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RECOMMENDATIONS FOR A MATHEMATICAL CURRICULUM TO BE USED IN CONJUNCTION WITH AN ORAL DEAF EDUCATION PROGRAM

by

Megan Rae Freese

An Independent Study
submitted in partial fulfillment of the requirements for the degree of:

Master of Science in Deaf Education

Washington University School of Medicine
Program in Audiology and Communication Sciences

May 16, 2008

Approved by:
Barbara A. Lanfer, M.A.Ed. and Julia L. West, M.S.S.H.,
Independent Study Advisors

Students who are deaf or hard of hearing have typically had difficulty in mathematics; however, this problem often is overlooked because of difficulties in language and reading abilities. This study aims to identify the most appropriate mathematics curriculum for deaf or hard of hearing students in an oral deaf education program.

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Houghton Mifflin Company (Houghton Mifflin Math publisher)

Pearson Education Inc. (Investigations in Number, Data, and Space publisher)

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Introduction

While the development of speech and language for children who are deaf or hard of hearing remains to be the primary focus of many curricula, research shows that these children also show disadvantages in their mathematical abilities as well. The curriculum being used to teach these students is important in their ability to acquire age-appropriate mathematical skills. Factors that may lead to difficulty in the understanding of mathematics include vocabulary with unfamiliar meanings, complex sentence structures, and non-standard, or idiomatic, language.

Purpose

The purpose of this study is to determine which of three mathematics curricula is most appropriate for students who are deaf or hard of hearing, learning in an oral deaf education setting.

Review of Literature

Introduction

Mathematics is a subject which many students dread throughout their education. It can be one of the most difficult subjects students have to face. The new concepts and the new vocabulary, the new teachers and the new equations – students often try their hardest simply to keep a passing grade.

Difficulties in mathematics can manifest themselves at a particularly young age. Without a solid foundation, students are often unable to successfully learn new mathematical concepts at an appropriate pace. For children who are deaf and hard of hearing, this is a particularly daunting task. These students are typically behind in developing language, thus affecting their mathematics abilities as well. In fact, Swanwick, Oddy, and Roper (2005) state that "consistent evidence from research studies between 1980 and 2000 indicates that deaf children lag behind hearing peers (by 2 to 3.5 years) in mathematics." For example, data was taken from the Stanford Achievement Test (9th ed.) to compare the results of hearing students with those who are deaf or hard of hearing. According to the data, "half of deaf and hard of hearing students, on average, achieve no better than just under the sixth grade level in mathematics computation and only at the fifth grade level in problem solving by the end of high school (Traxler, 2000). The need to narrow this gap between those who are hearing and those who are deaf or hard of hearing is imperative.

As functioning individuals in society, people encounter mathematics throughout the day, every day. Counting change, telling time, using the microwave, and measuring cough syrup are all examples of simple mathematics abilities people may take for granted. Without a solid foundation in mathematics, students may lose their ability to "develop [the] mathematical skills

[necessary] to have the confidence and competence to be effective participants in our … society" (Ray, 2001).

There has been much research done to determine the source of mathematical difficulty for students who are deaf or hard of hearing; and several explanations have been offered. As educators of students who are deaf or hard of hearing, we need to be well-informed about these barriers to success, and we must have the competence to break them down as much as possible.

There are several factors that contribute to how well a student who is deaf or hard of hearing performs in mathematics. These factors include (1) the amount of exposure to premath concepts, (2) auditory memory, (3) delayed language, (4) the development of logical reasoning, and (5) the reading style/technique practiced by students.

Premath Concepts

The 2 primary factors that contribute to the understanding of mathematics are that of exposure to premath concepts and incidental language learning (Ray, 2001). The development of logic and reasoning is a seemingly long path for children to travel, but according to Ray (2001), it "generally begins with the [premath concept of] classification of objects, numbers and ideas." This classification ability needs to be reinforced in a range of meaningful contexts for children to fully understand the concept. Learning and being exposed to this premath concept of classification is not is difficult as it may sound. In fact, Ray assures parents that there are an unlimited amount of opportunities to reinforce this concept at home. Experimenting with classification concepts ranges from sorting out clothes while doing laundry or working in the kitchen, sorting plates and cups (2001). Ray also provides a brief list of different learning experiences that can take place in the home beyond classification:

- Number – using play money to represent numbers, finding halves and quarters of everyday objects such as the division of a sandwich/cake
- Measurement – estimating and measuring using bottles/containers at the water-trough [or in the bathtub/sink]
- Geometry – exploring patterns and relationships by arranging colored bears in a repetitive sequence
- Statistics – the sorting of pictures and objects like personal clothing…

(2001)

All of these premath concepts can be built upon at home, thus providing children with a mathematical foundation they will carry with them into their school years. This informal learning that children can accomplish prior to beginning school plays an essential role in their learning mathematics through formal instruction (Zarfaty, Nunes, & Bryant, 2004).

Auditory Memory

Swanwick et al mention auditory memory as another factor that may contribute to the mathematical difficulties experienced by students who are deaf or hard of hearing. They state that "deaf children's lack of auditory experience might also affect short-term memory skills and account for slower response time of deaf learners in addition and subtraction tasks and their poor memory for digits" (2005)

While number concepts tend to be a significant issue concerning premath concepts, delayed language learning is another primary factor contributing to the poor mathematical abilities of students who are deaf or hard of hearing (Ray, 2001). "Hearing children hear mathematical talk from birth and most hearing children are involved in mathematical talk from

early on" (Swanwick et al, 2005). Unfortunately, due to hearing loss, children who are deaf or hard of hearing miss out on this early learning opportunity. Swanwick et al further explain how

> "Gregory explores how deaf children's early incidental learning of core mathematical concepts (e.g. counting, time, distance, size) may be impeded as a result of a deaf child's lack of access to parental commentary, explanations, instructions and conversations between others in the home."
> (2005)

Delayed Language

Because of language delays, children who are deaf or hard of hearing do not have this early exposure, and mathematical concepts have to "be deliberately brought to their attention in as many ways and as often as possible" (Ray, 2001). Ray (2001) goes on to explain that "the understanding of mathematical concepts involved considerable experience, with particular problems being presented in [both] familiar and different ways." As the cliché states: *Practice makes perfect*. Students who are deaf or hard of hearing need a tremendous amount of practice, exposure, and reinforcement in order to grasp the mathematical concepts that come more naturally to their hearing peers.

