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The Differences in spelling when practice utilizes a word processor versus writing by hand; parent perceptions

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Running head: DIFFERENCES IN SPELLING

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Abstract

The purpose of this study was to investigate parent perceptions about how their children become successful spellers by asking about digital and hand written practice alignment with test taking. Twenty parents of children from the primary grades of school (*1st to 4th grade)* completed the study, which utilized a brief questionnaire developed from the literature to collect data. This questionnaire asked demographic information (age, grade, etc.) and specifics about spelling homework, spelling tests in school, and perceived benefits of types of practice for spelling success. The questionnaire was distributed electronically via social media. Results show that most children still practice spelling and take tests at school by hand. The few child who did use technology for practice had better grades in spelling.

The Differences in Spelling When Practice Utilizes a Word Processor Versus Writing by Hand: Parent Perceptions

A communication disorder involves language, speech or hearing deficits that interfere with communication (ASHA, 1993). Having a communication disorder may impair written language, which includes phonological, grammatical and semantic errors. Writing involves understanding the rules of language and being able to apply them. Studies have found a significant correlation between communication disorders and writing (Outhred, 1989; MacArthur, 1987). Many disorders, such as learning disabilities, dyslexia, and other cognitive disabilities may make it more difficult for children to learn to write and spell correctly.

Computers are being utilized more frequently in schools, and as a result, children are expected to use a computer for many activities. One activity that many schools are transitioning to is using computers to take spelling tests. What is not known is the impact of practicing spelling words by hand and taking a spelling test by hand, versus practicing by hand and taking the test on a computer. Therefore, investigation of the interface between digital and hand produced written language, with regards to elementary school children who are learning how to spell, as well as write, is timely. Spelling provides a unique window into the relationship between handwritten and computer generated skill acquisition because it is a subject universally taught in schools that involves practice at home for application in the classroom. Spelling is also a task that many parents struggle with since the homework they assist with is directly evaluated by weekly classroom testing.

Therefore, parents as well as their children can feel the 'sting' of failure when practices are perfect but test results do not reflect this.

This study seeks to better understand the divergence between home and school spelling success by examining perceptions of technology use from the perspective of parents who are actively involved in assisting with the mastery of their young children's spelling.

Review of Literature

This review of literature covers many topics including the importance of spelling, the problems individuals have with spelling, and the differences in spelling using a word processor versus writing by hand. The purpose of this literature review is to determine whether a word processor or writing by hand helps individuals learn how to spell correctly.

What is spelling and why is it important?

In recent years the teaching of spelling has appeared to become less important in the classroom. Now, with the use of spell check on computers, there may not be a reason to spend precious classroom time on extensively teaching spelling. However, this is not the case. Reed (2012) observes that "accurate spelling reflects more advanced linguistic knowledge" (p. 5). Some teachers are spending more time focusing on reading and writing abilities rather than spelling, when spelling is the basic building block of reading and writing. Apel's (2012) research demonstrates that spelling is a fundamental component of language, reading and writing that share six underlying linguistic components:

-Phonology (sounds of language)

-Morphology (smallest units of meaning of language)

-Semantics (meaning of language)

-Syntax (rules governing order of language)

-Pragmatics (rules governing how we use language)

-Orthography (rules for letter order, letter-sound correspondence, and mental images of written words) (p. 2).

Although these six components aren't exclusively used for spelling, together they help individuals understand the relationship between letters and sounds, therefore helping to make the process of spelling more understandable. Spelling also helps individuals decipher the meaning of words. In ASHA's (2002) feature, Spelling: Logical, Learnable—and Critical, it is explained that:

> The English spelling system has developed in such a way that words that are related in meaning are often related in spelling as well, despite changes in sound—the spelling-meaning connection…Thus define/definition share the common spelling defin- and compete/competition share the common spelling compet-, despite differences in the pronunciation of those common letters. If we opted for letter-sound simplicity, we would lose the visual similarity among such words.

This shows that spelling is very important because if a child does not learn to spell correctly it may make him or her have a harder time understanding the meaning of visually similar words.

The importance of spelling is not just to be able to have fundamental linguistic knowledge. Spelling incorrectly may make a person seem unintelligent

and people may view that person as uneducated and unqualified when applying for jobs. According to research done by Apel (2011), "…80% of employment applications are negatively affected by misspellings" (p. 2). Although a teacher may believe that spelling is less important to focus on than reading and writing during the primary grades, the above knowledge reinforces the fact that learning to spell as a child will have a lifelong impact on that child's life.

