)
7. Pair fourth grade students up and have them take turns being the second grade student and being the fourth-grade tutor. Provide a paper that models the first draft of a second grader’s writing with several misspelled words in it. One partner helps the other fix one word, then they switch roles and the other partner helps their tutee fix another word on the same piece of paper. They should ask their tutee if

they see a misspelled word, and see if they fix the word on their own. If they don't, the fourth grader should encourage the use of a strategy. They should make note of spelling changes on a checklist. (6 minutes)

8. Ask students if they have any questions. (3 minutes)

SECOND TRAINING SESSION

1. (REPEAT) Explain to students that they will be paired up with one second-grade student. They will get together with that second-grade student once a week for 20-30 minutes each time. When they get together they will be helping the second graders edit their writing for spelling errors. (30 seconds)
2. (REPEAT) Establish from the very start that the fourth grade students are NOT to find all the misspelled words and are NOT to fix the words for the second grade students. Their job is to remind second graders to use certain strategies to fix the spelling errors that the SECOND GRADERS find. They are to facilitate the strategy-use process as much as possible without actually giving second-grade students the correct spelling of the word. (30 seconds)
3. Continue teaching fourth graders about the second strategy, "Word Parts." Have another fourth grader come up to practice being a second grader while you act as the fourth-grade tutor. Have a piece of paper that models the first draft of a second grader's writing with the misspelled word *teechr* in it. Ask the fourth grader if he/she can see a misspelled word in the writing. When they locate *teechr* say "What do you think we can do to figure out how to spell this word? Should we listen for word parts? What word parts do you hear? You hear the e sound? How do we spell that? Sometimes we spell it with two e's, but what's the

other way to spell it? That's right, *ea*. Let's put that in there. How about the end of the word? What sound do you hear there? *Er*? How do we spell that one? Sometimes *ir*, sometimes *ur*, sometimes *er*. Which one do you think? Okay, write that at the end." Also practice fixing the misspelled words *jiant* and *wend* (4 minutes)

4. (REPEAT) Tell fourth graders that they do not always have to suggest a strategy. They can wait to see what second graders do to try to fix the word. If they attempt to fix a word, the fourth grader should ask the second grader what strategy he/she used and make note of that on the checklist. Now would be a good time to reintroduce the checklist. (30 seconds)
5. (REPEAT) Show students an overhead of the checklist and model keeping track of the words that are fixed. In the column for the corresponding strategy, they should write the misspelled word that was fixed and what word second graders rewrote in its place. If second graders rewrote a word in its place but that word was still misspelled, fourth graders should write what word it should have been in parentheses at the very end. For example, *teechr/teachir* (teacher). (1 minute 30 seconds)
6. (REPEAT) Pair fourth grade students up and have them take turns being the second grade student and being the fourth-grade tutor. Provide a paper that models the first draft of a second grader's writing with several misspelled words in it. One partner helps the other fix one word, then they switch roles and the other partner helps their tutee fix another word on the same piece of paper. They should ask their tutee if they see a misspelled word, and see if they fix the

word on their own. If they don't, the fourth grader should encourage the use of a strategy. They should make note of spelling changes on a checklist. (6 minutes)

7. Ask students if they have any questions. (3 minutes)

THIRD TRAINING SESSION

1. (REPEAT) Pair fourth grade students up and have them take turns being the second grade student and being the fourth-grade tutor. Provide a paper that models the first draft of a second grader's writing with several misspelled words in it. One partner helps the other fix one word, then they switch roles and the other partner helps their tutee fix another word on the same piece of paper. They should ask their tutee if they see a misspelled word, and see if they fix the word on their own. If they don't, the fourth grader should encourage the use of a strategy. They should make note of spelling changes on a checklist. (20 minutes)

ADDITIONAL TRAINING SESSIONS DURING WEEKS THREE, FIVE, SEVEN, AND NINE OF THE STUDY

1. Allow time for students to ask any questions they might have.
2. (REPEAT) Pair fourth grade students up and have them take turns being the second grade student and being the fourth-grade tutor. Provide a paper that models the first draft of a second grader's writing with several misspelled words in it. One partner helps the other fix one word, then they switch roles and the other partner helps their tutee fix another word on the same piece of paper. They should ask their tutee if they see a misspelled word, and see if they fix the word on their own. If they don't, the fourth grader should encourage the use of a strategy. They should make note of spelling changes on a checklist.

