

**UNVEILING WORDS WITHIN A PICTURE:
CONNECTING VISUALS WITH WORDS IN
EXPOSITORY TEXT ACROSS THE CURRICULUM**

by

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CERTIFICATION OF THESIS/PROJECT CAPSTONE WORK

We, the undersigned, certify that this project entitled UNVEILING WORDS WITHIN A PICTURE: CONNECTING VISUALS WITH WORDS IN EXPOSITORY TEXT ACROSS THE CURRICULUM by LEA M. WELLS, Candidate for the Degree of Master of Science in Education, Literacy Birth to Grade 12, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.


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Abstract

The Common Core State Standards (CCSS) for New York State include a set of standards for Reading Informational texts (RI). RI Standard #7 details the requirements for students from preKindergarten to grade 6 related to the reading of expository texts and their visuals. Moving from requiring an understanding of the relationship of pictures to words to the contribution of pictures to a topic requires some visual literacy skills. This capstone project has explored the question of the role of visual literacy when reading pictures in an expository text, and how educators might tap into this role to assist struggling readers. The most appropriate way to answer this question was with a research synthesis. The exhaustive literature review and subsequent synthesis for this study produced three findings. The first is that the role of visual literacy and the reading of graphics changes as grade levels increase, from connecting to a reader's interest and attention in the preKindergarten to grade 1 levels, to inspiring mental imagery or drawing that increases topic comprehension by the grade 10 level, to providing accurate and detailed information in addition to that provided by the words at the collegiate level. The second finding is that students at all grade ranges appear to benefit from direct instruction on reading comprehension strategies that specifically address reading the visuals in an expository text, and the third finding is that direct instruction and implementation of research based reading strategies increase students' comprehension of expository text structure including visuals.

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Chapter 1: Introduction

Statement of Problem

The Common Core State Standards (CCSS) for New York State require students at various grade levels to reach mastery level for integrating of knowledge and ideas, which includes knowledge and information presented in various formats including illustrations and visuals. The CCSS English Language Arts have a set of standards for Reading Informational texts (RI). RI Standard #7 for Kindergarten requires students to, “with prompting and support, describe the relationship between illustrations and the text in which they appear” (Common, 2012, RI. K7). By the time a student reaches grade 6, the student is expected to be able to “integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue” (Common, 2012, RI. Gr6). Moving from an understanding of the relationship of pictures to words to the contribution of pictures to a topic requires some visual literacy skills. However, ability to understand and teach visual literacy skills may be unfamiliar to elementary teachers who have been taught to focus only on the words of a text as a source of information. The topic of visual literacy is one that most teachers would benefit from knowing more about. This leads to the question, what is the role of visual literacy knowledge when reading pictures in an expository text, and how can educators tap into this role to assist struggling readers?

Background

I am interested in the topic of visual literacy because I would like to further explore children’s

ability to decode and construct knowledge from various forms of visually based media (such as pictures). The topic is of personal interest to me as a mother because I have noticed that my children tend to rely on and use the visuals (especially the pictures) in an expository text to find the text meaning rather than rely on the written words; more specifically my eight-year-old son prefers to rely on and use the visuals (especially the pictures) in an expository text to find the text meaning rather than rely on the written words. For example, I observed my son building a Lego Avengers aircraft; my son chose to rely solely on the pictorial representations of the steps to be completed to build the product. He did not read the words, just the pictures. My son used the provided illustrated instructions and went page by page through the instruction sheets to build upon previous structures -- using and reading only the provided pictures. He chose not to read the word-based instructions and instead used visual aids from the instructions to assist him when he was unsure what to do next. From other observations and experiences in my life, I feel that many people use a similar approach to reading expository texts; they look to the visuals of a text as a source of information, not explicitly to the words.

Terminology

For the purpose of this research study, terms are defined below to provide the reader with a better understanding of the topic. The first key term is “visual literacy” defined as “the reaction to images as part of a plethora of other written, spoken, and electronic texts, while we work study or play” (Callow, 2005, p. 6). This definition was selected for use because this definition best fits the research question as it pertains to various aspects of “visual literacy”. The above definition of visual literacy focuses on the visuals as “part of” a larger text. This definition implies that visuals

in a text work along with the words of text to carry the content for the text as a whole. This definition is also appropriate for this proposal because it talks about the “reaction” to images, and for this proposal, that reaction is the “meaning” that a reader gets from the visual.