Roles and Responsibilities of Teachers and Parents for Spelling

Early childhood pedagogy has consistently supported the notion that explaining spelling and grammar rules clearly to children will help them perform better when they start using spelling in written language. Children rely not just on their teachers for such learning but they also rely heavily on their parents to help them practice spelling outside of the classroom. According to a study by Patall, Cooper, and Robinson (2008), children benefit from having their parents involved in their homework. However, Patall, Cooper, & Robinson (2008) also found that parents many times use different methods than teachers been completing homework, which may ultimately lead to a decline of achievement in the classroom. Based on these findings, the study (Patall, Cooper, & Robinson, 2008) recommends that "schools and teachers may want to encourage particular forms of parent involvement. Specifically, setting rules about when and where homework should be done may have the most beneficial effects for students" (p. 1093).

Evidence Linking Spelling and Written Language to Technologies

Some studies (Greenberg, Ehri & Perin, 2002; Elkins, 1986) examine differences in writing, reading and spelling as well as other literary processes across

a variety of subjects. There are also a handful of studies that illustrate how word processors may assist people in writing and spelling better or more accurately than writing by hand. For example, in Elkins (1986) study using word processers, he concluded that "the word processor offered an easier mechanical process in creating legible writing…and that usually it was easier for children to judge if a word 'looked right' on the video screen than from untidy handwriting," (p. 73). Other studies involving this field of research include decoding, reading, spelling words, and word identification tasks, like those involved in the Greenberg, Ehri and Perin (2002) study.

An intriguing study focusing on children by Outhred (1989) examined the impact of word processers on children's writing. According to Outhred, "…writing is a complex process linking language, thought, and motor skills" (p. 262). As a clinician he researched the impact of word processors on the writing abilities of children. Fifteen children with learning disabilities were used as subjects in this study. The children wrote two stories every week and the writings were analyzed on a word processor and on paper. The results show that the stories written on the word processer were longer and had fewer spelling errors, giving children more confidence in their writing skills (Outhred, 1989). It was unclear if the computer program used by the children had a spell check that corrected the children's spelling errors. If so, this may have been the reason for the fewer spelling errors and does not necessarily mean that using a word processor actually improved their spelling abilities. It may have just corrected the mistakes that were most likely present on the hand written forms of the papers.

Phonological Issues and Spelling Rules

There can be a variety of issues when it comes to spelling and problems learning to spell. Hatfield and Patterson (1983) state that "the type of spelling error perhaps most common in normal adults and children is a phonologically plausible rendering of the target word" (p. 451), for example, a phonological rendering of the word 'campaign' would be 'campain'. Many words in the American English language have irregular spellings, which inevitably make them more difficult to learn and to remember all of the rules associated with the irregularities. As a result, it is easier to just spell the words how they sound than to use the rules, which may be why phonological renderings of words are so common. Ball and Blachman (1991) researched how the early teachings of phonological awareness to kindergarteners could help improve a child's reading and spelling abilities in their future. They compared a group of children who had not had phonological awareness instruction to children who had received early instruction. The results showed that "the group that received…instruction spelled significantly better than the…control group" (p. 63). If children had better instruction in phonological awareness at a young age, literature suggests they would not struggle with phonological plausible renderings of words quite as often.

Phonological renderings of words are not the only problem children have with spelling. The many rules of spelling in the English language are difficult for children to learn and remember. Common spelling rules that are difficult for children to remember are "i" before "e", and knowing when to use two of the same letter or just single letters; for example using two S's in 'misspell' and one S in

'misuse.' Silent letters in words also become a problem for children when learning how to spell.

Mode of Production

Handwriting: Printing and cursive. There is some evidence that when an individual handwrites something rather than typing it, the person is more likely to retain the information being written. This is important because schools in recent years have begun having students complete their spelling tests on computers. In contrast, even though some schools have children take spelling tests on a computer, most children practice their spelling words by writing them out onto paper. When it comes time for the children to take the spelling test, they may not do as well because they are used to writing out each individual letter and recognizing letter combinations and writing movements rather than using a keyboard. Switching from paper to keyboard may hinder their ability to learn the spelling of words. Research such as that of Deardorff (2011) supports this notion. He concluded that "… forming letters by hand may engage our thinking brains differently than pressing down on a key" and that "handwriting engages different brain circuits than keyboarding" (p. 2).

Since it seems that handwriting has a big influence on learning how to spell, what about the different types of handwriting? There may also be a difference in spelling when comparing printing versus writing in cursive. Blumenfield (2012) explains that an "important benefit of cursive is that it helps the child learn to spell correctly since the hand acquires knowledge of spelling patterns through hand movements that are used again and again in spelling" (p. 2). Although cursive now

seems to rarely be used outside of elementary school, this shows that learning cursive is not a waste of timeas it is actually beneficial to a child's spelling abilities.

Word Processing. Typing on a computer has become second nature in society. It makes documents easier to edit, makes sure everything is spelled correctly, and most importantly it is faster. Even though a computer can correct spelling, it cannot help you learn to fix your spelling mistakes. In MacArthurs (1988) examination of the writing process, he explained that "students can use spelling checkers to compensate for poor spelling skills, but current software was not designed to help students develop spelling skills" (p. 540). Since computers correct almost every incorrect spelling error in a document, children may not understand the need to learn how to spell. As a result, the spell checker on a computer is a great quick fix for individuals with spelling problems but it will most likely hinder their learning in the future.