Cross-age tutoring sessions. Over the course of a nine-week period, the two classes of second-grade students participating in cross-age tutoring sessions met their fourth-grade tutors once each week for 20 minutes each session in the school library. Thus, a total of nine cross-age tutoring sessions were held. During each session, fourth graders assisted second-grade students as they identified misspelled words in their writing and attempted to use the two spelling strategies taught in the mini-lessons to fix spelling errors. The trained fourth-grade tutors used a checklist to keep track of how often each strategy was used.

On days when the intervention groups participated in cross-age tutoring sessions, the wait-list control group of second and fourth graders also came to the library and worked independently on editing their own writing for spelling errors. The meaning of the two spelling strategies used were written on two posters and displayed in the library where all students could see them. The researcher reminded all students to refer to these posters and use the strategies.

Implementation fidelity. Two approaches were used to ensure implementation fidelity. First, the researcher tracked what actually occurred during the cross-age tutoring sessions with trained fourth graders by using a checklist. This ensured that the fourth graders were conducting the tutoring sessions the way they practiced in training sessions. Second, the trained fourth-grade tutors tracked on a checklist the number of times second graders used each spelling strategy. The checklists were gathered at the end of each cross-age tutoring session by the researcher.

The trained-tutor checklist and researcher checklist are included here:

TUTOR RECORD OF SESSION FOCUS AREAS

Directions: During this tutoring session, write the original misspelled word in the column that matches the spelling strategy the second grader used. When the second grader rewrites that word, write what they wrote next to where you wrote the original misspelled word. If they did not rewrite the word correctly, write the word it was supposed to be in parentheses.

Visual Memory	Word Parts
<i>hott/hot</i>	<i>choo/shoo (shoe)</i>

Researcher Observer Notes

Partner Names _____

___ Tutor lets second grader identify misspelled words by him/herself.

___ Tutor allows second grader to try to fix the word by him/herself.

___ Tutor encourages the use of one of the two spelling strategies when students need help. Which strategies are used? _____

OR

___ Tutee individually chooses one of the two spelling strategies to use. Which strategies are used?

___ Tutor makes note of which spelling strategy is used on the checklist.

Notes _____

Data Sources

To answer the research questions, several data sources were used—pre-assessment and post-assessment spelling scores from both dictated and free writing. Students wrote one paragraph as the researcher dictated it. This was called “dictated writing.” Second graders wrote one paragraph from a Level 2 passage in the Qualitative Reading Inventory (2011). The paragraph has second-grade high-frequency words (Fry et al., 2000) and academic words (Johnson, 2009). Fourth graders wrote one paragraph from a Level 4 passage in the Qualitative Reading Inventory (2011). The paragraph has fourth-grade high-frequency words (Fry et al., 2000) and academic words (Johnson, 2009). Students wrote the same dictated paragraph before and after the intervention.

Dictated writing assessments and their corresponding scoring guides are as follows:

High Frequency Words are underlined.

Academic Language Words (on grade level) are bolded.

Academic Language Words (prior to grade level) are italicized.

SECOND GRADE PARAGRAPH

Whales and fish are alike in some ways too. Whales and fish have flippers on their sides. They **also** have fins on their tails. Flippers and fins help whales and fish swim. Fins move and push the water away. **Finally**, whales and fish both live in the water, but they are different in many ways.

