Effect of Cartoon Mnemonics and Revised Definitions on the Acquisition of Tier-2 Vocabulary Words Among Selected Fifth-Grade Students: Phase II: Crossover Mixed Analysis

Cindy L. Benge a, Anthony J. Onwuegbuzie b and Mary Robbins c

aDepartment of Urban Education, University of Houston-Downtown, TX, USA; bDepartment of Educational Leadership, Sam Houston State University, TX, USA and Department of Educational Leadership and Management/Department of Educational Psychology, University of Johannesburg, Johannesburg, South Africa; cSam Houston State University, TX, USA

ABSTRACT
This is the second of 2 articles that examine the effect of cartoon mnemonics and revised definitions on the acquisition of Tier-2 vocabulary words among selected fifth-grade students. The first article presented Phase I of the study, whereas this second article presents Phase II. For the present study (i.e., Phase II), the researchers build on Phase I to examine (a) select fifth-grade teachers' perceptions about the effect of cartoon mnemonics and revised definitions on their students' learning and understanding of vocabulary concepts, (b) the extent to which these teacher perceptions are similar to the perceptions of select fifth-grade students obtained in Phase I, (c) the relationship between fifth-grade students' self-reported vocabulary learning strategies and attitudes and their acquisition of second-tier vocabulary words; and (d) the relationship between fifth-grade students' perceptions of the use of cartoon mnemonics and revised definitions and their acquisition of second-tier vocabulary words. Qualitative analyses revealed that teachers' beliefs pertaining to the effects of the 4 vocabulary learning conditions focused on the following themes: (a) student engagement, (b) cognitive support, and (c) prior knowledge. A crossover mixed analysis revealed a statistically significant multivariate relationship between the 3 constructs (i.e., learning/memory strategies, language experiences/word consciousness, word concept analysis/exploration) that pertained to students' beliefs and attitudes about strategy use and learning and students' actual performance on the questioning tasks. The implications of these Phase II findings, alongside the Phase I findings, are discussed.

KEYWORDS
Cartoon mnemonics; crossover mixed analysis; direct vocabulary instruction; mixed methods research; mixed research; revised definitions; Tier-2 vocabulary words

Vocabulary instruction is “one of those educational arenas in which research and best practice are elusive” (Allen, 1999, p. 1). Unfortunately, Allen’s (1999) description of her early attempts at vocabulary instruction, which included having her students look-up words and compose sentences, is representative of much of the vocabulary instruction that occurs in many classrooms (Scott & Nagy, 1997). Scott and Nagy (1997) point out that, for many teachers, using rote memorization of definitions as the primary means of instruction has declined. However, for other teachers, the dictionary more than likely remains their primary tool (McKeown, 1990), and traditional vocabulary instruction still largely depends on definitions as a means for providing word meaning (Scott & Nagy, 1997). Nagy and Scott (2000) deem this practice to be a part of a “reductionist perspective” (p. 574), which is associated with a part-to-whole, bottom-up philosophy of reading and vocabulary instruction, a “picture inconsistent with our current understanding of the reading process” (p. 574). However, many teachers, inundated
and confused by the sometimes contradictory findings in vocabulary research but still recognizing the ineffectiveness of rote memorization, sometimes resort to doing nothing, hoping that whatever vocabulary their students need will be learned incidentally with no additional vocabulary instruction (Allen, 1999). The lack of interest exhibited among many practitioners in the three decades prior to the release of the Report of the National Reading Panel (2000) might be due in large part to this confusion. However, with the release of the Report of the National Reading Panel (2000) more than 15 years ago, vocabulary, due to its connection to reading comprehension, once again became a focus.

Vocabulary acquisition begins with a child’s first verbal interactions with an adult and can have far-reaching consequences for long-term vocabulary growth and reading ability (e.g., Hart & Risley, 1995). These early interactions extend to read-alouds of picture books (e.g., Elley, 1989; Pressley, Disney, & Anderson, 2007), an activity that can support significant gains in vocabulary growth, even with just one reading of the text and no additional adult interaction beyond the initial reading (Sénéchal & Cornell, 1993). Furthermore, although it is dependent on a number of text- and student-related factors (Nagy, Anderson, & Herman, 1987; Nagy, Herman, & Anderson, 1985) and is not entirely efficient (Schatz & Baldwin, 1986), the context of reading can provide a mode of incidental vocabulary acquisition (Swanborn & De Glopper, 1999).

In addition to incidental learning, students’ vocabulary acquisition can be supported through instruction in morphology as well as via direct instruction (i.e., definitions and keyword mnemonics). White, Power, and White (1989) estimate that a child’s ability to derive words utilizing morphemic analysis increases exponentially as they age. Furthermore, although dictionary use (Fischer, 1994) and traditional definitions are problematic (e.g., Miller & Gildea, 1985; Scott & Nagy, 1997), revised definitions provide promise in helping students to gain a clearer understanding of a word’s meaning than is provided with a traditional definition (McKeown, 1993). Keyword mnemonics also have shown great potential in the direct teaching of words (e.g., Atkinson, 1975; Pressley & Dennis-Rounds, 1980) with implications for recall (e.g., Condues, Marshall, & Miller, 1986; Lawson & Hogben, 1998) and comprehension (e.g., Mastropieri, Scruggs, & Fulk, 1990; Pressley, Levin, & Miller, 1981). According to Wysocki and Jenkins (1987), (a) incidental learning, (b) morphological generalization, and (c) direct instruction all play key roles in vocabulary development. The extant literature in the area of vocabulary acquisition reflects the importance of these key components, their potential impact on vocabulary instruction, and the need for “multi-faceted, long-term” (Graves, 2009, p. 2) and systematic vocabulary programs (Berne & Blachowicz, 2008). However, consistent with the literature, the nature of vocabulary acquisition is complex and multifaceted. Along with providing students with rich linguistic experiences to foster incidental vocabulary instruction, research supports the use of strategy instruction such as morphological analysis and direct instruction such as using dictionary definitions and keyword mnemonics (e.g., Atkinson, 1975; Hogben & Lawson, 1994; Lawson & Hogben, 1998; Pressley & Dennis-Rounds, 1980; Pressley, Levin, & Ghatala, 1984; Pressley, Levin, Hall, Miller, & Berry, 1980; Pressley, Levin, Kuiper, Bryant, & Michener, 1982; Pressley et al., 1981; Scruggs & Mastropieri, 2000; Wolfe-muth, Cobb, & Alwell, 2008). Yet, it is clear that more research is needed in this area, especially research studies in which methods of direct vocabulary instruction are compared using rigorous methodological techniques.

Purpose of the Study

As stated in the Phase I article, no previous research studies were identified that address the use of quality cartoon mnemonics as a means of introducing and supporting vocabulary concept attainment. Further, no previous researchers appear to have paired cartoons with mnemonics captions with revised definitions in an attempt to improve students’ initial understanding of words. As such, this two-phase study focused directly compared two methods of direct vocabulary instruction to teach directly select words, namely, revised definitions and cartoon mnemonics. Specifically, the first study phase involved examining student success and perceptions of the following four vocabulary instructional conditions: dictionary definition, revised definition, dictionary definition plus cartoon, and revised definition plus cartoon. We refer the reader to the published article providing the results of Phase I.

The purpose of this second study phase was twofold. First, Phase II involved an examination of teacher perceptions concerning the use of cartoon mnemonics in combination with traditional definitions (e.g., Atkinson, 1975), the use of dictionary definitions (McKeown, 1993; Miller & Gildea, 1987), and the use of revised definitions (McKeown, 1993) alone as tools in vocabulary acquisition. Second, this second study phase examined the relationship between fifth-grade students’ perceptions of the use of cartoon mnemonics and revised definitions and their acquisition of second-tier vocabulary words. Simply put, the researchers sought to determine whether the combination of methods of vocabulary acquisition have an effect on student understanding and attitude
towards learning new vocabulary of fifth-grade students and their teachers. Using Greene, Caracelli, and Graham’s (1989) framework, the purposes for the mixed research design in Phase II were complementarity (i.e., “measure[s] overlapping but also different facets of a phenomenon, yielding an enriched, elaborated understanding of that phenomenon” [p. 258]), development (i.e., utilizing data from one method to inform the other method), triangulation (“seek[ing] convergence, corroboration, correspondence of results from the different methods” [p. 259]), initiation (“seek[ing] the discovery of paradox and contradiction” [p. 259]), and expansion (i.e., “seek[ing] to extend the breadth and range of inquiry by using different methods for different inquiry components” [p. 259]).