Although using a computer to learn to spell for typically developing children is inefficient, it is very beneficial for children with disabilities. Children with disabilities may have no other way to communicate except for using a computer or similar device. Computers assist in the development of communication and reading skills. By being able to type on a keyboard, a child with a disability, who cannot communicate otherwise, is able to interact with their peers. According to Blischak and Schlosser (2003) "for students with little or no functional speech, the ability to spell is critical in generating spontaneous, novel utterances" (pg. 293). If an individual has the choice between using a computer or handwriting when they have an assignment the most likely choice is the computer.

Summary

The purpose of this study was to investigate parent perceptions about how their children become successful spellers by asking about digital and hand written practice alignment with test taking. The focus was on spelling, a universal subject, to determine if there is a difference between correct production when practicing versus during the actual assessment if this utilizes different technologies, i.e. digital versus hand-written. One main issue covered in this literature review is the importance of learning how to spell correctly. Another issue is the benefits and downfalls of using either a word processor or writing by hand since research has shown that the brain functions differently for each during learning. Limited research was found that focused on parent involvement in spelling homework, and still less on the advantages or disadvantages of computer assessment following handwritten practice. This study sought to contribute to this emerging literature.

Questions of the Study

1. Do parents perceive that digital practice enhances or reduces learning associated with spelling?
2. Do children who do spelling homework by hand tend to take spelling tests at school by hand, or vice versa, do they practice and take spelling tests digitally?
3. Is there a difference in the grades of children who practice and take spelling tests in the same modality versus those where the modality is different?
4. Does the pedagogy of spelling change over the primary grade years?

Methodology

Participants

Thirty parents/guardians of children from the primary grades of school (1st through 4th grade) were sought as participants in this study. There was no control for the type of school (e.g. private versus public).

Materials

The materials of the study included a brief questionnaire developed from the literature. This questionnaire asked demographic information (age, grade, etc.) and specifics about spelling homework and spelling tests in school, as well as parents beliefs about the best way children learn to spell.

Procedures

The questionnaire was transferred to a digital form using Qualtrics and was distributed to the children's parents by means of social media.

Analysis

Descriptive analysis was used to analyze the questions of the study.

Results

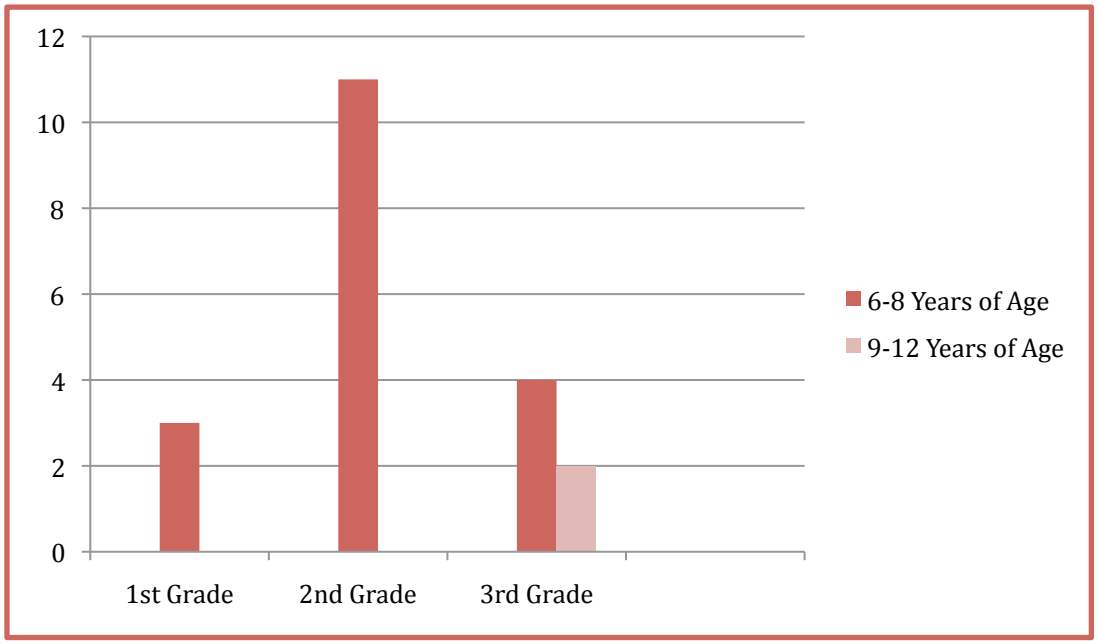
Demographics

Thirty-one respondents began the survey and 20 completed the survey. Some respondents answered all of the questions while others answered only some. Nineteen out of the 20 respondents who completed the survey chose English as the predominant language spoken by their child, the remaining one did not chose to

answer that specific question. Twenty respondents answered the question regarding their child's age and current grade level. As can be seen in Table 1, the majority of the children where in second grade and between the ages of 6-8 years.