3Wh5ales 4a2nd 1f4i3sh 7are 8al5ike 4in 1S8ome 1w6ays 1t6oo. 3Wh5ales 4a2nd 1f4i3sh 1have 2fl4ipp7ers 4on 3th7eir 1S5ides. 3Th6ey 7als5o 1have 1f4ins 4on 3th7eir 1t6ails. 2Fl4ipp7ers 4a2nd 1f4ins 1h7e2lp 3wh5ales 4a2nd 1f4i3sh 2sw4im. 1F4ins 1move 4a2nd 1p4u3sh 3th8e 1wat7er 8aw6ay. 1F5in8ally, 3wh5ales 4a2nd 1f4i3sh 1b5o3th 1live 4in 3th8e 1wat7er, 1b4ut 3th6ey 7are 1d4iff7er8e2nt 4in 1many 1w6ays. (55 words)

PHONICS CATEGORIES

(1 point)	# correct	# correct x 1 = points possible
1. Initial consonants	___/26	___/26
2. Consonant blends	___/11	___/11
3. Consonant digraphs	___/16	___/16
4. Short vowels	___/23	___/23
(2 points)	# correct	# correct x 2 = points possible
5. Long vowels/VC-final e	___/9	___/18

(3 points)	# correct	# correct x 3 = points possible
6. Vowel digraphs	____/7	____/21
7. Controlled vowels	____/11	____/33
8. Schwa	____/7	____/21
TOTAL POINTS ____/170		

FOURTH GRADE PARAGRAPH

Plants and animals live in many different environments—hot, cold, wet, dry. But no matter where they live, all living things have basic needs that must be met. Any structure or behavior that helps a living thing meet those needs and survive in its environment is called an adaptation. Plants also need water. In cold climates, water is frozen in ice and snow for part of the year. Plants that live in these areas have adaptations to help them **conserve** water.

2Pl4a2nts 4a2nd 4an8imals 1live 4in 1many 1d4iff7er8e2nt 4env5ironm4e2nts-1h4ot, 1c7old, 1w4et, 2dr5y. 1B4ut 1n50 1m4att7er 3where 3th6ey 1live, 7all 1l4ivi2ng 3thi2ngs 1have 1b5as4ic 1n6eeds 3th4at 1m4u2st 1b5e 1m4et. Any 2str4uct7ure 7or 1b5eh5avi7or 3th4at 1h7e2lps a 1l4ivi2ng 3thi2ng 1m6eet 3th5ose 1n6eeds 4a2nd 1s7urv5ive 4in 4its 4env5ironm4e2nt 4is 1c7alled 4an 4ad4apt5ation. 2Pl4a2nts 7als50 1n6eed 1wat7er. 4In 1c7old 2cl5imates, 1wat7er 4is 2fr5oz8en 4in 5ice 4a2nd 2sn6ow 1f7or 1p7art 8of 3th8e 1year. 2Pl4a2nts 3th4at 1live 4in 3th5ese ar5e8as 1have 4ad4apt5ations 1to 1h7e2lp 3th4em 1c8ons7erve 1wat7er. (81 words)

PHONICS CATEGORIES

(1 point)	# correct	# correct x 1 = points possible
1. Initial consonants	____/37	____/37
2. Consonant blends	____/24	____/24

3. Consonant digraphs	___/11	___/11
4. Short vowels	___/39	___/39
(2 points)	# correct	# correct x 2 = points possible
5. Long vowels/VC-final e	___/18	___/36
(3 points)	# correct	# correct x 3 = points possible
6. Vowel digraphs	___/5	___/15
7. Controlled vowels	___/18	___/54
8. Schwa	___/6	___/18
TOTAL POINTS	___/234	

Students also wrote for five minutes in response to a prompt. This writing was called “free writing.” Before the intervention, fourth graders wrote for five minutes about their favorite things to do at recess and second graders wrote about their favorite foods for lunch. After the intervention fourth graders wrote about their favorite field trip and second graders wrote about their favorite vacations.

Defining Variables

To prepare for the data analysis we first delineated the outcome/dependent variables. Then we determined what background/independent variables would be used in the regression analyses. Dependent and independent variables are discussed below.

Outcome/dependent variables. Students’ pre- and post-assessment free writing score was the total number of words students wrote because this measured students’ writing fluency (i.e., how quickly they can write). Students’ pre- and post-assessment dictated writing score was determined by how many words were spelled correctly

(referred to as “number-of-words-correct”) and with a phonological coding system (referred to as “phonics”) similar to that used in The Names Test (Duffelmeyer et al., 1994).