The second key term is “graphic” which is a term used to describe “a two-dimensional object with a visuo-spatial structure that represents some content based on structural commonalities between the representing graphic and the represented content” (Schnotz & Baadte, 2014, p. 606). This definition emphasizes the content that a “graphic” contains and explains that the content of a graphic shares commonalities with the content of the larger text it represents or is a part of. Therefore, these two definitions together help explain the topic for this proposed research: obtaining and understanding the content meaning from a visual which is part of a larger content (expository) text.

Theoretical Framework

The theory that supports this proposed question of understanding the content in a visual form is literacy as a social practice. Gee (1991) explains that literacy is tied to a Discourse, a social grouping. This means that a content area, including a school subject area like history or chemistry, is a “social grouping” which shares the same understanding of content knowledge and how visuals and graphics within subject area texts share commonalities with the content area and therefore contain a content area meaning understood by members of the Discourse. This theory then relates to the practice of reading because learning and finding the content area meaning in visuals in an expository text becomes the job of a reader.

Rationale

When addressing the proposed research question of the role of visual literacy knowledge in reading pictures in an expository text, this proposed research will help close any educational gap which may occur when students are trying to decipher pictures within an informational text. Per the Common Core State Standards (CCSS) (2012) for New York State, by the time a student reaches grade 6, the student is expected to be able to “integrate information presented in various formats including visuals” (Common, 2012, RI. Gr6). Therefore, students will require some visual literacy skills in order to move their understanding of the relationship of pictures to words to an understanding of the contribution of visuals to a content topic. Teaching visual literacy and increasing students’ understanding of visuals becomes a problem for elementary teachers whose visual literacy knowledge may be lacking or who may have been taught to focus only on the words of a text as a source of information. Therefore, this proposed research into the role of visual literacy knowledge when reading pictures in an expository text will provide elementary educators with knowledge and increased capability to assist readers and struggling readers as they develop into proficient readers of expository texts.

Chapter 2: Literature Review

The most appropriate way to address the question of the role of visual literacy knowledge when reading pictures in an expository text is to conduct a literature review. After searching academic databases, such as *OneSearch*, *ERIC* and *Academic Search Complete*, 12 research articles were found that have the greatest relevance to the research question. These 12 studies are sequenced below based on age or academic grade of the participants involved in the research studies.

With Students in Prekindergarten to Grade Two

In studies with elementary children, Bortnem (2008) examined the amount of time educators read aloud to students in grades Prekindergarten through grade 2. The research data were collected via surveys provided to educators regarding the amount of time they spend reading aloud to students and the type of reading (fiction or nonfiction) used during read alouds. The 101 participants which replied to the survey included preschool, kindergarten, first grade and second grade teachers from the northeast portion of a Midwestern state. Believing that discussion of the various parts of a nonfiction text, including a discussion of pictures by “drawing attention” (p.30) to the “information in the illustrations” (p.30), allows for deeper understanding and the acquisition of additional knowledge of the content of a nonfiction text, Bortnem designed a survey that asked teachers how many minutes per day they read nonfiction texts to their students, and whether they then discussed parts of the text with their students. Data from the survey showed a “large difference” (p.39) in the amount of time Prekindergarten through grade 2 educators read expository (nonfiction) text to their students in comparison with fiction text: that is, “nonfiction

literature is not being read aloud as frequently as fiction literature in early childhood classrooms” (p.38) The researchers suggested several reasons why non-fiction was not read as frequently. One key reason they offer is that “fiction seems to capture children’s interest because they enjoy the story while nonfiction needs some interesting ‘ploys’ to first get and then keep the children’s interest” (p.39). The researchers further suggest that these “ploys” could include “concrete materials and examples” (p.39) including pictures to “capture and hold” (p.39) student interest.