Table 1

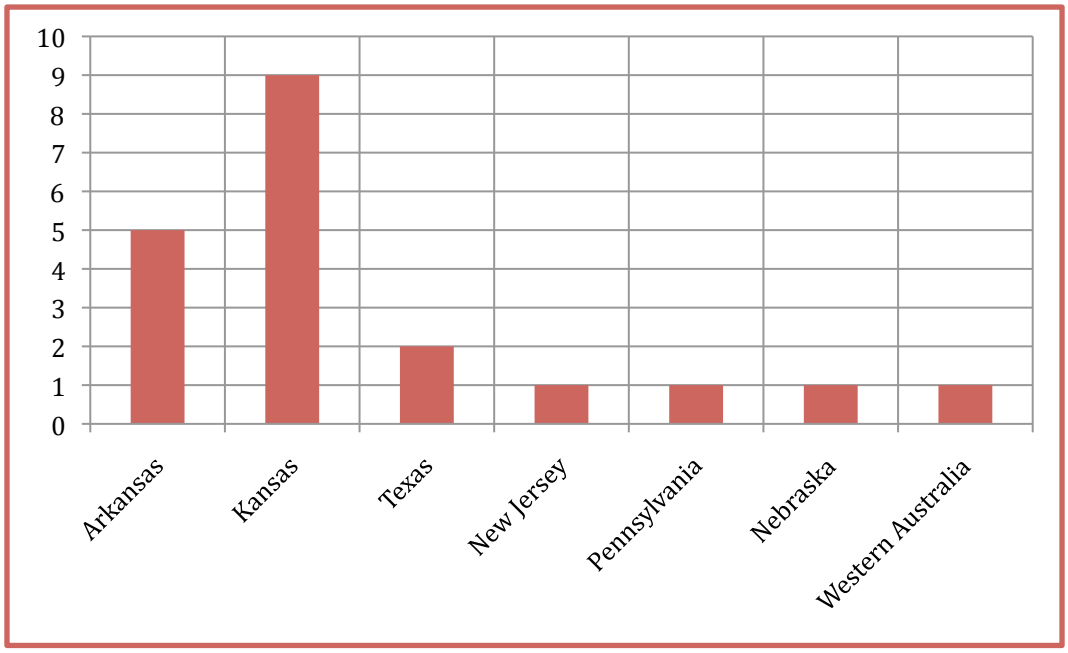
Age and Grade of Children



Twenty respondents answered the question regarding the state and county in which their child attended school. The majority of the respondents lived in Kansas and Arkansas, but other areas of the country as well as Australia were represented. The table below displays the number of children in specific locations.

Table 2

Location Child Attends School

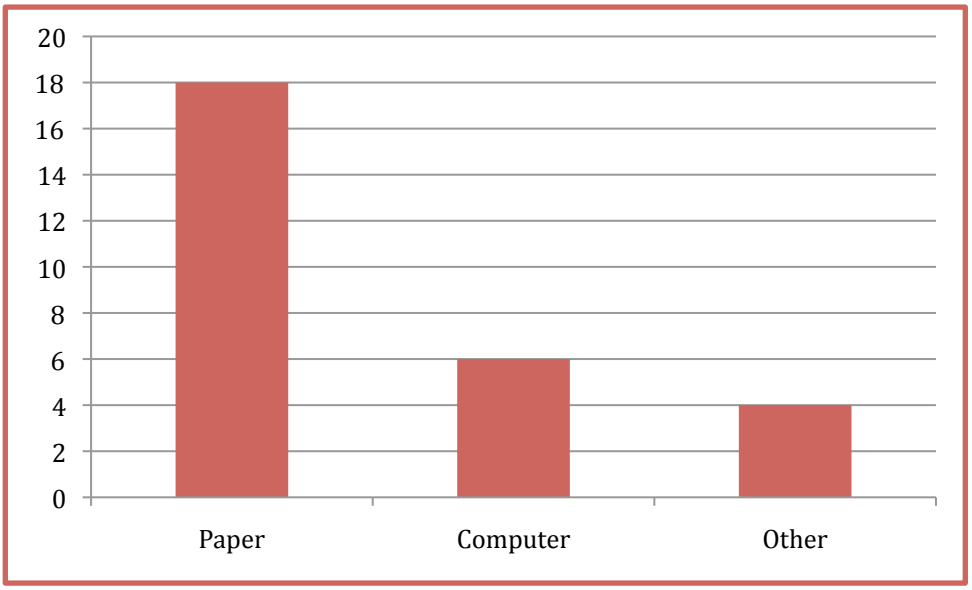


Question One

The first question of this study asked if parents perceive that digital practice enhances or reduces their child's learning associated with spelling. Item 15 in the questionnaire (see Appendix A) was used to answer this question. All 31 of the respondents, even those who did not complete the survey, answered this question. The most common response was paper and pencil practice. These results are reflected in Table 3 below.