The phonological coding system used in this study assigned a value of one, two, or three points to word parts such as beginning consonant blends, vowel digraphs, and controlled vowels. Word parts that tend to be more difficult to spell were assigned more points. If students misspelled word parts then those points were deducted from the total possible score. The researcher and a colleague not involved in the study each scored pre-assessment dictated writing of ten randomly chosen students using this phonological coding system. Inter-rater reliability of the phonics scoring had a correlation of .980.

Background/independent variables. Pearson correlation statistics were used to determine the relationships between various student background variables (i.e., grade, teacher, gender, ethnicity, whether they attended resource classes, whether they received English Language Learner [ELL] services, whether they were tutors or not, and which intervention group they belonged to). These background variables were chosen and then correlated in order to determine which ones should be controlled for in the regression analyses. Correlations are found in Table 2.

Several variables were highly correlated, suggesting potential collinearity that would threaten the assumption of independence needed for linear regression analyses. In particular, grade and teacher were correlated at $-.885$ ($p < .01$). Since students’ teacher was not expected to make a difference in gain scores this variable was eliminated. Intervention group and whether students were tutors or not was also highly correlated at $.746$ ($p < .01$). Due to the fact that students’ placement in a particular intervention or control group

determined whether they were a tutor or not, the intervention group variable was kept but not whether students tutored.

Table 2

Correlations between Student Background Variables

	Grade	Ethnicity	Gender	Teacher	Tutor or Not	Intervention Group	English Language Learner	Resource Services
Grade	1.00							
Ethnicity	-.085	1.00						
Gender	.025	-.111	1.00					
Teacher	-.885**	.138	-.057	1.00				
Tutor or Not	***	.057	-.187	.054	1.00			
Intervention Group	-.069	.149	-.177	.326**	.746**	1.00		
English Language Learner	-.009	-.461**	.103	.032	.032	.034	1.00	
Resource Services	-.114	-.064	.129	.080	.022	-.069	.231*	1.00

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

***Cannot be computed because at least one of the variables is constant.

Whether students received ELL services was correlated with ethnicity at $-.461$ ($p < .01$) and correlated with whether students attended resource classes at $.231$ ($p < .05$).

The number of students who were in resource classes or ELL services was negligible ($n < 15$). Therefore, resource and ELL variables were eliminated whereas the ethnicity variable was not. The final set of student background variables included ethnicity, gender,

and intervention group. Pre-assessment scores were also included as a background variable in the regression analyses in order to control for where students started. Grade was still part of the analysis because we ran the regression for only second graders and then again for only fourth graders.

Data Analysis

To help answer research question A, descriptive statistics were conducted to show dictated and free writing scores for each grade and each intervention group within that grade. A paired-samples t-test also helped answer research question A by determining whether students significantly improved their scores from the pre- to the post-assessment.

Research questions B and C were answered by conducting linear regression analyses to see whether intervention group significantly predicted students' dictated writing scores. The models for these analyses determined whether intervention group significantly predicted post-assessment dictated writing phonics and number-of-words-correct scores, controlling for gender, ethnicity, and pre-assessment scores. Each model was run first for second graders and then again for fourth graders.

APPENDIX C: RESULTS

There was one additional research question that was not included in the article because there was a limit to the number of pages the article could be. Including this question would have made it too long. The research question was as follows: How are pre-assessment spelling accuracy scores related to post-assessment spelling accuracy scores for second- and fourth-grade students?

Correlations between pre-assessment and post-assessment composite percentage scores were found for students who scored in a low, middle, and high range on the pre-assessment. Those in the low group scored below 300 on the pre-assessment, those in the middle group scored between 301-350, and those in the high group scored from 351-400 (see Table 11). The correlations helped determine if pre-assessment scores can predict post-assessment scores. If so, then spelling accuracy improvement for students who scored low on the pre-assessment will be similar to spelling accuracy improvement for students who scored high on the pre-assessment. If not, then perhaps students who scored low on the pre-assessment improved more in spelling accuracy than students who scored high on the pre-assessment, or vice versa.