As mentioned previously, the ability to relate mathematics to experiences is highly important to the understanding of mathematical concepts. This is true even in early childhood settings. Educators in early childhood have the task of giving students meaningful experiences with mathematical concepts that they can relate to prior experiences as well as later relate to new information. According to Ray (2001) teachers need to "facilitate learning experiences through play that are meaningful, spontaneous and which allow children's existing knowledge to be built upon, while at the same time constructing new knowledge." Furthermore, one of the emphases in the National Council of Teachers of Mathematics' *Principles and Standards for School Mathematics* (NCTM, 2000) is on the importance of teaching students to make connections between new mathematical concepts and prior knowledge as they solve problems" (Land &

Pagliaro, 2007). Without premath exposure and incidental language learning, students are unable to make these connections in the typical manner, particularly those students who are deaf or hard of hearing.

Development of Logical Reasoning

Another contributing factor to the impaired mathematical skills in children who are deaf or hard of hearing is the development of logical reasoning. As mentioned previously, the development of logic is necessary for the understanding of mathematics. Johnson (1993, cited in Davis, 1996) revisits this idea claiming that logical thinking develops only after language skills are sufficiently developed. An individual needs these language skills in order to construct "chains of causal thought" (Ray, 2001). Unfortunately, White (2004) states that "most children with severe-profound bilateral hearing loss, or what is commonly referred to as deafness, have a great deal of difficulty learning language."

Linguistic Structures

Comprehension of certain language structures can also create a challenge for students who are deaf or hard of hearing. Swanwick et al (2005) explain that there are particular phrases, such as *'more than'* or *'less than'* often pose a problem for children who are deaf or hard of hearing. These students may have difficulty recognizing and, therefore, interpreting these and other key mathematical phrases. Other difficulties may include the identification of crucial connectives, such as *'if'* and *'because'*. These words "signpost readers through a mathematical problem," explains Gregory. "There are also a number of everyday words that are used in very specific ways in mathematics such as *'difference'* and *'high'* (Gregory, 1998 cited in Swanwick et al, 2005). It has even been noted that "without a basic understanding of nouns, verbs etc,

deaf/hearing-impaired children have no idea what questions are being asked of them and thus what is expected of them (Ray, 2001).

So, exactly what aspects of English are particularly difficult for children who are deaf or hard of hearing? According to Pagliaro and Ansell (2002), there are a number of complicated aspects of the English language that act as a barrier to students. These include "the use of conditionals, comparatives, negatives, and inferentials (Barham & Bishop, 1991 cited in Pagliaro & Ansell, 2002); the use of words with meanings that differ inside and outside the classroom; and the existence of multiple ways to express a single idea" (Kidd & Lamb, 1993; Kidd, Madsen, & Lamb, 1993 cited in Pagliaro & Ansell, 2002). Moreover, as Ray (2001) states, "Mathematics discourse has distinct features not found in normal English. For example, it is particularly dense, it is very precise, it is read in multiple directions (not just left to right), and it contains familiar words [such as *'difference'* and *'high'*] with precise meanings which are different from their normal meanings." In their article, Swanwick et al list nine of the most significant problematic language structures that impose difficulties when reading mathematical problems:

1. conditionals (*if, when*)
2. comparatives (*greater than, the most*)
3. negatives (*not, without*)
4. inferentials (*should, could, because, since*)
5. low information *pronouns* (*it, something*)
6. lengthy passages (reliance on connectives)
7. words that have different meanings within math than they do in general usage (such as *difference, factor, product*)
8. multiple ways of expressing single concepts

9. abbreviations and symbols

(2005)

When students begin to read their own mathematics texts, they also begin to apply their linguistic knowledge towards the solving of word (story) problems. In a study by Ansell and Pagliaro (2006), they found that the lack of ability to make connections from the words in the story problem to the arithmetic function played a large role in the difficulties children were having (cited in Blatto-Vallee, Kelly, Gaustad, Porter, & Fonzi, 2007).

Reading Style

Another primary factor affecting students' performance is the way they read the problems. For example, Marschark's (2003) "review of cognitive functioning in deaf … children suggests that they focus primarily on the individual words and pieces of text rather than adopting a more holistic, relational approach to abstracting the meaning" (cited in Blatto-Vallee et al, 2007). Hyde, Zevenbergen, and Power (2003) further add to this statement noting that "With their restricted understanding of semantics, deaf students are compelled to rely on fragments of sentences (a lexical "strategy")" in order to make sense of what they are reading.

When children who are deaf or hard of hearing find it difficult to understand a written mathematical problem, they may resort to this idea of "filtering" the information presented. Filtering through word problems in order to gain understanding can potentially create a problem for students. Pau (1995) states that "in order to solve written problems correctly, deaf/hearing-impaired children need to correctly interpret every one of the words contained in the problem's text" (cited in Ray, 2001). Because of this, students often learn best in guided situations that are engaging as well as purposeful and have relevance to everyday life (Ray, 2001).

The Challenge of Story Problems

The affect of a child's language on his/her mathematical abilities is tremendous. Students are expected to solve increasingly complex word problems which may demand more critical thinking than previous mathematical tasks. Problem-solving is a skill that is often deemed as problematic for children who are deaf or hard of hearing. According to Ray (2001), "Problem-solving requires children to use their observations to make predictions, which in turn requires a sound language base."