Focused only on first grade students, Mohr (2003) researched grade 1 students’ preference for expository texts when making book selections. The study participants were students in a semi-rural, economically diverse school district in the southeast portion of the United States. The 190 participants were from ten classes located within the same school district and had a mean age of 7.7 years. Of the 190 participants, 104 students were male and 86 females. The students were tasked with selecting from nine high quality expository texts: “The criteria governing the selection of books included: published within the last year; high quality illustrations; content appropriate for first-graders; similar in quality and price; and representative of different genres, genders, ethnicities and languages (Spanish and English)” (p.74). Each student was asked to choose one book (out of the nine books provided) that they would like to own. The students were given as much time as they needed to make the selection. In addition to the larger study, a subset was conducted in two of the ten first-grade classrooms with a total of 41 students. These students were selected by the school principal to hear the books read aloud in their class during their regular reading time. The researcher read three different books per day for three days. Following the three days of read-alouds, the book selection process was conducted with the two classes. Book preference for both boys and girls was for nonfiction books. Of the 104 boys participating, 100 selected nonfiction and 59 of the 86 girls also selected a nonfiction title. Of the 190 students, 122

students consented to being interviewed about their book selection. The researcher took note of the student's selection and asked each student, "What kind of book is this?" (p.77). When "most students had difficulty with this question" (p.77), the researchers determined that maybe the students "were not accustomed to classifying books with genre terms, such as fiction, nonfiction, narrative, story, information, or expository" (p.77). When unable to give a response, the student was prompted with, "is this book a story book or an information book?" This question helped the students respond. For their book selection, "an overwhelming number of these first-grade students selected nonfiction, expository text, rather than fictional narratives" (p.76). According to Mohr's results, both male and female participants preferred nonfiction books when able to select their own book. Another "perhaps surprising finding" was that book selection was "based more on content [topic] than on illustrations" (p.79) in a book. This study focused on criteria for preference used by students when making a book selection. Results show that illustrations and pictures play a smaller role in book selection than does the topic of the book.

Also focused on first grade students, Santoro, Chard, Howard, and Baker (2008) researched the decoding skills needed to become independent readers in first grade. Participating in the study were 24 first grade students in the Kennedy elementary school district (from an undisclosed location within the United States). The study evolved when first grade teachers became "frustrated because their comprehensive reading program" became "time consuming" (p.396) and left "little opportunity" (p.396) to address important content areas such as science and social studies, or to teach students how to "think about the ideas they read" (p.396). These educators wanted to find ways to "use expository text read alouds" (p.396) in a manner which made the most of the instructional time. The research project included teachers reading aloud from expository texts from across the curriculum and helping students make "text-to-life connections"

(p.400) throughout each lesson. Along with the words within a text, the pictures provided a means for the students to make connections and increase comprehension. Each lesson included time to “pause and discuss content” and how the content connected to “real life stories and scenarios” (p.405). The teachers used “explicit comprehension instruction and active, engaging discussions about text” (p.407). Results show that such read-alouds with expository texts can “promote comprehension and vocabulary even as students are learning to read” (p.407). Providing young children with the opportunity and ability to relate to content of expository texts, including the content of pictures, provides them with necessary skills to increase comprehension by building on existing knowledge and connecting to real life (text-to-life) experiences. Incorporating the use of intentional focus on textual content, both words and pictures, provides children with the ability to expand vocabulary and comprehension. Therefore, pictures can be seen as part of the comprehension process.

Working with grade 2 students, Norman (2011) researched the reading processes prompted by pictures within informational text. Norman examined students’ thought processes when faced with “graphics in informational texts” (p.741) as well as “comprehension of informational texts” (p.741). Participants were 30 (17 males, 13 females) second grade students in two northeastern states in the United States; the specific location was not identified. Norman collected data as the students read two different informational texts. For both texts, the students were prompted to “share their thoughts” (p.748) when a picture or graphic was presented within the text, to “retell” (p.749) the content of the text in their own words, and to answer eight comprehension questions about each text. Norman analyzed the qualitative data of the students’ answers and found that the use of “certain” processes when reading graphics in informational text are “associated with a better overall understanding of that same text” (p.768). The use of “*labeling*” a graphic was

associated with higher retelling scores but not with higher comprehension question scores”

(p.765). Labeling of the graphic entailed the use of words to provide further detail to the picture.