The correlation between the pre-assessment score and the post-assessment score for all second graders was .904 and the correlation for all fourth graders was .921. The correlation for all students was .920. These r scores indicate that the pre-assessment score all students achieved strongly predicted the post-assessment score they achieved. The only group with poorly correlated pre- to post-assessment scores was second graders who scored between 301 and 350 on the pre-assessment. A scatter plot of this group's pre- to post-assessment data indicates that students who scored lower on the pre-assessment

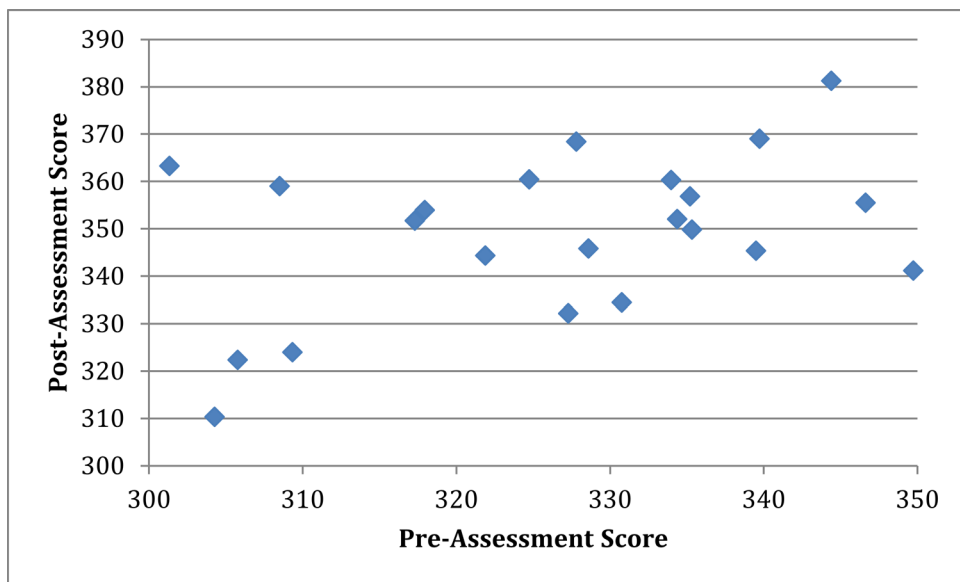
seemed to have a larger gain score than students who scored higher on the pre-assessment (see Figure 1). Therefore, one might expect that second graders who score in the lower portion of the range between 301 and 350 on the pre-assessment would achieve higher gain scores than other students.

Table 11

Correlations between Pre-Assessment and Post-Assessment Scores

Score on Pre-Assessment	0-300	301-350	351-40	All Students in Grade
Second Graders (n = 42)	.861	.418	(n<10)	.904
Fourth Graders (n = 43)	(n<10)	.735	.825	.921
All Students	.841	.441	.728	.920

Figure 1. Pre- to Post-Assessment Correlation Scatter Plot for Second Graders with Scores of 301-350 on the Pre-Assessment



THESIS REFERENCES

- Bodycott, P. (1993). Personalizing spelling instruction: Lessons from a classroom. *Childhood Education, 69*, 216-221.
- Diab, N. M. (2010). Effects of peer- versus self-editing on students' revision of language errors in revised drafts. *Science Direct, 38*, 85-95.
- Gentry, J. R., & Gillet, J. W. (1993). *Teaching kids to spell*. Portsmouth, NH: Heinemann.
- Glazer, S. (1994). A meaningful way to assess spelling. *Teaching K-8, 24*(7), 87-88.
- Mullen, M. (2003). *Excellence in elementary editing* (Master's thesis). Available from ERIC database. (ED479069)
- Routman, R. (1993). The uses and abuses of invented spelling. *Instructor, 102*(9), 36-39.
- Stemper, J. (2002). *Enhancing student revising and editing skills through writing conferences and peer editing* (Master's thesis). Available from ERIC database. (ED465187)
- Topping, K. J. (2001). *Peer assisted learning: A practical guide for teachers*. Cambridge, MA: Brookline Books.