The entire process can be a daunting task for any child who has trouble with language. The process is the same as it has been over the past 20 years; however, for children who are deaf or hard of hearing, it is still a difficult one. In an article written by Pagliario and Ansell (2002), they explain the process which students follow. Solving the story problem first requires students to understand what they are reading as well as what the problem is that needs to be solved. Once the problem is identified, the students then must be able to depict that particular situation mathematically and calculate the answer. The final task is for the students to relate the answer they have calculated back to the situation (Pagliaro & Ansell, 2002). All of these tasks have been noted to cause particular problems for students who are deaf or hard of hearing, further demonstrating the reason language is such an important aspect in the understanding of mathematics.

In their article, Mousley and Kelly (1998; cited in Ray, 2001) offer an explanation for these difficulties. They note "the tendency of many [students who are] deaf [or hard of hearing] … to proceed too quickly when attempting to solve a problem rather than pausing to think it through or develop a coherent plan." Another explanation is that children who are deaf or hard of hearing, and may not understand all of the language, may attempt to simplify the problems by converting what they do not understand into more familiar structures or terminology (Ray,

2001). As explained by Pau (1995), children need to fully understand what is being read in order to successfully solve mathematical problems. The Misunderstanding of key words or phrases used in the problem often results in many incorrect responses (cited in Hyde et al, 2003).

Imagery as a Successful Intervention

Nunes and Moreno (2002; cited in Swanwick et al, (2005) describe a successful intervention program which focused specifically on core mathematical concepts as well as ways of presenting mathematical problems visually (using drawings and diagrams). According to their results, both of these strategies were successful. This is an important piece of insight for all teachers of children who are deaf or hard of hearing.

Using visual techniques to teach students has also been supported by Land and Pagliaro. Land and Pagliaro explain that the results of their study show that, "Recall of high imagery terms was significantly better than for low imagery terms…Concrete terms were recalled significantly better than abstract terms" (2007). This shows that a successful strategy in the teaching of mathematics to children who are deaf or hard of hearing is through a visual manner in which students can experience the problem as purposeful and relate to it in a meaningful way.

Methods

The primary investigator began this study by contacting school districts to determine three mathematics curricula used in the surrounding St. Louis area. After determining which three curricula are most commonly used, the primary investigator contacted the publishers in order to obtain examination copies of grade 2 mathematics curricula from *Investigations in Number, Data, and Space* (Pearson Education Inc., 2008), *Everyday Mathematics: The University of Chicago School Mathematics Project* (Wright Group/McGraw Hill, 2007), and *Houghton Mifflin Math* (Houghton Mifflin Company, 2005).

In order to come to a well-informed conclusion, the examiner decided upon 4 separate categories in which to compare each mathematical curriculum. The first of these areas was that of language. This category consisted of two including vocabulary and average sentence length. Unfamiliar vocabulary as well as long sentence length can cause problems for students. Words which have the same pronunciation but a different meaning also prove to be an area of difficulty for students who are deaf or hard of hearing.

The second category of focus was on the visual format of the student text. For example, was there visual support for unfamiliar vocabulary? Were there pictures to provide mathematical explanations? Were the pictures representing manipulatives clear and easily understood?

The third category of comparison among curricula focused on the amount of practice provided for the student when the concept is first introduced. How many pages in the student text cover the topic when it was first introduced?

The final category in which comparisons were made was available resources outside of the textbook. Are there student reference books? Are the students able to access online web

pages for practice and instruction? Are additional pages available to reinforce and practice skills?

Once the categories for comparison were determined, the primary examiner consulted of the Show-Me Standards in Mathematics from the state of Missouri Department of Elementary and Secondary Education. After reviewing these standards, the examiner was able to choose one lesson from each curriculum that correlated with three of the six[1] Show-Me Standards. After reviewing the lessons in each text, the examiner then analyzed the language, visual support, skill practice, and resources available.

Language was analyzed by calculating the average length of sentences in the student text for each Show-Me Standard. An average length of sentence for the language each curriculum recommended the teacher use in class discussion was also analyzed. This information is shown in figures 1, 2, and 3. A summary of the language analysis for all curricula within Standards 1, 2, and 4 can be seen in figure 4.

In addition to sentence length, language was evaluated by noting challenging vocabulary included in each lesson that may be unfamiliar to children who are deaf or hard of hearing. For example, in *Everyday Math's* student text, *Math Masters*, on page 36, directions state, "On the calculator, enter a number between 1 and 20." In these directions, the usage of *enter* may be used in an unfamiliar way. While here, *enter* is a verb signifying the action of inputting data into an information system, students may be more familiar with other meanings of *enter* such as *to come in or go in*, or *to be admitted into*. This information is shown in figure 5.

[1] Due to the difference in examination copies sent by the publisher, the primary investigator was forced to limit the range of material covered to correlate with the first three mathematical units within the *Investigations* curriculum. These units include (1) "Counting, Coins, and Combinations: Addition, Subtraction and the Number System 1," (2) "Shapes, Blocks, and Symmetry: 2-D and 3-D Geometry," and (3) "Stickers, Number Strings, and Story Problems: Addition, Subtraction, and the Number System 2."

Challenging vocabulary was determined by comparing the language in the student text to the "Dolch Basic Words List." The Dolch words are the 220 most frequently found words in books that children read. These words are primarily learned while students are in the first and second grade. Using the Dolch Word List, the primary examiner analyzed the student text to determine vocabulary that students may be unfamiliar with.

In order to determine the amount of visual support available, the primary examiner analyzed the visual imagery provided on each page of the student text. Pictures that supported any part of the lesson (i.e. the concept itself or an unfamiliar word) were deemed as "Positive Support." Pictures that seemed unnecessary, or in no way supported the learning material were labeled as "Negative Support." For any pages in the student texts that had no images available, the label of "Neutral Support" was provided. A summary of findings can be seen in figure 8.