In comparison, some processes were associated with lower comprehension scores, for example,

students’ use of “word identification” (p.765) while reading one text is “negatively correlated with

their retelling scores for that book” (p.765). Norman’s research findings suggest that the use of

specific processes is “associated with better comprehension” (p.768). Intentional instruction to

teach students how to “strategically use these processes” (p.768) and how to adequately

“comprehend graphics” (p. 768) are to increase comprehension. Providing students with strategies

which target comprehension of various aspects of a text would most likely increase

comprehension and provide students with the ability to decipher all components of a text,

including pictures, on a more efficient level.

Also working with grade 2 students, Williams, Hall, Lauer, Stafford, DeSisto and deCani (2005) investigated the effectiveness of an instructional program designed to teach 2nd graders how to comprehend expository text. The study “addressed the issue” (p.546) of what can be done to help young children so that when they get to fourth grade they will have “the knowledge, skills, and strategies to deal with expository text” (p.546). The participants of the study were 128 second grade students from three elementary schools in a large metropolitan area. Ten second grade teachers also volunteered to participate in the study. The teacher participants were randomly assigned to one of three “conditions” in this experimental research: a group to be taught text structure, another taught content only, and a third group with no direct instruction on expository text. The teachers in both instructional control groups used a comprehensive animal encyclopedia, trade books, and compare-contrast paragraph when providing instruction. The text structure group focused on vocabulary development through reading and discussion, graphic organizers, and were

also taught to locate clue words. The content group received the same books, but the emphasis was placed on the content of the material. After the teacher provided a brief introduction of content, the students listened to a read aloud of the text, then the students organized the content using an information web graphic organizer which required the students to extract words directly from the text. Next, the students were presented with a list of “vocabulary concepts” (p.542) which required the students to generate sentences using the vocabulary words. Data were collected using a pretest and posttest to assess knowledge growth. The pretest and the posttest given were the Word Identification and Passage Comprehension subtests of the Woodcock Reading Mastery Test, Form H (Woodcock, 1998) and the Listening Comprehension subtest of the Wechsler Individual Achievement Test (Wechsler, 1992). According to data collected, the greatest increase in knowledge retention was seen in the text structure group where students not only learned what they were taught but also “demonstrate transfer” (p.546) of what they had learned to “content beyond that used in instruction” (p.546). The study investigated the effectiveness of an instructional program that teaches how to read expository texts and results indicate that comprehension of expository text is increased when receiving direct instruction on expository text structure and its various aspects including graphics and pictures.

With Students in Grade Four through Grade Six

Also working with grade 2 students but including grade 4 and middle school (grades 6-8) students, McTigue and Flowers (2011) explored students’ perceptions and interpretations of science diagrams. Participants included 30 students: 10 students from each grade level (grade 2, grade 4, grades 6 to 8 combined in a rural, working class school district in the southwestern United

States. The study began with student interviews which included a sorting task where the students were to sort diagrams of the water cycle which ranged in complexity and included diagrams from participants' grade level science texts. During the sorting activity, the students were asked to sort a set of diagrams into four categories: very useful, useful, less useful or not useful for learning about the water cycle. The students then arranged the diagrams based on difficulty, attractiveness, and use. All students were asked to explain their sorting of the diagrams and asked follow up questions, by their teacher, about their sorting choices. An additional follow up interview was conducted with two students from each grade level (total of 10 students). The study findings show that three major themes were highlighted when students talked about their sorting; amount of information, overall organization, and use of conventions. Students identified the diagrams based on amount of information such as "details" (p. 582) that would help "learn the water cycle" (p. 562). The "quantity of text and complexity of the design were equated with information" (p. 582) which allowed for better understanding of the diagram. The use of conventions in each diagram was "frequently" (p. 584) considered as being "the most helpful" (p. 584). The convention features, such as; *labels*, *text boxes*, *arrows* and *captions* were considered "most helpful" when comprehending the diagrams. The subset of 10 students (two from each grade), noted that "less clutter" (p. 582) in a picture was an asset when reading diagrams. The findings indicate that "specific conventions and abstractions of diagrams are often misinterpreted by young readers" (p. 585). McTigue and Flowers concluded that science related diagrams provide useful information when students are guided and learn how to properly read, interpret and use diagrammatical information within a text.