Table 3

Best Way for a Child to Learn How to Spell



Four parents added additional information under 'other' regarding the best way they believe is for their child to learn how to spell. This additional information included: using [spelling words] in context and grouping by spelling rules, using as many different strategies as possible, memorizing and writing the words on paper, and spelling them out loud. According to the data, the majority of parents believe that writing the words on paper is the most effective way for their child to learn.

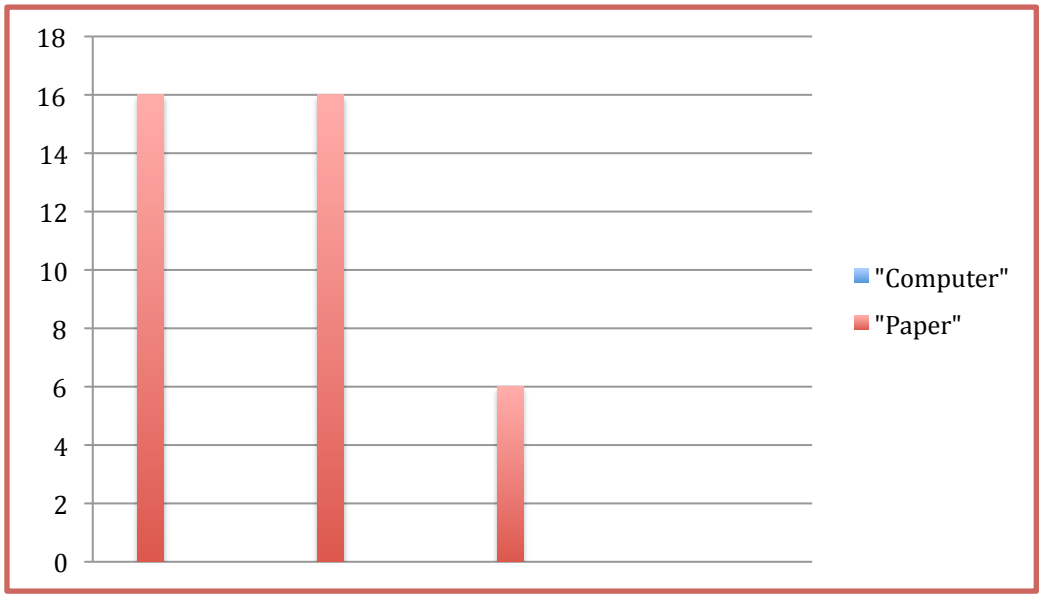
Question Two

The second question asked if children who do spelling homework by hand tend to take spelling tests at school by hand or vice versa, practice and take spelling tests digitally. Question 12 on the survey was used to answer this question. Of the 20 respondents, 16 completed this question. One hundred percent of the

respondents indicated that their child takes and has always taken hand written spelling tests in grades 2nd through 3rd. (see Table 4) There was no information reported for grades 1st and 4th.