Research Questions

Using Plano Clark and Badiee’s (2010) typology, the research questions addressed in Phase II of this mixed methods research study represented combination research questions, which involves at least one mixed methods question combined with separate quantitative and qualitative questions. Specifically, the following research questions were addressed in Phase II of this study:

**Qualitative research question.** The following qualitative research questions were addressed in this study:

*Research Question 3.* What are select fifth-grade teachers’ perceptions about the effect of cartoon mnemonics and revised definitions on their students’ learning and understanding of vocabulary concepts?

*Research Question 4.* To what extent are perceptions of select fifth-grade students regarding the effect of the concurrent use of cartoon mnemonics and revised definitions on their ability to learn vocabulary concepts similar to those of their teachers?

**Mixed methods research question.** The following mixed methods research questions were addressed in this study:

*Research Question 5.* What is the relationship between fifth-grade students’ perceptions of the use of cartoon mnemonics and revised definitions and their acquisition of second-tier vocabulary words?

Method

A fully mixed sequential equal status mixed research design was utilized for Phase II of this study (Leech & Onwuegbuzie, 2009). According to Leech and Onwuegbuzie (2009), a fully mixed sequential equal status mixed research design involves conducting a study that mixes qualitative and quantitative research approaches within one or more of, or across the stages of the mixed methods research process, whereby the quantitative and qualitative phases occur sequentially at one or more stages or across the stages, and the qualitative and quantitative research approaches are given equal weight.

Using a dialectical pluralist lens (cf. Johnson, 2012, 2017) that was described in the Phase I article, Phase II involved a qualitative component followed by a mixed research component. The qualitative component involved examining teacher perceptions of the four vocabulary instructional conditions across cases via teacher interviews, yielding a collective case study design (Stake, 2005). The mixed methods component involved the administration of an open-ended questionnaire (qualitative component) to the fifth-grade students from Study 2 of Phase I to identify students’ perceptions of the usefulness of the intervention to their understanding of words, combined with the extraction of these Study 2 (Phase I) students’ construct scores received in the questioning tasks in each of the four vocabulary instructional interventions—which yielded four vocabulary scores. These two sets of data—namely, the students’ open-ended responses (qualitative data) and previously obtained four vocabulary scores (quantitative data)—subsequently were correlated.

Participants

**Teacher participants.** Two teachers from each campus participated in either Study 1 or Study 2 for a total of eight teachers. All eight teacher participants were female. The teachers were White (n = 6), African American (n = 1), or Egyptian (n = 1). Ages ranged from 22 to 60 years old, and years of teaching experience ranged 1 to 35 years. For seven of the eight participants, the highest degree held was a bachelor’s degree. One teacher participant had a master’s degree. All teachers are referenced using a pseudonym selected by us. Table 1 presents pseudonyms and descriptions of the eight teacher participants.
<table>
<thead>
<tr>
<th>Teacher</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Teaching experience</th>
<th>Highest degree held</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyleigh</td>
<td>60</td>
<td>White</td>
<td>35</td>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Susan</td>
<td>33</td>
<td>White</td>
<td>9</td>
<td>Master’s</td>
</tr>
<tr>
<td>Karin</td>
<td>29</td>
<td>White</td>
<td>3</td>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Kasey</td>
<td>32</td>
<td>White</td>
<td>5</td>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Roxanne</td>
<td>23</td>
<td>White</td>
<td>2</td>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Kyndall</td>
<td>39</td>
<td>African American</td>
<td>11</td>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Selma</td>
<td>22</td>
<td>Egyptian</td>
<td>1</td>
<td>Bachelor’s</td>
</tr>
<tr>
<td>Amanda</td>
<td>24</td>
<td>White</td>
<td>3</td>
<td>Bachelor’s</td>
</tr>
</tbody>
</table>

**Student participants.** As stated previously, the students involved in Phase II were the fifth-grade students obtained from Study 2 of Phase I. A total of 133 students were involved in Phase II. For more information about these students, we refer the reader to Table 2 (i.e., socioeconomic status and limited English proficient [LEP] status) and Table 3 (i.e., gender and ethnicity) of the Phase I article.

**Table 2. Open-Ended Question Response Examples**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Example Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liked it/Didn’t like it</td>
<td>I choose Week 2 because the pictures help me understand what the word means and because it is funny.</td>
</tr>
<tr>
<td></td>
<td>Because Week 4 words and pictures were useful and funny. They made me laugh!</td>
</tr>
<tr>
<td></td>
<td>I picked Week 1 [as the least helpful] because it had nothing funny or a sentence.</td>
</tr>
<tr>
<td></td>
<td>[I picked the one I picked last because] it wasn’t funny at all.</td>
</tr>
<tr>
<td>Humor/entertaining</td>
<td>Cartoon</td>
</tr>
<tr>
<td></td>
<td>Because the pictures were about the words and definition plus I liked it because it helped me and I used my visualization.</td>
</tr>
<tr>
<td></td>
<td>I’ll say the pictures really helped me. I think that because I like looking at picture and draw pictures.</td>
</tr>
<tr>
<td></td>
<td>[I picked the one I picked last because] I did not like it. It was too hard without the pictures. I can’t consutrate.</td>
</tr>
<tr>
<td>Definition</td>
<td>I like that the fact that it came from the dictionary.</td>
</tr>
<tr>
<td></td>
<td>I don’t like regular definition. For explain nothing help.</td>
</tr>
<tr>
<td>Other Attributes</td>
<td>Like, I don’t like to just look at the words. I have to look at the definitions and pictures. I think because words are plain. I need something exciting.</td>
</tr>
<tr>
<td></td>
<td>I don’t like not having the caption. I like the pictures they had and it look weird.</td>
</tr>
<tr>
<td></td>
<td>I like [Week 2] because it had a sentence definition for explain the caption.</td>
</tr>
<tr>
<td>Easier/More difficult</td>
<td>The picture is helpful to infer the word.</td>
</tr>
<tr>
<td>Explanatory Power of the Cartoon</td>
<td>Because the cartoon helps me know the definition. It gives me more example. It makes me understand the word.</td>
</tr>
<tr>
<td></td>
<td>I picked it [as the least helpful] because it didn’t look alive. Like for example beleaguer just has a little bit of definition. The ones with the cartoons come alive.</td>
</tr>
<tr>
<td>Supportive/</td>
<td>Because the teacher definitions were really easy. For example all of the words were like I was reading a pre-k book.</td>
</tr>
<tr>
<td>Not Supportive</td>
<td>It’s harder with just a definition. It sometimes didn’t give enough information with the word. Sometimes it left you hanging ... like I still don’t understand.</td>
</tr>
<tr>
<td>Definition</td>
<td>No pictures dose not help me what is going on. I can not infer wats hapining.</td>
</tr>
</tbody>
</table>
Table 2. Continued.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Example Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Attributes</td>
<td>Some of the definitions were a little complicated to understand. It made me think of weird</td>
</tr>
<tr>
<td></td>
<td>chores and meanings. Things that confuse me is when it uses words that sometimes have more</td>
</tr>
<tr>
<td></td>
<td>than one meaning or words that I don’t know what they mean.</td>
</tr>
<tr>
<td></td>
<td>I think there was not enough in the definition. I couldn’t really understand it so much</td>
</tr>
<tr>
<td></td>
<td>about what it meant. The linking words made more sense with the word and the pictures made</td>
</tr>
<tr>
<td></td>
<td>easier. For example, efface rhymes with erase face.</td>
</tr>
<tr>
<td></td>
<td>I thought the sentences under the cartoons were helpful. I think this because it helps me</td>
</tr>
<tr>
<td></td>
<td>understand the definition more.</td>
</tr>
<tr>
<td></td>
<td>Nothing on the link word [helped]. It makes me think of something other than that.</td>
</tr>
<tr>
<td>Additive Power of Multiple Attributes</td>
<td>I chose week 2 as the best because it had cartoons and the definitions and if I didn’t</td>
</tr>
<tr>
<td></td>
<td>understand either of them the extra sentence helped.</td>
</tr>
<tr>
<td></td>
<td>It made it easy because it had a cartoon and a link word. The cartoon and link word</td>
</tr>
<tr>
<td></td>
<td>teaches meaning the cartoon because it gave me almost the answer.</td>
</tr>
<tr>
<td></td>
<td>The definitions being different from the picture and caption confused me.</td>
</tr>
<tr>
<td></td>
<td>The sentence [was not helpful]. Because aside from the definition and pitcher it doesn’t</td>
</tr>
<tr>
<td></td>
<td>really help</td>
</tr>
</tbody>
</table>

Instruments and Procedures

Teacher data. For the qualitative component, three formal semi-structured 30- to 60-minute interviews were conducted with all eight teachers. The interviews of these teachers were conducted at the convenience of each teacher throughout the duration of the study. The open-ended questions focused on teachers’ vocabulary learning history as both a learner and a teacher in addition to their perceptions about their students’ attitudes and performance within the four instructional conditions of the study and their own attitudes about the instructional conditions.