Working with fourth grade students, Kucer (2010) examined the nature of "comprehended meanings" (p.62) that do not match those of the author and its impact on overall comprehension of

a text. Participants were 34 fourth grade students from three different classrooms within a middle-class elementary school district in the Pacific Northwest. Of the participants, 19 students were female and 15 were male. The texts used in the study were selected by the teacher, each participant read the narrative, *Who Stole the Wizard of Oz?* and the expository text, *Lands of Rock*. Each page of the expository text included at least one color photograph related to the topic being discussed on that page. The participants were given one of the two text and asked to read the texts aloud as naturally as possible and to engage in whatever “processing behaviours” (p.64) they know. Examples of processing behaviors include rereading, sounding out or skipping words. After reading a text, the participants were then asked to retell the story. The researcher followed the retelling with “probing” (p.64) questions based on the retelling. The researcher also asked additional questions to elaborate given answers as well as clarify, but not introduce new information. The researcher used miscue analysis as the primary method of measuring comprehension. The findings of the study indicated that all readers had “great facility” (p.66) in processing the texts. The researcher found “no significant differences” (p.67) between the two groups for maintaining the “author’s meaning” (p.67) and ability to comprehend the information within each text. Another finding was that readers of expository texts were “significantly” (p.67) more likely to “substitute information” (p.67) than were readers of narrative texts. The researcher assumed that a reader could “extract” (p.68) additional information from the pictures contained within the text to add information that was not directly stated in words. Readers go beyond the “information given” (p.68) in words and use pictures, when supplied, to aide comprehension. Results indicated a “significant difference” (p.67) between a reader’s ability to supply additional information to an expository compared to a narrative text. Kucer concluded that this may be due to the expository text “containing pictures” (p.68) which “coincide with the information” (p.68)

being given in the words.

Also focusing on fourth grade readers, Belfatti (2015) researched and studied participants as they read and discussed science information (expository) books. The study focused on seven students, identified as struggling readers by their classroom teacher. The geographical location of the study is not identified. These seven students read and discussed earth science and life science information books during 25 meetings over one school year. During the meetings, the students initiated discussions on textual and conceptual questions about the provided text. In many meetings, the students stated that the words were “more helpful” (p.273) to them for “clarifying meaning” (p.273) of images, and at other times, they judged the images more helpful to them for clarifying meaning of words, also at times the text and images worked together to “clarify meaning” (p.273) within a text. The researcher found that these fourth-grade readers tended to question the “trustworthiness” (p.275) of informational text, often questioning textual accuracy when compared to corresponding images. The findings suggest that students are “capable” (p.275) of more complex “textual and conceptual” (p.275) understanding of informational text. Belfatti suggests using “research based strategies” (p.275) to assist students with dissection and comprehension of informational text through “diversified interactions” (p.275) with informational texts. Students would have opportunities to build “multiple pathways” (p.275) to understanding a text and at the same time, educators will get a better sense of student comprehension and ability in relation to expository text. Allowing and encouraging students to “explore and question” (p.275) informational text as a means of “heightening” (p.275) comprehension of textual information provides students, both struggling and proficient readers, with an opportunity to explore literacy in a “different and intriguing” way which will increase interest and knowledge retention, as well as reading ability.

Also working with fourth grade students, but including fifth, and sixth grade students, Paquette and Fello (2010) researched the use of the “Open-Mind Portrait” strategy used to enhance student comprehension of expository text and the effect on writing ability. The location of the study was not provided but the participants were 105 students using samples of the Open-Mind Portrait strategy. The use of this strategy is typically implemented with narrative text to “assist” (p.234) readers with story comprehension and character development. However, Paquette wanted to use the strategy with expository text. Using the Open Mind Portrait strategy, students draw pictures, symbols, and captions inside the head outline as they “recall, elaborate, and visualize story events” (p.234). The classroom teachers involved in this study gave students completed samples of the open minded graphic organizer. The samples related to the expository topics of science and social studies. The students read a three to five- page passage from the textbooks for their grade level chosen by their teachers. Students were then asked to fill in a blank copy of Open Mind Portrait based on the selection they read. The students could draw any information from the text. This strategy required students to recall information from the text in order to transform the information into an alternate format through drawing. The students then used their Open Mind Portrait to write a summary of the text they read prior to completing the graphic organizer. The researcher concluded that the Open Mind Portrait strategy can be used “effectively” (p.239) as a “springboard” (p.239) for expository text writing. Analysis of the Open Mind Portrait drawing and expository writing samples revealed that all the participants matched at least three pictures, symbols, or captions with “factual information” (p.239) in their expository writings. This research shows that the implementation of this visual strategy would be beneficial for enhancing comprehension of text as well as increasing students’ ability to relate information from a text directly into their writing.