The amount of practice provided for each skill was also analyzed by the primary examiner. Each teacher manual provided the page numbers for those pages which corresponded to the skill being taught. The summary of the amount of pages provided for each skill in its particular standard can be seen in figure 9.

The final category of analysis for each curriculum was the amount of resources available for the student as well as for the teacher in each curriculum. In order to determine this information, the teacher manuals were examined, and all available resources listed were taken note of. The results for this analysis can be seen in figure 10.

Results

Upon examining each curriculum, the results for language, visual support, skill practice, and available resources were determined. Language was analyzed in two subcategories: average

sentence length and possible unfamiliar vocabulary. For analyzing sentence length, the curricula lessons were divided into individual standards first, and then an average of these was taken to summarize the findings.

For Standard 1, the average length of sentence found in the Everyday Mathematics student text was 11.1 words per sentence. Investigations had an average of 6.7 words per sentence, and Houghton Mifflin had the least amount of words per sentence with 6.1. These results can be seen in figure 1.

For Standard 2, Everyday Mathematics had the highest amount of average words per sentence with 11.1. Investigations had an average of 9.6 words per sentence, and Houghton Mifflin again had the least amount of words per sentence with an average of 6.8. These results can be seen in figure 2.

For Standard 4, Everyday Mathematics again contained the highest average of words per sentence with 9.3. Houghton Mifflin had an average of 7.8 words per sentence, and Investigations had the least amount of words per sentence with an average of 7.0. These results can be seen in figure 3.

After analyzing the information found for each individual standard, the average amount of words per sentence in all three standards as a whole was determined. On average, the Everyday Mathematics curriculum contained 10.5 words per sentence. Investigations had a total average of 7.8 words per sentence, and Houghton Mifflin had the least amount of total words per sentence with an average of 6.9. These results can be seen in figure 4.

In order to determine which words in particular may be unfamiliar to students, the primary examiner referenced the Dolch Word List. Words found that were not listed on the Dolch Word List were recorded and then calculated into two different percentages for each

curriculum. The first percentage represents the percent of *total* words not found on the list compared to those that were present on the Dolch Word List. For example, the Investigations curriculum had a total of 286 words in the lessons examined in the student text. Of these, 97 words were not present on the Dolch Word List; therefore, approximately 33.91% of the words in the text may be unfamiliar to students.

The second percentage represents the *number* of unfamiliar words found in the student text. For example, while 97 words in the Investigations curriculum were not found in the Dolch Word List, many of these words were present more than once. For the second percentage, words repeatedly mentioned after the first usage were discarded. After discarding these repeated words in the Investigations curriculum, 38 of the original 97 words were calculated into a percentage, showing approximately 13.29% of words that may need to be taught or explained to students.

In summary, the results of this analysis are as follows: Everyday Mathematics contained a total of 53.51%. Houghton Mifflin had approximately 37.68% unfamiliar words, and Investigations had the least amount at approximately 33.91% total unfamiliar words.

After discarding words that were repetitious, the results were recalculated. Everyday Mathematics had approximately 25.44% unfamiliar words in the student text. Investigations contained 13.29%, and Houghton Mifflin had the least amount with 11.35%. These results can be seen in figures 5, 6, and 7.

After analyzing the images present in each of the student text books, it was determined that the Everyday Mathematics curriculum had the most amount of images that offered positive reinforcement for instruction or for the skill being taught. Houghton Mifflin was the only text to have negative support (pictures that did not necessarily support instruction or skill), and Investigations had no images to either support or distract the students. This analysis as a whole,

however, may not be fully reliable based on the amount of curriculum materials made available to the primary examiner. Therefore, this information was held in low regard compared with other findings in this study.

The number of pages of skill practice pertaining to the concept being taught was also analyzed for each standard. In the Investigations curriculum, the lesson correlating with Standard 1 of the Show-Me Standards offered one page of practice to reinforce the skill. Everyday Mathematics also offered only one page of practice. Houghton Mifflin offered two pages of practice for the lesson correlating with Standard 1.

For lessons correlating with Standard 2 of the Show-Me Standards, Investigations offered three pages of practice, Everyday Mathematics offered two pages of practice, and the Houghton Mifflin student text offered four pages of practice.

For lessons correlating with Standard 4, all curricula provided the students with two pages of practice. In summary, Investigations offered a total of six pages of practice, Everyday Mathematics offered a total of five pages of practice, and Houghton Mifflin provided a total of eight pages of skill practice.

Concerning available resources, after reviewing each curriculum, it was determined that proficient resources are available for both students and teachers who use any of the aforementioned curricula. Each curriculum offered support on the Internet, extra practice pages to be administered by the teacher, as well as additional resources that were available to be purchased if desired.

Recommendations

Based on the results of this study, paired with the information acquired concerning the learning and mathematical abilities of students who are deaf or hard of hearing, Houghton Mifflin would be the recommendation for a mathematics curriculum to be used for students in an oral deaf education setting. These recommendations are supported by the researcher's findings concerning language, vocabulary, and skill practice provided.