Student data. For the mixed methods component, the 133 fifth-grade students from Study 2 of Phase I were asked to complete an open-ended questionnaire. The goal of this questionnaire was to determine the students’ perceptions about each of the four vocabulary conditions that they underwent in Phase I. This questionnaire is presented in Appendix A.

Further, data were extracted from Study 2 of Phase I. Specifically, we utilized students’ construct scores received from the questioning task activity in each of the four vocabulary instructional interventions. The questioning task activity, which was based on the questioning task activity created by McKeown (1993), involved a six-word activity packet that was administered each week over the course of the four-week intervention. This packet contained two questions for each word for all 24 second-tier words and eight example words that were designed by the primary researcher. For each questioning task activity, students were required to answer two questions concerning the concept involved with each vocabulary word being introduced by either a traditional definition, a revised definition, a traditional definition plus cartoon mnemonic, or a revised definition plus cartoon mnemonic. Responses were assessed and coded both nominally and ordinally by two of the researchers. For the words and questions used for the questioning task, we refer the reader to Table 5 of the Phase I article. Also, we refer the reader to the Phase I article for a detailed description of the questioning task grading scheme, that was based on McKeown’s (1993) three-category rating system, whereby (a) a score point 2 was awarded to responses that represented a clear understanding of the concept of the most common use of the word received; (b) a score point 1 was awarded to responses that represented a “pseudo-concept” of the word (i.e., the response did not indicate a student’s total understanding of the concept of the word, but demonstrated partial understanding); and (c) a score point 0 was awarded for responses that exhibited no understanding of the concept of the word.

Results

Qualitative Findings

Research Question 3: Perceptions of teachers. Pertaining to the four instructional conditions, teachers’ perceptions focused on either the specific attributes of the cartoon condition (i.e., the illustration, the caption, and
the keyword) or the definition type (i.e., traditional dictionary or revised) or both. Specifically, themes emerging from teacher interviews were (a) student engagement, (b) cognitive support, and (c) prior knowledge. Figure 1 provides a visual depiction of the themes emerging from the teacher interviews. Each of these themes and subthemes is discussed in the following sections.

**Figure 1.** Teacher themes and subthemes. Themes and subthemes were extracted from interviews pertaining to teachers’ perceptions of students’ use of cartoon mnemonics, revised definitions, and traditional dictionary definitions.

- **Student Engagement**
  - Extended time/extended thinking
  - Piqued interest/enjoyment
  - Student connections/ability to relate
  - Bored
  - Frustrated

- **Cognitive Support**
  - Meaning support
  - Retention support

- **Prior Knowledge**
  - Context of cartoon
  - Words knowledge
  - Structure of definition

**Student engagement.** As described by all eight teachers, student engagement was a direct function of the particular attributes of the instructional conditions. The three attributes particular to the cartoon condition were cited when speaking about student engagement, and the two definition types were cited as being the cause of the lack of student engagement. Because the four student groups received the cartoon conditions at different times during the four-week period, the degree of the student reactions reported by the teachers differed, but, overwhelmingly, the two cartoon conditions were perceived to have achieved a much higher degree of student engagement than were the two conditions with the definitions only. Within the student engagement theme, teachers cited the following as being important indicators of student engagement: (a) extended time/extended thinking, (b) piqued interest/enjoyment, and (c) student connections/ability to relate. Teachers stated that students who were disengaged from the activity were most often (a) bored and/or (b) frustrated. Teachers reported that these two negative states were witnessed most often in the two definitions-only conditions.

**Extended time/extended thinking.** Teachers reported that, no matter what the definition type, students who were engaged in the cartoon condition exhibited a willingness to spend more time engaged in studying the
words and extended their thinking time beyond what they did when given only the definitions. Karin, a pseudonym (as are all names in this study), explained that “I guess the main way for me to gauge was the amount of time it took them or how much writing was on their paper ... but, I could tell with the pictures they definitely took longer.” Furthermore, Kyleigh noted:

If there had been a picture, they might have made a little better of an attempt to try to understand. With the pictures, I saw the kids looking, and going back, sometimes asking me something about what I said. It might have been that they were looking at the pictures while I was talking too. Just the fact that I think that I saw more writing going on, and more of an attempt made with the comics provided also with it.

Students’ willingness to engage longer with the cartoons and to extend their thinking also appeared to foster student independence. As Roxanne explained:

You could just tell it was easier for me to walk around and see kids writing. I didn’t have to force them to write. I didn’t have to say, “Look, try your best ... try again.” They were able to be a little more independent with their learning, or with their effort.

Susan noted a difference even between the two cartoon instructional conditions on the time that was spent crafting their response in addition to students’ willingness to extend their time on the activity:

On the day that they had the cartoon, the (revised) definition, they took forever to write. It was like they understood it well enough that they could really write a good sentence about it, and it was taking them ... it took time for them to process ... “okay, this is what it means,” and then to create a sentence after processing the new information, it took a little while. But, on the days whenever it was just the dictionary definition, it didn’t take them any time because most of them probably just wrote ‘I am’ and then whatever the word was ... “I am pliable” ... “I am lithe” ... because they don’t know what else to do with it, so everything is an adjective to a fifth grader if they don’t know it.

Piqued interest/enjoyment. As reported by all eight of the teachers, students exhibited a keen sense of interest and enjoyment for the cartoons, especially those cartoons that appealed to the students’ senses of humor. Kyleigh noted, “I saw a lot of interest in those cartoons, especially the funny ones. That’s another factor, you know, if there is humor involved, of course, they like that, and you certainly have their attention.” According to the teachers, the cartoons that most piqued students’ interest or facilitated their enjoyment were the ones that were the simplest conceptually and were funny and engaged in word play. Kasey explained that

the simpler the picture, you know, or something that stood out the most to the kids, which, I thought they were all good ... But, to see the kids’ reactions to them was really cute. Or if it was like some kind of ... if it was like a play on words ... if it was funny, they would laugh.

Teachers in schools where the cartoon condition was not introduced until the last two weeks of the study also noted that students’ interest increased when they opened their packet and saw the cartoons during the third week. Roxanne reported,

I know that they had the revised definition with the cartoon the third week, and the third week was when they seemed the most positive. I even had some kids saying that it was easier. I could tell that they were writing more for their sentences because it clicked more. There were some who refused to write because they didn’t have any idea when it was just the dictionary definition. At least they thought they understood the word, because they had so much to go off of, compared to just having the definition.

Student connections/ability to relate. Teachers also credited the cartoon for providing them with the resources to make connections between the context of the cartoon and the meaning of the word or between the word and something in the students’ lives. For example, Kyndall explained that the visual sometimes helped to bridge the gap in students’ understanding of the definition and a specific context:

Visuals always help the kids, and I think that, without the visuals, they probably would have had a more difficult time trying to come up with a sentence, you know, but when they saw the picture, and they saw how the picture relates to the word, it made it a lot easier for them to come up with some type of sentence, to create a sentence to go with it. So that helped.

Teachers also reported that cartoons that provided students with a context with which they could relate also were important for students’ understanding. Susan explained:
Quandary, that one was so funny ... I thought that one was really helpful, because it was so funny, that all of the kids, because they have all been in trouble, they remembered that one, that he was having a problem with [explaining to his mother why he was giving kids rides in the dryer].

Whereas cartoons were named most often when teachers spoke of student engagement, the dictionary-only conditions were most cited as the reason that students were not engaged in the vocabulary activities. Boredom and frustration were reasons that the teachers gave for students' disengagement.

**Boredom.** Teachers cited students' boredom as one of the reasons why students were disengaged from one or more of the vocabulary instructional activities. Specifically, teachers cited the two definitions-only conditions as the two conditions where their students were consistently bored. Amanda noted that the boredom also impacted student motivation:

They thought it was really boring. They hated it. They were so bored with just reading when it was just the word and the definition. Towards the end of it, like the last study, the last two had pictures, so at least when I said, "It's time for the vocabulary," they would be like, "Ugh, at least does this one have pictures?" They would want to know ... they got really bored with just the definition, so there was zero motivation.

Roxanne explained that there was a connection between the level of difficulty and lack of humor exhibited within the definitions-only conditions and students' boredom and subsequent lack of motivation:

There were some who refused to write because they didn't have any idea when it was just the dictionary definition. When I was just reading the definitions, they were all just blank-faced, but I [read the protocol] verbatim, and, yeah, but, no, they weren't excited.