Focusing on fourth and fifth grade students, Sharer, Lehman and Peters (2001) investigated the content of book discussions about both expository and narrative texts. The study took place in 8 fourth and fifth-grade classrooms in two urban school districts for a total of 16 discussions. Teachers were selected (8 total) from a pool of 94 potential volunteers for the study. Discussions in each classroom were based on two children's picture books about whales: a narrative, *Amos & Boris* (William Steig, 1971) and an expository text, *Whales* (Seymour Simon, 1989). The books were selected based on their "reliability of content" (p.302), length, and picture book format, which provided opportunity to examine the ways teachers and students talked about illustrations since use of such picture books is "increasingly encouraged" (p.320) in upper-elementary classrooms. The discussion groups were selected by the teacher and ranged in size from five to ten children in each group, and typically ranged in time increments of 15 to 30 minutes per discussion. The researchers took "field notes" (p.303) during each discussion including the order of speaking, physical organization of the room, and instruction after the discussion. The book discussions included story plot, character development, and illustrations; students and teachers in the eight classrooms discussed the illustrations of *Amos & Boris* a total of 15 times and *Whales* 19 times. They talked most often about how Steig's drawings in *Amos & Boris* "enhanced" the author's descriptions of the story and aided in interpretation of the characterization of Amos and Boris. Discussions of the photographs in *Whales* focused mostly on how the pictures "extended the descriptions" (p.306) of different types of whales by providing details, colors, and realistic information. Analysis of the 16 discussions between teachers and students revealed four types of topics discussed related to the books: literacy, informational, intertextual, and topics focusing on illustrations. The researchers concluded that this study provides "useful information" (p.308) regarding discussions of both narrative and expository texts in elementary classrooms. The

researchers were able to “discern clear patterns” (p.308) in what was discussed and the process of those discussions. These findings have implications for children’s “expectations and understandings” (p.308) of what to focus on in different genres, how to think about those genres, and who is expected to lead during literature discussions. These findings support the importance of discussing and exploring both narrative and informational text related to the same topic to facilitate student comprehension.

With Students in High School and College

Extending into high school grades Leutner, Leopold and Sumfleth (2009) focus on students in grade 10. Leutner et al researched the effects on learning from a nonfiction, expository science text that did not include any pictures as well as on the improvement of comprehension through visualizing content or physically drawing a picture to correlate to each paragraph (“multimedia effect”) of a text. This form of multimedia based learning is thought to “deepen comprehension” (p.288) by encouraging the students to “explore other media” (p.288) not provided in order to “facilitate understanding” (p.288) of provided content. The researchers anticipated that the advantages of multimedia-based learning with verbal and pictorial material could “amplify” (p.288) impact on learning outcomes, even when there is verbal material only provided and students are instructed to construct (provide) the “pictorial material” (p.288) by themselves. The participants of this study, 111 high school students (56 boys and 55 girls) in Germany who were randomly assigned to one of four groups, the groups were balanced according to gender. During the study the students read an expository science text on the dipole character of water molecules. Students were instructed to read the text and either “mentally imagine” (p.285) the content of each

paragraph of the text while reading the paragraph, to draw pictures on a sheet of paper representing the content of each paragraph of the text, or to do both by imagining the pictures after drawing them. To begin the study, students were administered a science pre-test; they were then given 35 minutes to read the provided science text, followed by a cognitive load questionnaire, then a verbal-ability test and a spatial-ability test. Lastly, the students given a multiple-choice post-test on science comprehension. The entire procedure took 90 minutes. The study found that “mental imagery” (p.289) while reading an expository text, as opposed to drawing, seems to embrace “helpful process characteristics” (p.289) whereas drawing does not. These findings support the idea that multimedia learning, specifically mental imagery, enhances and deepens student comprehension of nonfiction, expository science texts.