Figure 1.
Average length of sentence for teacher's explanation, and average length of sentence in student text for lessons covering Standard 1

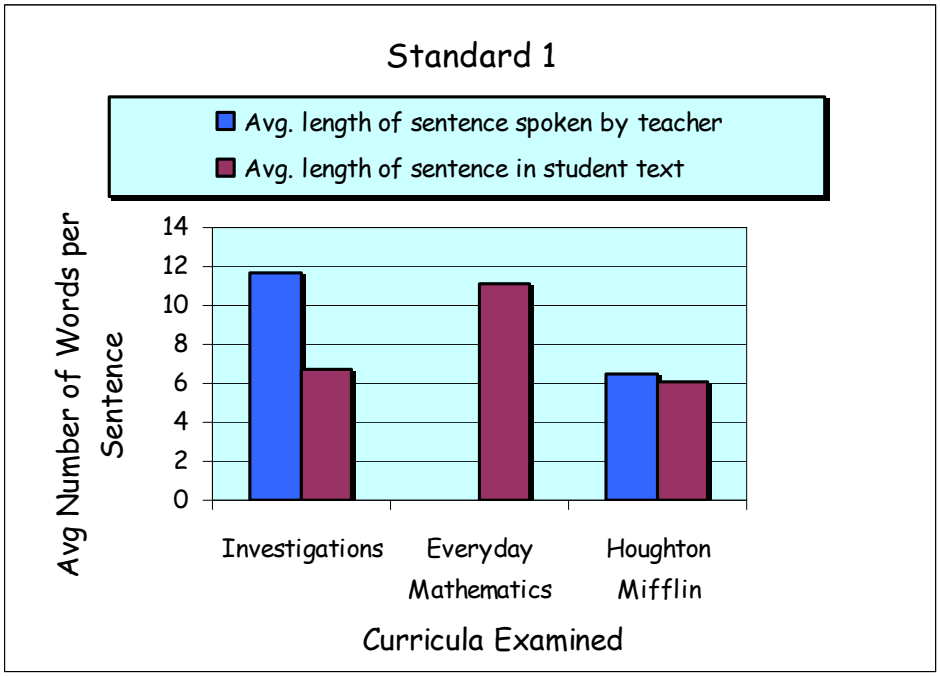

Figure 2.
Average length of sentence from teacher's explanation, and average length of sentence in student text for lessons covering Standard 2

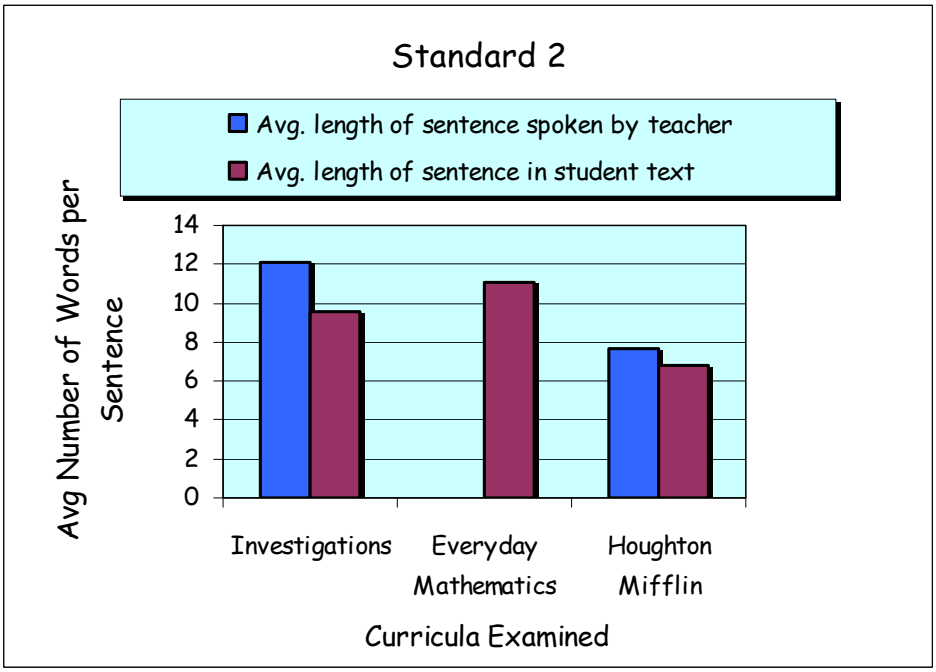

Figure 3.
Average length of sentence from teacher's explanation, and average length of sentence in student text for lessons covering Standard 4

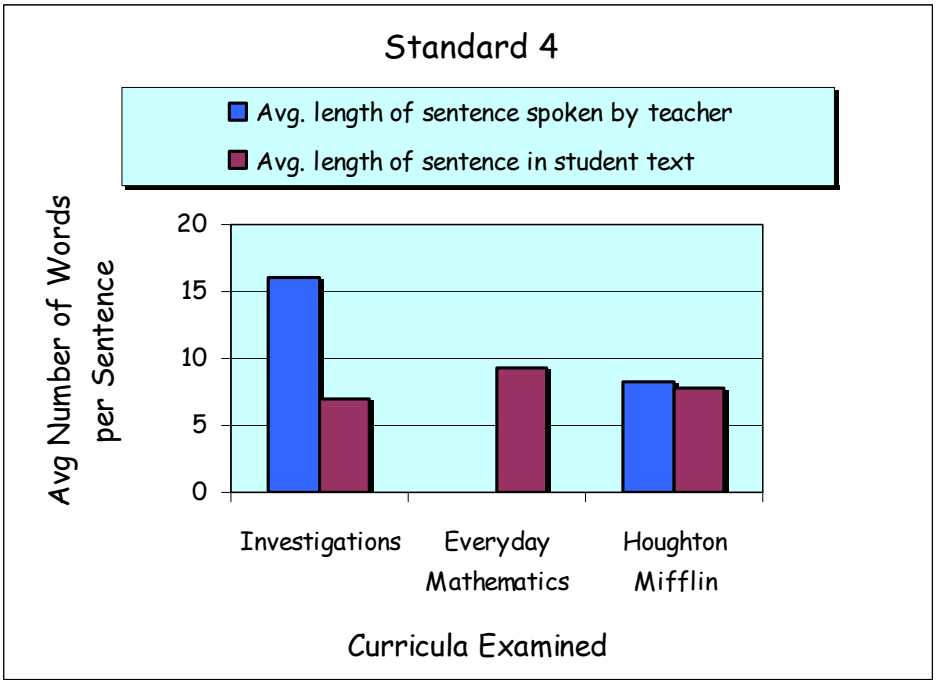

Figure 4.
Summary of language analysis for all curricula within Standards 1, 2, and 4.