**Frustration.** Due to the conceptual difficulty behind the second-tier words utilized for the study, the teachers reported a high level of frustration among the student participants, especially within the two definitions-only instructional conditions. Kasey describes her students' frustration:

They would sigh, and "Ugh! I don't even know what you just said, can you repeat that miss?" They just ... I think it was frustrating to them because they were really trying to listen, but they weren't understanding the definition, so they had no connection to the word. You didn't hear any excitement, you didn't hear anybody talking. You just heard a lot of kids getting frustrated, putting their pencils down right away. Not really double checking.

Roxanne compared her students' reactions to the two definitions-only instructional conditions to their reactions when they were unsuccessful on an assessment:

They were just frustrated. They were upset. I have kids who, if they don't know, they get frustrated. That's like with the test that we were talking about: if you show them their grade, and then you ask them to retake the test, they are going to shut down—"No way am I retaking a test when I just got a forty"—it's the same here. It was ... the next word I didn't know ... the next word I didn't know ... so they just got more and more frustrated to the point where some of them wouldn't write anything down.

The teachers did, however, note that, when students received the cartoon condition (no matter which definition), they exhibited less of the frustration that teachers' witnessed when students received the definitions only. Amanda described her experiences with both conditions:

I was there to see [students'] frustration ... and [when students received the cartoon condition] was when it was the least—when you saw the least amount of hands grabbing their heads, or putting their heads down, or getting mad, or raising their hand. That was definitely the most beneficial. The other ones were just so confusing. Especially the dictionary definition. So confusing.

**Cognitive support.** Cognitive support represented the type and magnitude of the support provided for the understanding of the meaning of the word and for the retention of the word. Again, teachers' comments on the support that was provided for students' learning of the Tier-2 words was specific to the instructional condition. According to the teacher participants, cognitive support came in the form of (a) meaning support and (b) retention support. Teachers referred to both the support and lack of support provided in both the cartoon conditions and the definitions only conditions.

**Meaning support.** The teachers most often named the cartoon condition as providing the most meaning support for their students. Amanda noted that the cumulative effect of all attributes of the cartoon condition supported her students even if the definition was poor:
I think the pictures were great. They really helped them because they gave them another reference. Even if the structure or a word in the definition messed them up, they had something to look at and be like, “Oh, OK,” … It’s pulling pieces together. The captions really helped because then you have the definition, and if they don’t get the definition, they have a picture, and on the picture they have that word used in a sentence, you know? So, it’s just like I said, it’s like puzzle pieces that they can kind of pull together. At least, if they don’t know exactly what it means, they can start to create an idea from those.

Conversely, the definitions-only conditions, no matter which definition was provided, were viewed by the teachers as not providing enough meaning support for their students. Kyndall explained, “When it came to the pictures and the captions, they were okay, but just the definition … it was just hard for them, it was a challenge for them to try to even come up with a word.” However, teachers did state that they saw greater meaning support in the revised definitions than in the dictionary definition when the definition alone was provided. Karin noted that:

... the revised definition I thought really helped, and I don’t think I noticed it as much with the pictures. I didn’t notice that the definition was that much different between … and I guess that maybe I wasn’t as much looking for a difference, but I did notice it when there wasn’t a picture, and it was just the dictionary definition, and the revised definition. I definitely noticed them at least having a little bit of an easier time.

The teachers also stated that the cartoon condition paired with the revised definition provided the most in terms of meaning support for their students. Susan described her experiences during the first week of the study when her students were given the dictionary definitions alone, and another school was given the revised definitions plus the cartoons condition:

They flew right through whatever sentence it was that they jotted down because they had no clue what it meant. It was really funny too because we had our (district) training in October, and … I forgot her name, the really sweet one … she came up to me and she said, “Well, how did the vocabulary experiment go,” and I said, “Oh, it didn’t. They didn’t need anywhere near 3 minutes.” She said, “Really? My kids took the whole 3 minutes.” Then, we were discussing what version of it we had, and hers were taking a really long time because they had the [revised] with the cartoon, and mine just had the big, long, funky definition that didn’t help them at all. And, so it was interesting because it took them a lot less time because they had no clue, so probably every sentence said, “My dog is lithe.”

The dictionary only instructional condition was named as providing the least meaning support for students, even when paired with the cartoon. Roxanne described her perceptions of her students’ experiences with the dictionary definitions:

There were some who refused to write because they didn’t have any idea when it was just the dictionary definition … So, yeah, you could tell from the third week when they had the revised definition and the cartoon to the fourth week when they had the dictionary definition and the cartoon. You could tell that a lot of them were lost with the cartoon. They thought they understood more, but you could tell that their sentences had no … the way they wrote their sentences you could tell that they did not understand the word.

The teachers also noted that, without the additional support of the teacher, students involved in the cartoon condition might have, at times, been distracted by a cartoon that was too complex, diminishing their ability to extract meaning. Kasey explained, “This had a lot going on in the picture, and I don’t think that they … that the word ‘precarious’ … because I feel like I thought they were just too busy trying to study the picture.” Of the same cartoon, Karin also noted, “I think if it was bigger, they would see it. And also I think some of them were more focused on the dinosaur than the bridge that was falling apart.” Selma clarified:

Yeah, although the dialogue here is … I mean it is very clear that it shows what “petulant” might be, but the focus … their focus might be what is going on with the dog here. Yeah, so, if the word was a noun, the more prominent that noun was in the cartoon, the more helpful it is, and if it’s a verb, the more prominent the action is in the cartoon, I think the more helpful it is. The more it’s in the background, the more it’s like they’re focusing on what’s going on in the cartoon rather than the word and the definition.

Retention support. The teachers stated that the strong acoustical connection (i.e., rhyming sound) that some of the link words provided in the caption helped students in remembering the word. Kyndall noted:

I guess because with nursery rhymes you have certain words that rhyme together; so, I think for them, like they could say, like “beleaguer,” they could say “big leaguer”; so, for them, they could associate those two together.
However, the teachers also stated that the link words that delivered the most retention support were those that not only provided a strong acoustical connection but also provided a strong meaning connection to the word. Susan explained, "I thought ‘efface’ was helpful because he was ‘effacing’ his face, he was ‘erasing’ it. ‘Efface’ and ‘erase.’ ‘Erase’ is basically the definition of it, and it rhymes. So, that’s kind of why that one worked.” But, Kasey noted that (on the delayed recall test) “sometimes [the students] remembered just the link, and not actually what it means.” And, Selma voiced her concern that students “either would make a permanent link to that word, like, ‘Oh, I can only be talking about periphery when I’m saying something about a referee.’” Roxanne concurred:

I think the link word needs to have something to do with the definition rather than always being similar to the word because, otherwise, they are just going to take that word … and that’s what they think it means. That is just where my kids are developmentally. I mean, there are probably a few who would be able to understand the difference, but a lot of them are trying to grasp onto anything they can to remember that word.

Prior knowledge. As it pertained to students’ success in the four instructional conditions, teachers perceived that students’ prior knowledge played a crucial role in whether a student was able to extract meaning from the cartoon, caption, or the definition. Specifically, the teachers observed that a student’s prior knowledge was a determining factor in whether he/she was able to extract meaning from the context of the cartoon condition and whether or not he/she was able to understand the individual words within the definitions that were provided.

The context of the cartoon. Teachers pointed out that several of the cartoons contained concepts that students had not yet encountered; therefore, students were unable to understand the connection to the words’ meanings. For example, several of the teachers noted that students were unfamiliar with the term “tennis aces,” which served as the link word for the word “tenacious”; and “cue,” which served as the link word for the “askew.” For example, Susan noted, “I don’t know that they knew what a “tennis ace” was. I don’t think that they got that it’s someone who is really awesome in tennis.” Karin explained:

I think the hardest part about the cartoon was that, sometimes, you could tell that they didn’t get it, and it was like, you wanted to say so badly, ‘This is what the cartoon is. This is why this is funny. Or, this is what is going on.’ Because, sometimes, I think, even with the cartoon, they were just lost.”

Words within the definition. According to the participating teachers, students’ ability to develop a concept of a word’s meaning from a definition was determined by students’ prior knowledge of the words within the definition. Teachers cited the dictionary definitions as having specific words and word combinations that were unfamiliar to young children within the definitions. Susan explained:

Well, the dictionary definition reinforced why I am not a big fan of dictionaries because when you are defining beleaguer with “besiege” you really haven’t accomplished anything … What was the one, “to make less by or as if by cutting off part of.” I don’t even. It’s ridiculous. It didn’t even make any sense at all, and the kids would all kind of look at me like, “Did you mean to say it like that?”