Table 4

Mode of Spelling Test



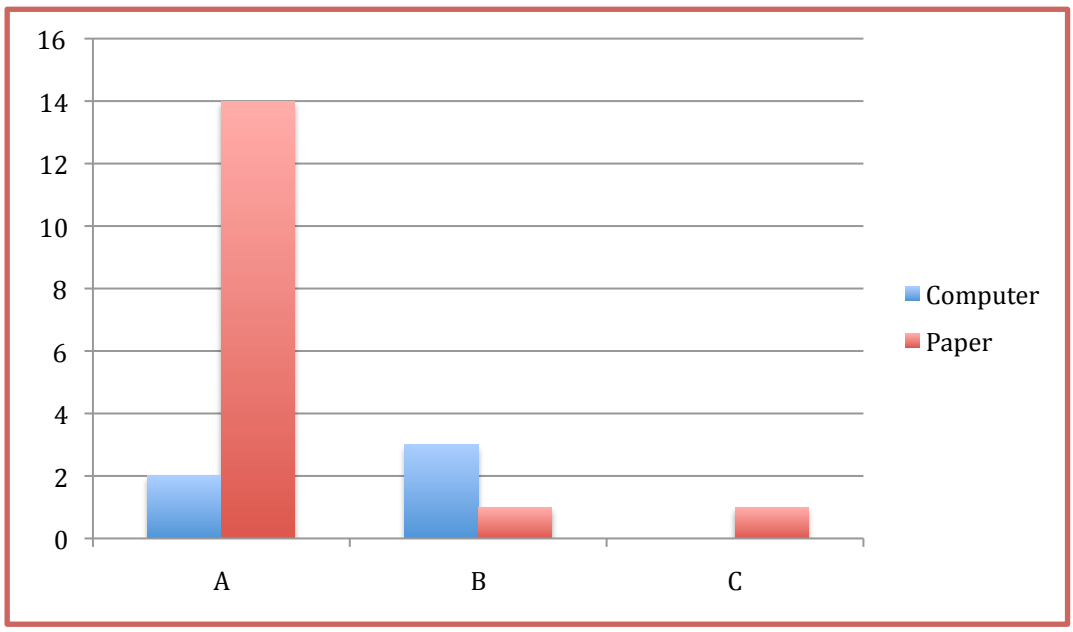
Question Three

The third question of this study asked if there was a difference in the letter grades of children who practice and take spelling tests in the same modality versus those where the modality is different. Items 7, 8, 11, 12, and 13 on the questionnaire addressed this question. Children used handwriting, computers, and oral practice to learn spelling words, but referring back to Table 2 all of the children took handwritten spelling tests. This being stated, the data is inconclusive as to whether taking a spelling test on the computer would in fact hinder or benefit a child. However, referring to Table 5 below, some respondents who reported their child practicing spelling words by hand and on computer received more B's as grades

than children who practiced spelling without a computer, just using handwriting and/or spelling the words orally. Overall, five children were reported using computers to practice and of these, three receiving B's and two receiving A's. There were two other children who did not use a computer and received grades lower than an A. One received a B and one received a C. Table 5 represents the spelling test grades of children at different grade levels as well as the mode of spelling practice used by children. As can be seen, grades of B correspond to spelling word practice on a computer.

Table 5

Spelling Test Grade and Mode of Practice



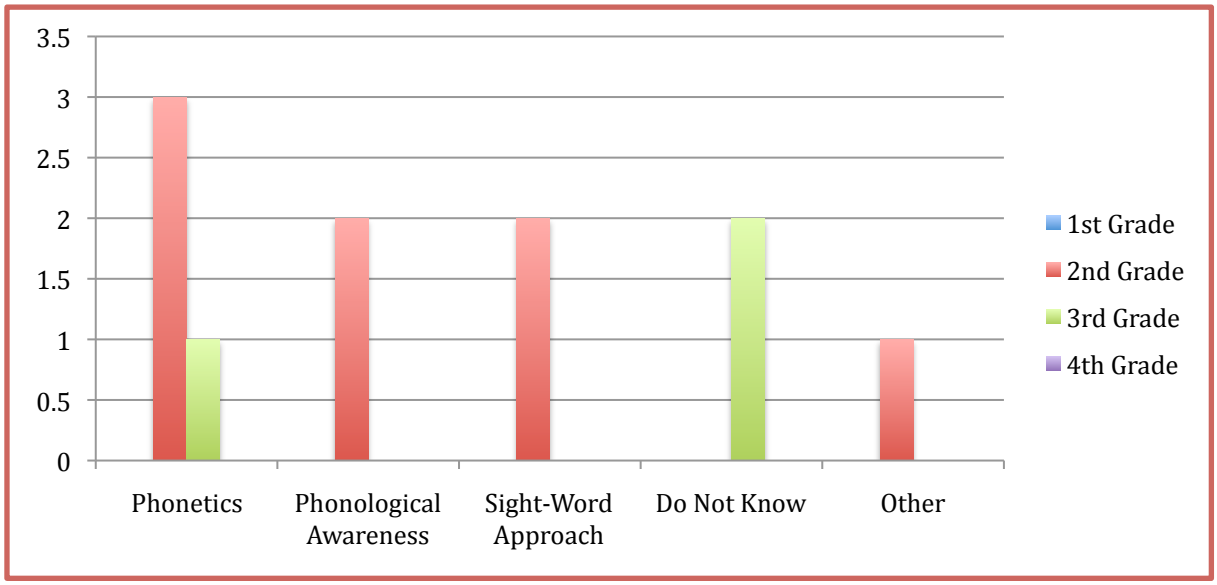
Question Four

The final question of this study asked if the pedagogy of spelling changes over the primary grade years. Items 12 and 13 on the questionnaire was used to answer this question. Only six of the 31 respondents gave information about the

type of spelling teaching method used in the classroom. These results were paired with results from those same six respondents about their child's letter grades in school. (see Table 6)

Table 6

Teaching Method Vs. Grade in School



Other than the above information, there was little data offered by parents, however, it seems that there is fairly even coverage of all aspects of how spelling is taught in 2nd grade. Two of the three 3rd grade parents did not know what teaching method was used and one indicated that only phonetics was used. Respondents with children in grades 1st and 4th did not answer this question.