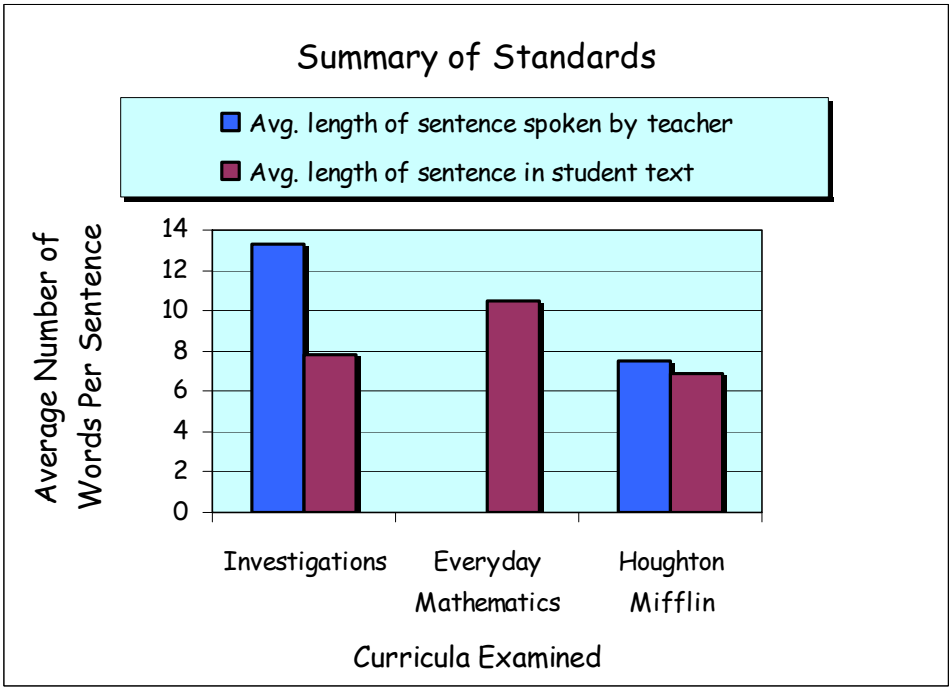

Figure 5.
Total amount of words that may be unfamiliar to students versus the specific number of words that may be unfamiliar found in the Investigations curriculum.

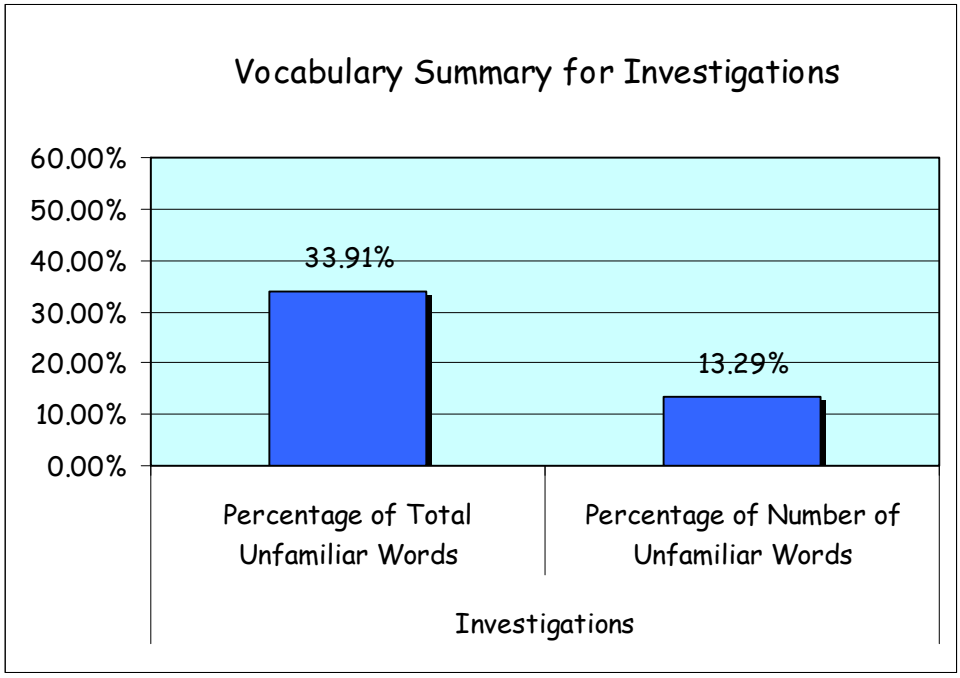

Figure 6.
Total amount of words that may be unfamiliar to students versus the specific number of words that may be unfamiliar found in the Everyday Mathematics curriculum.