Structure of the definition. Teachers also noted that, even if students understood the individual words within the definition, the dictionary definition’s structure was unfamiliar and perceived to be foreign to young learners. Amanda explained why her students struggle with the dictionary definition:

They didn’t get it because they also didn’t get the definition. The definitions are written in just a very unfamiliar way to them, and they don’t get it when it has a few words, and then a semicolon, and then another word. They just didn’t understand it mainly because they don’t get the layout of a definition … They are not around things like that, and I don’t think they have learned it in any other grade—really been taught to sit down and use a dictionary.

Relationship among themes and subthemes. To explore further teacher endorsement and perceptions pertaining to the themes, a correspondence analysis was conducted on all eight teacher interviews utilizing QDA Miner 4.0 (Provalis Research, 2011). Correspondence analysis is an exploratory multivariate analysis whereby categorical variables are factored and their associations mapped within two or more dimensions and placed within a data display (Onwuegbuzie, Dickinson, Leech, & Zoran, 2010). When correspondence analysis is performed on themes/subthemes or other forms of qualitative data, it serves as a crossover mixed analysis (Onwuegbuzie & Combs, 2010). Teachers were clustered according to frequency of theme and subtheme endorsement. The resulting displays illustrate teacher similarities pertaining to the themes and subthemes.
**Relationship among perception themes.** Figure 2 presents the perception themes for the eight teachers pertaining to the four vocabulary instructional conditions. Based on the position of their names within the display, one can see that Amanda and Karin were most concentrated on their students’ prior knowledge relating to learning vocabulary utilizing the four methods. Kyndall and Selma were more focused on the cognitive support that was either present or lacking within the conditions. Susan’s name appeared almost midway between the prior knowledge and cognitive support themes, indicating that perhaps she perceived that both are constructs requisite to student vocabulary learning. Kyleigh, Roxanne, and Kasey clustered around the theme of engagement, indicating their belief in the importance of student engagement to vocabulary learning pertaining to the four conditions utilized in this study.

![Figure 2. Perception themes for the eight teachers pertaining to the four vocabulary instructional conditions.](image)

**Relationship among perception subthemes.** A second correspondence analysis was conducted to explore the 10 teacher perception subthemes. Figure 3 represents a three-dimensional model of teachers’ perception subthemes as they pertain to the four vocabulary learning conditions. Susan and Kyndall were most alike in their perceptions with their names clustering most closely around the meaning support and word knowledge subthemes; however, both teachers’ names were closest to the meaning support subtheme, indicating their belief that it might have played a more crucial learning role for their students than did the other subthemes. Amanda also endorsed the meaning/support and word knowledge subthemes; however, she also strongly endorsed a third theme—structure of definition. Further, Roxanne also focused on meaning support, but her name appeared in closest proximity to the frustration subtheme, indicating her belief that frustration played an important role in her students’ ability or inability to learn within the four instructional conditions. Kyleigh and Kasey were unique in that they were the only teachers who most strongly align to the piqued interest/enjoyment and connections/relate subthemes, supporting their perception that student engagement was a necessary component to their students’ ability to learn within the four conditions. Kasey’s name also was the only name that was placed in close proximity to the subtheme of retention support. Only two teachers exhibited perceptions central to one subtheme, as evidenced by the placement of their names within the three-dimensional model: Karin perceived that the context of the cartoon was central, and Selma perceived that meaning support was central to students’ ability to learn within the four condition places.
Research Question 4: Similarities between student and teacher perceptions. Pertaining to their perceptions of the four vocabulary instructional conditions, students (as documented in the Phase I article) and teachers (as documented in the current Phase II article) shared two themes: cognitive support and prior knowledge. Although one student mentioned humor within the cartoon conditions and another student mentioned the extended thinking in which she engaged while utilizing the cartoon conditions, no other student touched upon any aspect of engagement. However, both the cognitive support and prior knowledge themes were strongly endorsed by both groups of participants. Figure 4 provides a visual depiction of the similarities between student and teacher perceptions of the four vocabulary instructional conditions.

![Figure 4. Shared themes and subthemes. Two themes were shared between student participant perceptions and teacher participant perceptions of the four vocabulary instructional conditions.](image-url)
Both teachers and students provided evidence of their beliefs that the cartoon conditions delivered more cognitive support in terms of word meaning than did the definitions-only conditions. Student responses supported teacher beliefs about the specific strengths and weaknesses of the content of the cartoons. For example, Theresa’s (i.e., student) response that the cartoon would “show what the word is like, and how the characters are acting” provide verification of Selma’s (i.e., teacher) belief that “the more prominent the action is in the cartoon, I think the more helpful it is.” Student responses concerning the definition types also supported teachers’ beliefs that the revised definition provided more cognitive support to students by providing more information. Furthermore, students’ beliefs that sometimes they were “distracted” (Chandra) by what was going on in the cartoon supported the teacher beliefs that sometimes students were “just too busy trying to study the picture” (Kasey). Although students’ responses generally did not provide a strong understanding of the type of retention support that was provided in the form of the link word, they did recognize that the link word sounded like the vocabulary word that they were studying and that it might have helped them remember. However, the students’ lack of understanding of the meaning in relation to their understanding of the keyword provided support for the teachers’ observation that, sometimes, students just remembered the link word and not the word being studied.

Both students’ and teachers’ comments also supported the finding that a student’s prior knowledge had an impact on his/her understanding of word meanings. Christopher’s (i.e., student) statement explaining the connection between part of the definition (“it says holding fast”) and what was happening in the cartoon (“when he swings very fast”) validated the teachers’ beliefs that sometimes when they looked at a cartoon “they didn’t get it ... they were just lost” (Karin). Both groups also cited the unfamiliar words within the definitions as being problematic. Jennifer’s misinterpretation of the phrase “to make unclear” within the definition for “efface” and Ferdinand’s observation that the best definition was the one with “most of the words we already know” reinforced why teachers are not “a big fan of dictionaries” (Susan). Figure 4 represents shared student/teacher perceptions.

**Mixed Analysis Findings**

**Research Question 5: Open-Ended Questionnaire and Questioning Task Scores Open-ended questionnaire.** For Research Question 5, the researchers sought to understand students’ preferences for and perceptions of the four vocabulary learning instructional conditions. To accomplish this, the researchers first analyzed students’ responses to the open-ended questions that were completed by Study 2 students to address students’ perceptions of the usefulness of the intervention to their understanding of words. The open-ended questionnaire was administered by the primary researcher one month after the final week of the study. Students were given the four vocabulary instructional packets that had been utilized over the four weeks of the study and asked to indicate (a) which instructional intervention they believed had been the most helpful to them, (b) which instructional intervention they believed had been the least helpful to them, (c) why they selected the one they thought was most helpful, (d) why they selected the one that they thought was least helpful, and (e) why they thought the ones that they selected were the most and least helpful. Student-reported “most helpful” and “least helpful” instructional conditions were coded based on the condition selected, and numeric codes were placed into SPSS. Students’ responses concerning their thoughts leading to their “most helpful” and “least helpful” selections were analyzed further via the method of constant comparison (Glaser, 1965).

In selecting the instructional condition that was the “most helpful” to them, students overwhelmingly selected the two conditions that provided additional support through a cartoon, caption, and link word (i.e., the traditional definition plus cartoon instructional condition, 50.4%; and the revised definition plus cartoon instructional condition, 43.6%). The two instructional conditions that students reported to be the least helpful were the two conditions with definitions only (i.e., the traditional definition only instructional condition, 64%; and the revised definition only instructional condition, 54%). The reasons that students gave for selecting the instructional conditions that they believed were most helpful and least helpful were clustered into the following two a posteriori themes: *like it/don’t like it* and *easier/more difficult*. Both of these themes are discussed in the following sections.

**Like it/Don’t like it.** Many students exhibited a strong liking or a strong disliking to particular attributes of the instructional condition, using the words “like” and/or “disliked” when responding to the reasons that they had chosen the most helpful and least helpful weeks of instruction. Students’ reasons for “liking” or “disliking” a particular condition pertained to the presence or the lack of the presence of the cartoon, a caption, definition type, link words, and, by extension, humor. For example, a student revealed that he chose the instructional condition presented to him in Week 2 “because it had a sentence definition to explain the caption,” but that he...
didn’t “like the regular definition ... for the explain(ation) nothing helped.” The support that the cartoon provided appeared to play a key role in supporting students’ ability to visualize the concepts behind the words. Joel wrote that he “like[d] the visualization and looking at the pictures ... I don’t like to just look at the word. I have to look at the definitions and pictures.” Another student wrote that “because the pictures were about the words and definition plus I liked it ... it helped me and I used my visualization.”