Discussion

This study sought to investigate the interface between digital and hand produced written language, by focusing on spelling related homework and test taking. Since homework and parent participation in this is a constant for elementary children as they learn to spell, the study focused on parent perceptions rather than

reports from teachers who, being employed in different districts or even states, might use specific testing or practice procedures in their schools. For example, one school might be digital based, while one may not, while in all cases parents determine how they choose to work with their children on spelling homework. Several main points emerged from the results of this study. Firstly, almost all the parents surveyed used hand written spelling practice with their children, and by their report, all of the schools used hand written spelling practice and testing. Parents who did report other ways of working on spelling with their children listed using computer programs and/or typing the words out. A second point that emerged was a grade difference in spelling homework. There is a pattern of children in grades 1st through 3rd doing spelling homework with parent involvement. The results were unable to determine if children in 4th grade used parent involvement in spelling homework because no parents reported children in 4th grade in any state.

One of the most striking findings of the study was that schools didn't use technology. Even with the small amount of respondents who completed this survey, it is clear that handwritten spelling tests are still the preferred method by teachers. This may be because, referring back to Blumenfield (2012), "…the hand acquires knowledge of spelling patterns through hand movements that are used again and again in spelling" (p. 2). However, this may change in the future as the use of technology rises. As technology becomes more prevalent in the classroom, it may be beneficial for teachers and parents to start introducing new ways to practice and take spelling tests on computers as well as writing by hand. The state of Arkansas, along with other states, has recently approved on April 4, 2013 The Digital Learning

Act. This act will "provide for the expansion of digital learning opportunities to all Arkansas public school students; and remove any impediments to the expansion of digital learning opportunities" (D. Douglas, 2013). These digital learning acts may facilitate teachers in integrating computers and computer programs into their student's spelling activities.

Another interesting finding was that no parents of children in 4th grade participated in the study regardless on the state in which they live. One can only speculate on why this might be. One explanation could be that by the time children are in 4th grade they may be past the stage of learning how to spell. A second but related possibility might be that the school curriculum may be more focused on integrating their knowledge of spelling into other aspects of literacy and language. Additionally, this shift from 1st-3rd grade to 4th grade may be due to the implementation of the common core standards. Common core integrates many skills to provide children with quality educations, and has been adopted by most states across the country. Of relevance to this study, the Common Core Standard Initiative (2010) first mentions technology with regard to writing skills at the 4th grade level. This means spelling, which is a fundamental building block of writing skills, may shift at the 4th grade level to digital literacy as this relates to written language. This literacy would include a student's awareness of features inherent in writing software that identifies misspelled words, ungrammatical sentences, and word usage mismatches. These features require skill development on the part of student, but Common Core requires more depth than just skill, which is why the standard encompasses digital literacy, which includes critical thinking. Part of critical

thinking related to digital literacy is acquiring the knowledge of how to search, identify, and modify written language using the tools provided by technology, and understanding. Incorporating technology and handwriting when given a discrete learning task, such as spelling, will increase the critical thinking and problem solving of the student.

Lastly, these findings are important to look at from a speech-language pathologist perspective. Speech-language pathologists are interested in all aspects of language. When children are learning how to spell, they are learning how to use morphology and phonology to help them initiate written language. Referring back to Apel (2012), research demonstrates that spelling is a fundamental component of language, reading and writing. It would be beneficial for speech language pathologists to center children's critical thinking on spelling in order for them to develop these other essential components of language and speech.

Limitations of the study

While the study met the number of participates stated in the methods, it would have benefited from having a larger number of respondents to get improved and more reliable results. There were few respondents from a wide range of locations, which also limited the data. Another limitation was that this study only focused on grades 1st through 4th, and schools may just now be starting to switch from handwritten spelling tests to computerized tests. Also, no parents with children in 4th grade responded to the survey.

Future Directions

The results of this study were somewhat inconclusive because of the few participants and limited age range. A future study surveying a teacher's perspective on student's spelling practice and spelling test mode would be beneficial in collecting data from a different but related perspective. This may be particularly interesting and important with the Digital Learning Act starting in the 2014-2015 school year. Also, surveying a larger audience would be helpful, especially children in grades higher than 3rd grade. Another direction would be to survey children who are very successful spellers, such as ones who compete in spelling bees, to determine how they have studied and practiced their spelling.

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Appendix A

Spelling Questionnaire. Please complete one questionnaire for each of your children if you wish to contribute information about more than one child.

1. How old is your child?

2. What grade is your child in? Select one.
   - ☐1ST
   - ☐2nd
   - ☐3rd
   - ☐4TH
   - [ ] Other. Please describe.

3. Indicate the predominant language spoken by your child. Select one.
   - ☐English
   - ☐Spanish
   - ☐Mandarin
   - ☐Marshallese
   - ☐Other

4. Indicate the type of school(s) you child has attended. Check all that apply.
   - 1ST Grade: ☐ Public ☐ Private
   - 2nd Grade: ☐ Public ☐ Private
   - 3rd Grade: ☐ Public ☐ Private
   - 4th Grade: ☐ Public ☐ Private

5. In what state and county your child attends school?

6. How does your child practice spelling words at home? Check all that apply.
   - ☐By spelling out the words by hand
   - ☐By spelling out the words on a computer

7. How often do they practice spelling words at home? Select one.
   - ☐Daily
   - ☐Twice a week
   - ☐Once a week
   - ☐Only right before the test

8. How do you have them practice spelling words? Check all that apply.
   - [ ] Practicing writing the spelling words
   - [ ] Writing the spelling words to complete sentences or phrases
   - [ ] Using the spelling words to write paragraphs or short stories
   - [ ] Other. Please list.