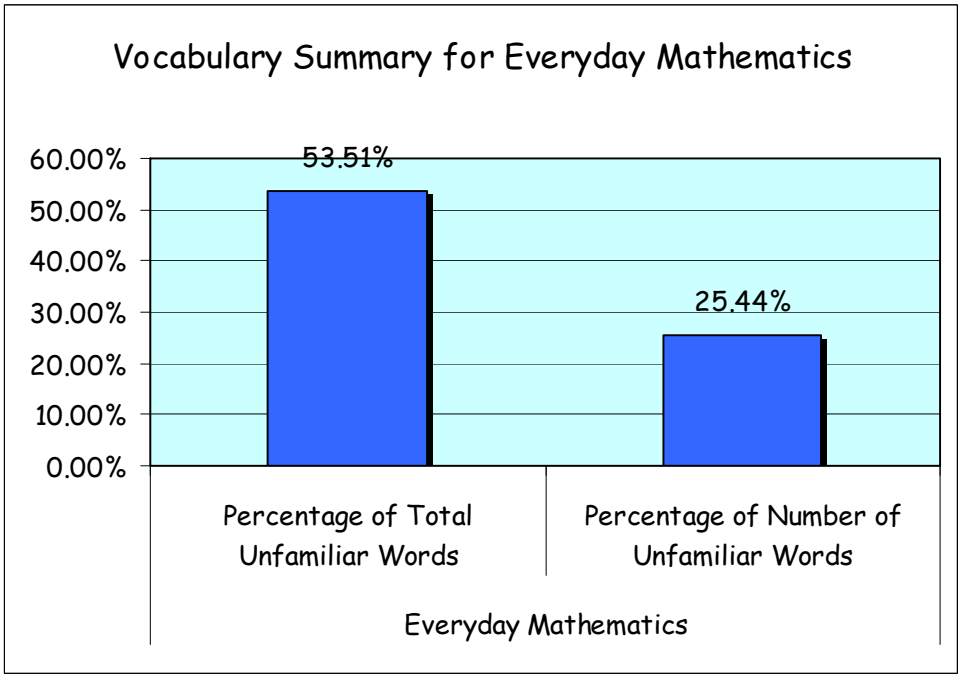

Figure 7.
Total amount of words that may be unfamiliar to students versus the specific number of words that may be unfamiliar found in the Houghton Mifflin curriculum.

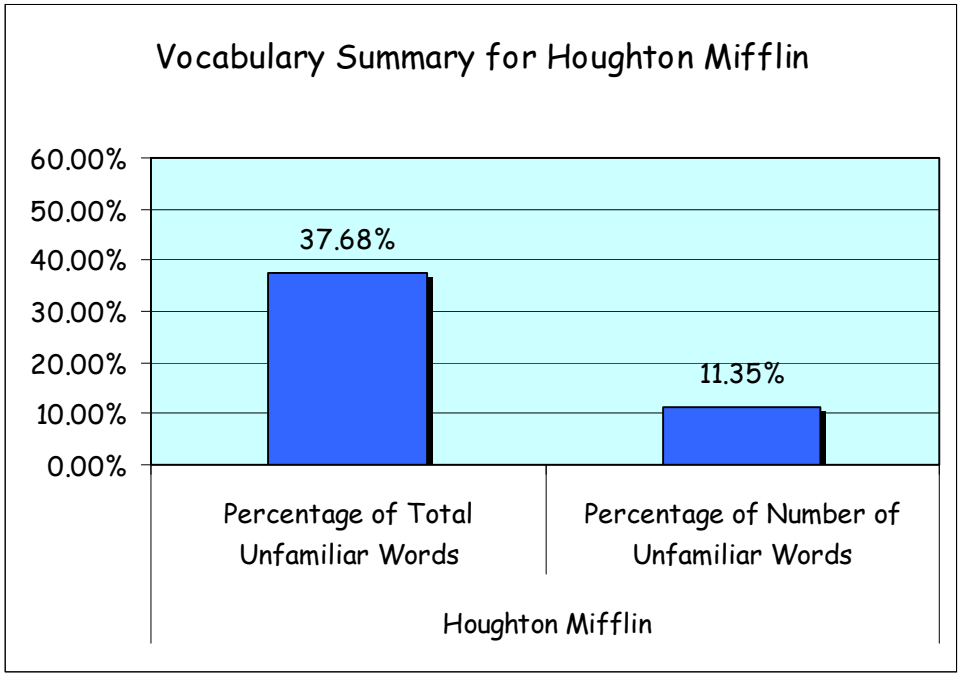

Figure 8.
The amount of visual support provided in student texts

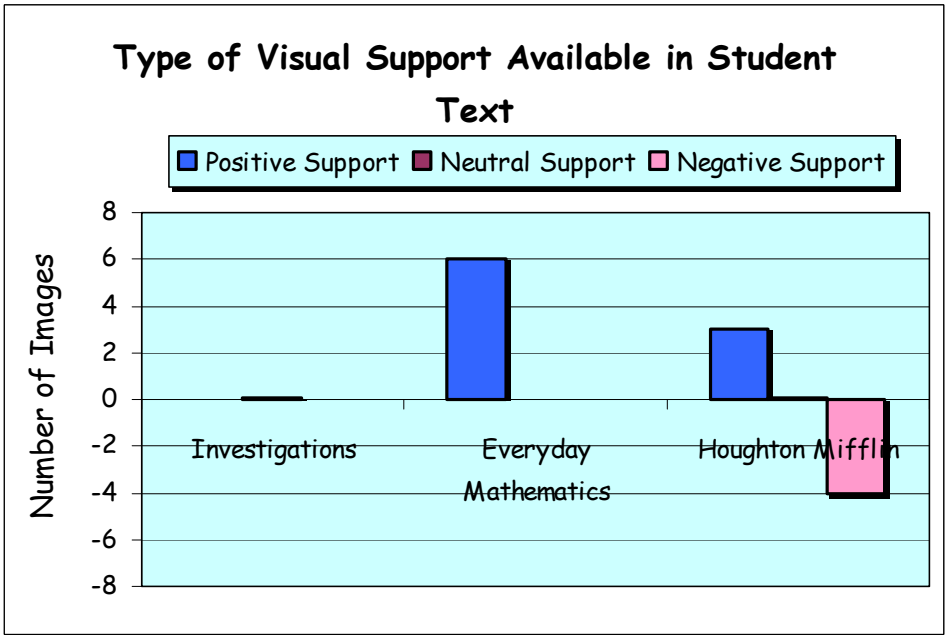

Figure 9.
The total amount of pages providing practice for each skill taught within its correlating standard