Humor also influenced students’ liking or disliking of vocabulary instructional condition. Several students specifically cited humor as one of the reasons that they selected one of the cartoon conditions as the instructional condition that was most useful to them. A student wrote that she “picked Week 2 because it was funny ... they pictures, for example, deduce because the picture was awkward.” The cartoon illustrating the word “deduce” depicts a cow that is in love with a moose because she could not deduce that it was a moose and not a cow. She recognized that the situation depicted in the cartoon was both awkward and funny. She also wrote that she had selected the instructional condition that she listed as the least helpful to her “because (it) had nothing funny or a sentence.”

Easier/More difficult. Again, students’ beliefs that a particular instructional condition was helpful to their understanding or not helpful to their understanding was centered around the amount of support that was provided. Students specifically cited the support that they were provided to make an inference or to provide a context through the cartoons, the definitions, other specific attributes such as the caption and link word, and the additive power of multiple attributes is what determined whether or not an instructional condition was easier or more difficult for them.

The cartoons. The majority (65.4%) of students cited the cartoon for providing extra information and making the word easier for them to understand because it provided visual information that supported their understanding of the concept. As one student wrote, “the pictures were helpful because just by looking at the picture it kind of gave me an idea of what it means without looking at the definition.” Specifically, students wrote about the action and the life depicted in the cartoon. Another student wrote that “it showed that the girl bend over even in the windy weather,” and yet, another student wrote that the reason he chose the instructional condition that he reported as the least helpful was because, “it didn’t look alive ... like, for example, beleaguer just has a little bit of definion (definition). The ones with the cartoons come alive.” However, a small number of students cited the cartoon as sometimes adding to their confusion about the meaning, as exemplified by the following sentence: “Some pictures confused me when the definition was kind of different because some of the pictures was not so specific like the definition.” A student wrote that “One word on Week 4 confused me (unwieldy) (parentheses added by student). I didn’t know what I was supposed to be looking at. I didn’t know if I was supposed to look at the wheel, Colcanno (volcano) or the hill.” However, more often students cited the lack of a cartoon as the reason that they selected the instructional condition that they reported as being the least helpful, indicating that the cartoon somehow helped their mental acuity: “When it did not have pictures, I can’t concentrate,” and “Some things is that the meaning was confused and the picture got my mind (to) work.”

The definitions. The definition also often was cited as being the reason for a particular instructional condition to be easier, with 33% of students mentioning the definition; however, having only the definition provided without a cartoon also was a reason that was often cited for choosing the instructional condition that was the least helpful (36.1%). Specific reasons given for citing the definition as making it easier or more difficult included the clarity of the definition, the explanatory power of the definition, and the simplicity or understandability of the words used within the definition.

Students who cited the definition as being supportive of their understanding did not articulate well their reasoning. Mostly, they stated that the definitions were “really helpful” or that the “clear words” helped them. Students who believed that the definition was not clear often wrote that the definition did not provide them enough information in the definition. A student stated that “there was not enough in the definition.” Another student surmised that the definition was not clear to her because the definitions were “a little complicated to understand,” and another student wrote that “the definitions didn’t make sense.” Several pointed out that, in the dictionary condition, sometimes there were two definitions, making it difficult for them to know which meaning was the correct meaning: “... sometimes it has two definitions; I don’t know which one it is,” a student declared.

Many students believed that the definitions either had good explanatory power or lacked explanatory power. Several students who cited the definition as being the reason that they selected an instructional condition as being the least helpful wrote that “the dictionary definition didn’t explain much” or the teacher definition “didn’t really give you any details.” A student stated that he “picked the last one [as the most helpful] because it only has the definition; it does not have a cartoon or a sentence. It didn’t help me because it doesn’t gives me more information.”
The actual words used in the definition also had an impact on students’ ability to access a word’s meaning through the definition. Students who were impeded by the actual words used within the definition stated that “in some definitions, I did not understand the words that were in it; it was too confusing,” and “some of the words in the definition were difficult to understand.” A student concluded that “some of the meanings have weird responses and words to understand sometimes.”

**Additive power of multiple attributes.** Students also cited the caption as providing a context with which they could place the word and its meaning and with helping them to make inferences about the meaning of the word. Instead of just listing one particular attribute of an instructional condition, a large percentage (48%) cited multiple attributes when asked what had helped them the most, implying that it might have been the additive explanatory power of several attributes that helped them better to understand the meaning. For example, one student stated that “the definition, the pictures, the link and the sentence helped me. They helped me because the picture had to do a lot with the definition and the link with word.” Another student revealed that the “link help me” because it “gives me a clue.” Conversely, when discussing the reasons that they selected the instructional condition that was least helpful, 48% of students stated that only having the definition and no other attribute did not provide enough information for them or did not provide the clues that they needed to access the meaning of the definition. For example, one student admitted that he “picked the last one cause it didn’t give no pictures and it only gave me a cople of sentences for the definition.” Another student stated that having “no pictures, no link or keyword” hurt her understanding because “they more information, the more knolege.” However, although students cited multiple attributes as providing them with help in understanding the words, they were less able to articulate specifically how these attributes contributed to their ability to make meaning.

**Other specific attributes.** A small number of students cited the caption or link as a factor that either contributed to their understanding or to their confusion about the meaning of the word. Specifically, the rhyming link words that had a strong connection to the meaning of the words were helpful; however, those link words that did not have a strong meaning connection to the definition were confusing to them. For example, one student stated that he “chose [the one he selected as most helpful to him] because the linking words made more sentice with the word. For example ‘efface’ rymes with erase face. On wk 4 word 4 fourth to the right rymned with forth-right.” However, the student did not provide his thoughts about why the rhyming word might have helped him. However, another student cited “the linking words” as hurting his or her understanding because “it don’t go with the questions.” Another student revealed that “the link (word) confoused (him) because I tough that the sentence and link were defenitions. I thougt maybe they gave us too much information.” Table 2 presents examples of student responses for the “like it/don’t like it” and “easier/more difficult” themes.

**Relationship between students’ open-ended questionnaire responses and questioning task cores.** The researchers conducted a canonical correlation analysis to examine the multivariate relationship between the two student vocabulary condition preference variables and the four student vocabulary performance variables. The two preference variables (i.e., vocabulary condition most helpful and vocabulary condition least helpful) were treated as the dependent set of variables, whereas the four vocabulary score variables served as the independent multivariate profile. It should be noted that the dependent set of variables originally represented qualitative data (i.e., open-ended responses) that were quantized for each student by binarizing each variable into “1” [if the theme was present for a student] and “0” otherwise—yielding what Onwuegbuzie (2003, p. 396; see also Onwuegbuzie & Teddlie, 2003) referred to as an *inter-respondent matrix* (i.e., student participant [representing the rows] by theme [representing the columns] matrix) that also included a column for each of the four vocabulary score variables. Because the independent set of variables represented quantitative variables and the dependent set of variables originally represented qualitative variables, the canonical correlation analysis represented a crossover mixed analysis (Onwuegbuzie & Combs, 2010). One canonical function was generated because the number of canonical functions that can be created for a dataset is equivalent to the number of variables in the smaller of the two variable sets (Thompson, 1984).

The canonical correlation analysis revealed that the canonical correlation was neither statistically significant ($p = .80$) nor practically significant (Canonical $Rc^2 = .03$), indicating that there was no relationship between students’ perceived preference for vocabulary learning condition and their actual performance, as measured by the questioning task scores. Therefore, no further analysis of the standardized canonical function coefficients and structure coefficients was attempted.
Discussion

Nearly two decades ago, the National Reading Panel (2000) returned vocabulary and its role in reading comprehension to the spotlight of literacy education. As a result, both practitioners and researchers alike became focused on the best means to improve students’ vocabularies within the classroom. Unfortunately, students who come from educationally and economically disadvantaged homes arrive at school with language deficits (e.g., Hart & Risley, 1995)—deficits that are likely to increase over time without intervention (Stanovich, 2004). For more than 20 years, the primary researcher has worked with students who, by the time they arrived in her classroom, were well below grade level in reading and had severe vocabulary deficits. Alongside many of her colleagues, she felt, at times, a tremendous sense of hopelessness about how educators could bridge the gap between where students were and where they needed to be as it pertained to their language development. Vocabulary instruction has been a particularly contentious pedagogical issue. Prior to the release of the Report of the National Reading Panel (2000), language arts teachers had been encouraged to teach only the vocabulary that could be found within the context of the literature that they were reading in class. Unfortunately, teachers really did not know what to do; consequently, many did nothing, hoping that students would acquire whatever vocabulary they could from their readings. Of course, many students did not read regularly outside of the school day and could not make-up their language deficits during their daily 50-minute language arts periods. Therefore, when they exited their classrooms, the gap between their language abilities and the language abilities of students from more socioeconomically disadvantaged backgrounds continued to increase—yielding a form of what Stanovich (2004) referred to as the Matthew Effect.