9. What methods are used in the classroom to teach spelling? Check all that apply.
   [ ] Phonetics
   [ ] Phonological awareness
   [ ] Sight-word approach
   [ ] Don't know

10. How does the school have them practice spelling words? Check all that apply.
   ☐ Practicing writing the spelling words
   ☐ Writing the spelling words to complete sentences or phrases
   ☐ Using the spelling words to write paragraphs or short stories
   ☐ Other. Please list.

11. How many times does your child usually take spelling tests at school? Select one.
   ☐Once a week
   ☐Once every two weeks
   ☐Once a month
   ☐Other

12. How does your child take spelling tests? Check all that apply by grade.
   1ST Grade: ☐ handwritten ☐ computer based
   2nd Grade: ☐ handwritten ☐ computer based
   3rd Grade: ☐ handwritten ☐ computer based
   4th Grade: ☐ handwritten ☐ computer based

13. What grades does your child usually receive on spelling tests? Check all that apply.
   1st grade:
   What percent correct? ☐ 90-100% ☐ 80-90% ☐ 70-80% ☐ less than 70%
   Report card grade? ☐ A ☐ B ☐ C ☐ D
   2ND grade:
   What percent correct? ☐ 90-100% ☐ 80-90% ☐ 70-80% ☐ less than 70%
   Report card grade? ☐ A ☐ B ☐ C ☐ D
   3rd grade:
   What percent correct? ☐ 90-100% ☐ 80-90% ☐ 70-80% ☐ less than 70%
   Report card grade? ☐ A ☐ B ☐ C ☐ D
   4th grade:
   What percent correct? ☐ 90-100% ☐ 80-90% ☐ 70-80% ☐ less than 70%
   Report card grade? ☐ A ☐ B ☐ C ☐ D

14. What do you believe is the best way for your child to learn how to spell? Check all that apply.
   ☐Writing the words on paper
   ☐Using keyboarding and a computer to write words
   [ ] Other. Please list.

15. Do you have any additional information you would like to share about your child's development of spelling skills?

Appendix B

The Differences in Spelling When Practice Utilizes a Word Processor Versus Writing by Hand: Parent Perceptions

Principal Researcher: Lauren Bleakley
Faculty Advisor: Dr. Fran Hagstrom

You are receiving this email as a request to participate in an electronic questionnaire that is being conducted as part of an undergraduate research project entitled The Differences in Spelling When Practice Utilizes a Word Processor Versus Writing by Hand: Parent Perceptions. Please complete only one survey.

Implied Consent:
Description: The purpose of this study is to investigate parent perceptions about how their children become successful spellers. We ask that you complete a brief questionnaire. The questions consist of information regarding demographic information (age, grade, etc.), specifics about spelling homework, spelling tests in school, and perceived benefits of types of practice for spelling success. The questionnaire should take no longer than 15 minutes to complete.

Risks and Benefits: There are no anticipated risks to participating in the study. You may gain insight on their perceptions of the use of technology and spelling and your child's skill at learning to spell.

Voluntary Participation: Your participation in the research is completely voluntary. You do not have to agree to take the survey. You can stop once you have started. You can decide to not submit your survey at any time. No one will think negatively of you should you decide to not participate.

Your name will not be on the survey, and the electronic link to the survey cannot be traced to you or the computer upon which it was completed, therefore no one will know how you answered the questions. The completed surveys will be kept in a secure place so no one except the researchers named above will be able to look at them. The results of the survey will be reported as group information.

By completing the survey and electronically submitting it, you are implying that you are willing to participate. It also means that you understand the description of the research, including risks and benefits, confidentiality and the right to withdraw.

If you have questions about this study or seek additional information please contact the researchers at the following address or telephone number.

Researcher:
Lauren Bleakley, Undergraduate Student
Fran Hagstrom, Ph.D., Faculty Advisor
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College of Education and Health Professions
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Ro Windwalker, CIP
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Research Compliance
ADMIN 210
University of Arkansas
Fayetteville, AR 72701
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Appendix C

November 4, 2013

MEMORANDUM

TO:	Lauren Bleakley Fran Hagstrom
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	13-10-210
Protocol Title:	*The Differences in Spelling when Practice Utilizes a Word Processor versus Writing by Hand*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 11/04/2013 Expiration Date: 11/03/2014

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 100 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.