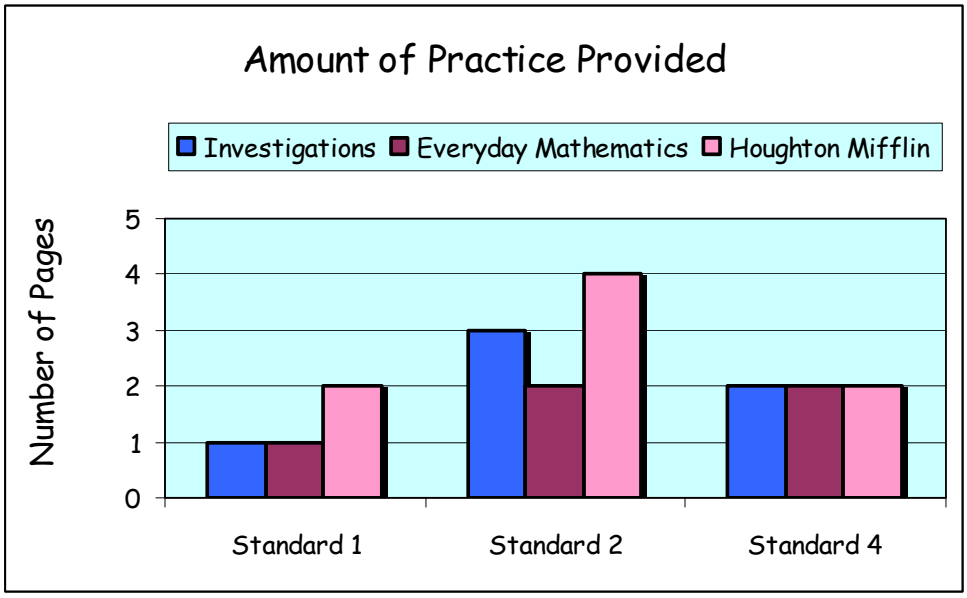

Figure 10.
Available resources for each curriculum

	For the Student	For the Teacher
Houghton Mifflin	eMathBook (available online and CD-ROM)	Math Tracks MP3 Audio CD
	Student Text	Ways to Success Intervention CD-ROM
	Education Place (free materials and support for lessons)	Chapter Challenges
		Lesson Planner CD-ROM
		Ways to Assess CD-ROM (Review Generator)

Investigations	Student Math Handbook	Curriculum Units Teaching Guides
	Student Activity Book	Implementing Investigations in Grade 2: Suggestions for implementing the curriculum
	Student Software CD	Resources Binder (contains all the Resource Masters and Transparencies)
	Student publications available online for purchase	Professional Development "Teacher Notes" and "Dialogue Boxes"
	Online Student Edition	Online Professional Development information
		Success Tracker
		Online index and printable resources
		Online Lesson Planner

	For the Student	For the Teacher
Everyday Mathematics	My Reference Book	Teacher's Lesson Guide, Volumes 1 and 2
	Student Math Journal Volumes 1 and 2	Teacher's Reference Manual
	Math Masters	Home Connection Handbook
	Minute Math	Differentiation Handbook
		Assessment Handbook
		Assessment Management System
		Interactive Teacher's Lesson Guide

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APPENDIX A

Missouri Department of Elementary and Secondary Education

The Show-Me Standards

Approved as a final regulation by the Missouri State Board of Education, January 18, 1996

Mathematics

Mathematics
In Mathematics, students in Missouri public schools will acquire a solid foundation which includes knowledge of

1. addition, subtraction, multiplication and division; other number sense, including numeration and estimation; and the application of these operations and concepts in the workplace and other situations

2. geometric and spatial sense involving measurement (including length, area, volume), trigonometry, and similarity and transformations of shapes

3. data analysis, probability, and statistics

4. patterns and relationships within and among functions and algebraic, geometric, and trigonometric concepts

5. mathematical systems (including real numbers, whole numbers, integers, fractions), geometry, and number theory (including primes, factors, multiples)

6. discrete mathematics (such as graph theory, counting techniques, matrices)

APPENDIX B

DOLCH BASIC WORDS LIST

a	as	again	about	any
all	away	ate	after	better
am	be	over	always	both
an	black	but	around	bring
and	brown	cold	ask	carry
are	by	cut	because	clean
at	came	fast	been	could
big	did	first	before	done
blue	eat	five	best	don't
call	fall	fly	buy	draw
can	find	four	does	drink
come	for	give	far	eight
do	get	goes	found	every
down	going	from	full	hurt
funny	have	got	gave	know
go	her	green	grow	light
good	him	had	hold	myself
he	his	has	how	never
help	if	hot	just	own
here	into	its	keep	pick
I	laugh	long	kind	right
in	let	made	much	seven
is	live	many	must	shall

The Dolch words are the 220 most frequently found words in books that children read. These words are usually learned in first and second grade; students who learn these words have a good base for beginning reading. Many of these words cannot be sounded out because they do not follow decoding rules, so they must be learned as sight words.

One way of estimating a primary student's reading level is by having the student identify the 220 Dolch Basic Sight Words. The number of words recognized is the basis for assigning his/her equivalent reading level.

The scale is as follows:

# OF DOLCH WORDS RECOGNIZED	ESTIMATED READING LEVEL
0 - 75	Pre-primer
76 - 120	Primer
121 - 170	1st Year
171 - 210	2nd Year
Above 210	3rd Year +

it	may	new	now	show
jump	my	not	off	their
like	no	of	once	them
little	old	open	only	then
look	on	please	round	there
make	one	or	sleep	these
me	put	our	small	think
out	saw	pull	take	those
play	said	read	tell	together
pretty	she	start	thank	use
ran	sit	say	that	very
red	some	sing	they	want
ride	stop	six	this	warm
run	three	soon	too	wash
see	today	ten	try	went
so	two	upon	under	what
the	was	us	walk	when
to	will	who	well	where
up	work	why	were	which
we	yes	wish	white	would
you	yellow	your	with	write