Fortunately, the findings of the National Reading Panel (2000) seem to have spurred vocabulary researchers to reach across the yawning gulf that at times divides research and practice. Over the 17-year period since the report was released, researchers have produced numerous professional books on vocabulary instruction that appealed to practitioners (see, for e.g., Baumann & Kame’enui, 2004; Farstrup & Samuels, 2008; Graves, 2006, 2009; Hiebert & Kamil, 2005; Schmitt, 2000; Stahl & Nagy, 2006; Wagner, Muse, & Tannenbaum, 2007). These researchers all agreed with the findings of the National Reading Panel (2000) that one method of vocabulary instruction is not optimal. Rather, students should receive both direct and indirect vocabulary instruction as well as repeated exposures within a rich and useful context (e.g., Graves, 2006), and explicitly taught vocabulary words should be high-utility words that can be used within many contexts (i.e., Tier-2 words) (e.g., Beck, McKeown, & Kucan, 2002).

Therefore, the purpose of this two-phase mixed methods research study—with the findings from each phase being presented in separate articles due to space constraints—was to explore two methods of direct instruction to teach individual Tier-2 words: the use of cartoon/keyword mnemonics and revised definitions. As such, this study replicated previous findings pertaining to student success and perceptions concerning the use of cartoon/keyword mnemonics in combination with traditional definitions (e.g., Atkinson, 1975), the use of dictionary definitions alone (McKeown, 1993; Miller & Gildea, 1985), and the use of revised definitions alone (McKeown, 1993) as tools in introducing vocabulary concepts to fifth-grade students. Additionally, this study extended prior research in that it involved an exploration of the use of cartoon/keyword mnemonics in conjunction with revised definitions explicitly to teach individual vocabulary words.

Research Question 3: What are select fifth-grade teachers’ perceptions about the effect of cartoon mnemonics and revised definitions on their students’ learning and understanding of vocabulary concepts? Comparing the findings from Phase II (i.e., teachers’ perceptions) to the findings from Phase I (i.e., students’ perceptions) revealed that teachers’ perceptions were similar to student perceptions in that they also believed that cognitive support and prior knowledge were key components within the vocabulary learning experiment. However, student engagement also was a key component within the teacher paradigm. Within the engagement theme, teachers noted that during the cartoon condition, students extended their time and thinking when writing their responses to the tasks. Teachers also stated that students’ interest and enjoyment was raised, and they proposed that their increased interest and enjoyment augmented their ability to make connections between and among the words, the definitions, and the contexts provided within the cartoon conditions, and that students were even able better to relate their own lives and situations to the contexts provided to them. The quantitative results and findings from the student interviews of Phase I of this study support these beliefs.

However, the teacher participants also strongly voiced a concern for the amount of boredom and frustration that students exhibited, especially within the conditions that supplied only a definition. Although the teachers were clear that vocabulary learning time during the four-week intervention period was not students’ favorite time, no matter which condition, they also vividly described students’ angst when they received their packets.
and saw that they had only received the definitions. Teachers even noted a slight difference in students’ attitudes when they received the two definitions-only conditions. This frustrational element was most strongly evident in School 3, which had received both of the cartoon conditions within the first two weeks and the two definitions-only conditions within their last two weeks. Karin and Kyndall, both teachers from School 3, strongly voiced their concern over their students’ continued frustration and boredom during the last two weeks when the support element that was most enjoyed by the students was suddenly gone. School 2 students also seemed to have experienced similar strong feelings of frustration and boredom during the third week after they had received only definitions for two weeks, she handed her protesting students their packets, and they saw the cartoons.

Although the teachers from School 2 and School 3 were the most vocal about their students’ frustration and boredom during the course of the experiment, it was a theme that was prevalent across all four schools. Teachers described how, over a four-week period, every Friday for 30 minutes, students would receive the vocabulary, and, after the first week when it was new and motivation was high, as a matter of course, students would protest with their moans and groans. The nature of this experiment required that interaction between the teacher and the students had to be limited to what was on the protocol so that no group had an instructional advantage compared to the other groups over and above what was provided on the activity. However, student motivation and engagement are crucial elements in engaging students in any learning task, and frustration and boredom are detrimental to both.

Nevertheless, it is promising that, despite these two negative emotions that emerged as a result of this four-week study, students were still able to gain some understanding of the words even without their teacher’s support. This might be related to the other thematic attributes noted by the teachers: cognitive support and prior knowledge. Teachers voiced their beliefs that students were more actively engaged in the conditions that provided them with more cognitive support in the form of a more friendly definition or a cartoon and caption that provided a familiar context. These beliefs were supported by the quantitative results (Phase I) that it was more likely for students to be successful on a cognitive task such as a sentence-generation task or questioning task if they had received the added support of a revised definition or a cartoon or both. However, the interview data (Phase I and Phase II) extended the quantitative findings (Phase I) in that they provided an explanation as to why that might have been so. As it pertained to the revised definitions, teachers reported that most of them not only provided students with more information but also they presented that information in a format that was more user-friendly for fifth-grade students—a format that was within students’ schemata for both definition structure and for vocabulary knowledge. Definitions that provided a structure that was foreign to students and that provided words that were beyond the expressive or receptive vocabulary of fifth-grade students were the least helpful in providing cognitive support. Therefore, prior knowledge was a crucial component.

The cartoon was most often cited by teachers as providing the most cognitive support, particularly if students were able to connect the context, especially the humor within the cartoon, to their own schemata. Although the enjoyment factor connected to the cartoon is most strongly associated with the engagement theme, it is also connected to cognitive support because humor is not only engaging but can also facilitate critical thinking and foster connections between and among ideas. The humor aspect of the cartoon most often facilitated student understanding when students were able to understand not only that the illustration was funny but also the context of the humor and why it was funny. Karin reported her own frustration at not being able to facilitate students’ understanding of why the cartoon was funny and how that humor connected with not only the context of the cartoon but also the meaning connection and subsequent retention connection.

When the connection between the meaning and the humor was lost, it was almost impossible for students to understand the memory, or retention, connection to the link words (i.e., keywords). Teachers believed that the probability of the link words being an aid in student retention was even less when there was no meaning connection between target word and the link word. Indeed, they most often cited the link words that exhibited an acoustical connection that was closely associated with the meaning (i.e., efface and erase) as providing the most support in retention. Unfortunately, it is a linguistic impossibility for every link word provided to have a meaning connection to the target word as well as an acoustical connection. That is why, beyond this study, when using mnemonics with children who do not have a vast array of prior experiences with which to draw in order in order make connections, teachers of intermediate-age children must build students’ schema and provide strong support for both the concepts within the mnemonic and help students to use all accompanying attributes to make meaning.

Research Question 4: To what extent are perceptions of select fifth-grade students regarding the concurrent use of cartoon mnemonics and revised definitions to learn vocabulary concepts similar to their teachers? Themes that were prevalent across the student/teacher divide included cognitive support and prior knowledge.
Both teachers and students were aware of the cognitive support and/or lack of cognitive support within each condition, and both were either aware or exhibited the importance of prior knowledge. Teachers, of course, had a greater understanding of, and ability to articulate, the limitations or positive attributes of the four conditions as they pertained to their students’ understanding and/or abilities. The primary researcher simply asked teachers what they noticed about the four conditions and their students’ reactions over the course of the four weeks. However, although students could tell her what they liked and did not like, they were less metacognitively aware when it came to telling her why a particular definition did not work for them or why a cartoon did not help them understand the meaning. Although the primary researcher was able to interview each teacher three times over the course of the study, she only was able to interview the students one time. Because she wanted to know what helped them and what did not help them, she focused on each of the conditions, showing them the four instructional sheets for several of the words. As her conversations with them illustrated, they could give her broad reasons why a definition did not work or point to the instructional condition that they thought was more helpful to them, but they were less able to provide her with specific reasons why it worked or did not work.

Although one student stated that the cartoons were funny and another student stated that a particular instructional condition made her think harder, the engagement theme was not prevalent within the student interviews. The interview format that the primary researcher utilized and the relatively short duration of the interview might have contributed to this omission. However, the strong endorsement rate among the teachers as well as the responses from the students’ open-ended questions support that engagement can be a crucial motivating factor when teaching vocabulary to fifth-grade students.

Research Question 5: What is the relationship between fifth-grade students’ perceptions of the use of cartoon mnemonics and revised definitions and their acquisition of second-tier vocabulary words? Students’ perceptions about their preferences concerning the vocabulary instructional learning conditions within the study were explored utilizing an open-ended questionnaire. Students were asked about their preferred instructional condition, their least preferred instructional condition, and their reasoning and thinking behind their selections. Students split between the two cartoon conditions for the instructional condition that they liked the most (i.e., traditional definition plus a cartoon, 50.4%, and revised definition plus a cartoon, 43.6%) and between the two definitions conditions for the instructional condition that they liked the least (i.e., traditional definition only, 64%, and revised definition only, 44%). That the slight majority selected the traditional definition in the cartoon condition as the one they liked the most and the dictionary definition-only condition as the one that they liked the least, suggests that it is unlikely that they were aware of the subtleties between the conditions within the two dictionary-only conditions and the cartoon conditions. It was easy for them to see the absence or presence of a cartoon, but it is quite possible that their metalinguistic abilities did not extend to their ability to make an informed choice between the closely related conditions. Although McKeown (1993) reported that the students in her study were able to articulate orally the differences between the dictionary definition and the revised definition and what was missing within the dictionary definitions during a teacher-led discussion, the students in the current study were asked to do so in writing. Given that they were fifth-grade students and were asked to answer the questions with very little discussion and support, it is not surprising that their reasons could be narrowed into the two categories of “like it/don’t like it” and “easier/more difficult.” Metacognitive skills, which are crucial in helping a learner to understand what really helps them as a learner, are present at the fifth-grade level, but according to Veenman, Van Hout-Wolters, and Afflerbach (2006), the ability to evaluate is a metacognitive skill that might develop at a later age. Therefore, asking them to evaluate the four instructional methods might have been beyond some of their independent metacognitive abilities and might have required more scaffolding than was possible in the current study.

Specific reasons pertaining to their liking or disliking were (a) the presence or lack of a cartoon, (b) a caption, (c) a link word, and (d) humor. Students also liked or disliked an instructional condition based on the type of definition that was provided. Attributes that they believed made it easier or more difficult were (a) the presence or absence of a cartoon and (b) the presence of the other attributes that were included within the cartoon condition. Also students believed that the more information that they received, the better it helped them to understand, especially if they were provided with a cartoon, a caption, a definition and a link word that not only provided an acoustical connection but also displayed a clear link to the meaning of the word. Although few students’ comments were rich with data, the information that they did provide served to confirm the beliefs and perceptions of the 12 student interview participants and the eight teachers. Finally, given the quantitative results, which, due to the interaction effects among the instructional conditions, appear to support all three instructional conditions that provide additional support beyond the dictionary definition (Phase I), it is not surprising that no multivariate relationship was revealed between students’ instructional preferences and their performance within the four instructional conditions.
Educational Implications Stemming from Phase I and Phase II of the Study

Graves (2006) suggests a four-part vocabulary system that involves (a) providing students with many language experiences such as reading, writing, listening, and speaking; (b) fostering word consciousness by finding ways to increase students’ interest in words; (c) teaching word-learning strategies such as morphological analysis; (d) and teaching individual words. Given the enormous number of words within the English language, no one method is effective enough to accomplish the task of teaching them all. However, the combined findings stemming from Phase I and Phase II of this mixed methods research study provide evidence that utilizing revised definitions, in conjunction with cartoons, captions, and keywords, would be a good place to begin.

Both conditions in which a cartoon, caption, and keyword were supplied produced promising results for conceptual understanding in both Study 1 (Sentence Generation Task; \( n = 87 \)) and Study 2 (Questioning Task; \( n = 133 \)), but the impact of the revised definitions was even greater. Students who were provided with a revised definition were more likely to exhibit understanding of a word and more likely to be able to recall the definition and to match it to a sentence. Although it is time-consuming to create the revised definitions (McKeown, 1993), providing students with child-friendly definitions for specific words would be beneficial, particularly Tier-2 words that have been carefully selected by teachers for their high utility across domains (Beck, McKeown, & Kucan, 2008).

Although revised definitions are a potent vocabulary-learning tool, the Phase I and Phase II findings suggest that using revised definitions in conjunction with cartoons, captions, and a keyword likely would provide an even more powerful tool, especially when coupled with a teacher’s assistance. Indeed, mnemonics is the only method of direct vocabulary instruction included in The Report of the National Reading Panel (2000) and has a more than 40-year body of research to support its use. Participating teachers in the current study were unable to help students beyond what was allowed on the protocol, and they voiced their frustration at not being able to help their students to understand the humor in the cartoon and caption, its connection with the meaning cue (i.e., keyword), and its connection with the meaning of the word. Thus, teachers’ scaffolding of students’ knowledge and use of this initiating strategy could provide an even greater impact on students’ ability to learn and to retain the words.

In most of the studies where experimenters or teachers created the materials used for the treatment, time was a significant factor (Mastropieri, Sweda, & Scruggs, 2000). In the studies where students were trained in the strategy and subsequently created keywords and drawings as part of strategy transfer training, time also was a factor. The researchers indicated that although determining the keyword for most vocabulary words was not a time factor, and published guidelines for creation of mnemonic strategies are available (Mastropieri & Scruggs, 1991), creating the interactive picture is extremely time-consuming for the teacher and the student (Mastropieri et al., 2000).

Although it did not directly pertain to the research questions, we asked teachers if they had ever used mnemonics to teach vocabulary in their classrooms. Two teachers stated that they had helped their students to create mnemonic devices to remember; however, no one had ever taught students new vocabulary words using a cartoon, a caption, or a keyword. Teachers either stated that they were not familiar with the strategy at all or that they were familiar but had not been provided any training in its use. Additionally, every teacher stated that a shortage of time would be a barrier in using cartoon mnemonics to teach words within their classrooms because it would be too time-consuming to create the materials that they would need to create.

One possible solution to the problem is commercial creation of mnemonic materials. Although several companies have marketed mnemonic strategies for teaching vocabulary to prepare for the Scholastic Aptitude Test (SAT; e.g., Burchers, Burchers, & Burchers, 1997), commercial materials are not widely available. These commercially marketed materials seem to be helpful in teaching SAT vocabulary to high school students (Benge & Robbins, 2009); however, they have not been involved in either extensive laboratory or classroom research.

The results of research conducted thus far on the keyword method and the findings of this study provide remarkable promise; however, teachers must use good judgment as to its potential adaptations to the classroom. Rarely does the instruction provided in the classroom call for one-on-one teaching in a sterile, clinical setting, and rarely does it call for instruction where the instructional treatments are limited to one or two students. Instruction in real classrooms requires that students be taught in several ways—whole class, small group, one-on-one, and the like. Furthermore, although the keyword method repeatedly has been shown to be superior to other forms of direct instruction in the clinical experimentation undertaken in the literature (e.g., Atkinson, 1975; Scruggs & Mastropieri, 2000), teachers have not embraced its use (Benge & Robbins, 2009; Levin, 1993).
Conclusion

In keeping with the multidimensional role that vocabulary plays within reading, vocabulary experts recommend that teachers provide vocabulary instruction that is multifaceted—instruction that includes teaching students words individually, teaching word-learning strategies, fostering word consciousness, and providing students with numerous language experiences (Graves, 2006). Further, Beck et al. (2002) recommend that when teaching individual words, teachers take a strategic approach, one in which teachers select words that have high utility within the language. These high utility words (i.e., Tier 2 words) are the type of words that a linguistically mature adult would use—words that are not domain specific and can be utilized across domains.

As suggested within Graves’s (2006) four-part vocabulary program, direct instruction must be a part of any vocabulary instruction (Mastropieri, Scruggs, & Levin, 1985). Vocabulary learning is, however, incremental. Therefore, findings from Phase I and Phase II of this mixed methods research study indicate that vocabulary instruction utilizing cartoon/keyword mnemonics in a regular classroom, in addition to providing revised, child-friendly definitions, would require not only the initial learning of the words using the keyword and interactive picture but also practice, follow-up, and reinforcement.

References


Appendix A

First Name: _______________  Last Name: ___________________

Answer the two questions below. Please provide as much detail about your thinking as you can.

1. Look at the four different ways that you learned the vocabulary words.

   Put the four ways in order. The one you pick for 1 will be the one you thought was the MOST helpful in helping you to understand the words. The one you pick for 4 will be the one you thought was the LEAST helpful in helping you to understand the words.

   ____ Week 1
   ____ Week 2
   ____ Week 3
   ____ Week 4

   Why did you pick the one you picked for first?

   Why did pick the one you picked last?
2. Look at the four different ways that you learned the vocabulary words. Think really hard.

What information that was given to you to help you learn the meaning was really helpful to you in your understanding of the words?

Why do you think this?

What are some ways that the information hurt your understanding the words? For example, what are some things that might have just confused you?

What makes you think this?