Working with German university students, Schnotz (2014) researched the comprehension of graphics in a text. Participants of the study were 157 students (116 female and 41 male). The participants were randomly assigned to six different groups to receive different learning material with varied instruction. The learning material was selected based on simplicity and student lack of prior knowledge of the content (new, fictitious material). The study participants were asked to read, understand, and memorize the learning materials. The study procedure consisted of several phases; during the pretest phase participants were tested on their cognitive abilities, in the learning phase all participants received the 168-word text combined with either political party graphs or religion graphs—either with no instruction, political party instruction, or religion instruction. Participants were asked to use supplied materials to learn about a new topic using graphs, diagrams, and reading material. Lastly, in the posttest phase the participants were tested on their knowledge of the new content immediately after learning. The researcher studied the participants’ ability to comprehend material via the supplied graphics. The findings of this study suggest that

“enhancing” (p.617) graphics’ comprehension by studying visual design alone does not increase comprehension. Comprehension seems to be a matter of “complex interactions” (p.617) between “perceived surface structures, semantic deep structures, perspectives of different familiarity, cognitive schemata associated with perspectives, and interference between schemata” (p.617). Researchers determined that to enhance not impede comprehension of material contained within a text, graphics should be displayed in a consistent manner, and it is not sufficient to deliver correct information via graphics. Implications of the study emphasize the importance of “adequate design” (p.616) of graphics, such as display of accurate information within graphics. In order to be adequate, graphics contained within a text should add to information provided in the written text.

Summary of the Review

This literature review contains reviews of 12 research based studies. They have been grouped according to the major implications pertaining to the research question. The sections of this review are studies focusing on early elementary students ranging from grades Prek through grade 2 (5 studies), upper elementary students ranging from grade 4 through grade 6 (5 studies), and students ranging from grade 10 in high school through college (2 studies). Within the three sections, the studies are organized according to ascending grade level. All studies were conducted within the last 15 years, with many studies (6 studies) conducted within past 5 years. All studies, excluding one (Schnotz, 2014), were conducted in the United States. The study by Schnotz, 2014, was conducted in Germany with German university students.

Chapter 3: Methodology

To address the research question of what is the role of visual literacy knowledge when reading pictures in an expository text, and how can educators tap into this role to assist struggling readers, an extensive review of the literature was conducted. This chapter explains the data collection process, the data analysis and data synthesis. The data collection section describes how the studies were found for this study as well as the processes used to organize the information. The data analysis section provides an examination of all the research studies collected and identifies common themes throughout the research studies. The synthesis section summarizes what was found as a result of the data analysis and presents the summaries as findings.

Data Collection

The data for this research synthesis consists of 12 research studies found through the data collection process of conducting an exhaustive search of the leading education data bases for peer-reviewed research studies. Data were then organized into three categories according to student's grade level: early elementary, upper elementary/middle school, and high school through college level. These categories emerged from preliminary data. These categories then served as the organizing structure for further data analysis which is described in the following section.

Data Analysis

Collected studies were analyzed and organized to uncover themes and categories for the data.

Studies within each category were then analyzed and synthesized to produce new findings.

The first category of studies are those examining the role of comprehension of pictures and graphics in an expository text for comprehension by students in the prekindergarten to grade 2 range. Of the five studies in this category, one study (Bortnem, 2008) with students in preKindergarten and grades 1 and 2 found that concrete materials such as pictures help gain and hold student attention. The two studies with only grade 1 students found that book content, not illustrations, have the greatest impact on book selection (Mohr, 2003), while the other study found that relating to the content (including to the pictures) increased student comprehension of expository texts (Santoro, et al, 2008). The remaining two studies with only grade 2 students found that direct instruction of expository text structure, including pictures and graphics (Williams et al., 2005) and direct and intentional instruction of graphics (Norman, 2011) both increase comprehension of expository texts. Analysis of this research has determined that for students in the elementary school grades of preKindergarten to grade2, the role of visual literacy and pictures and graphics can be to hold the reader's attention and increase comprehension of expository texts. In addition, by second grade, this role can be taught through direct instruction.

The second category of studies are those examining students in the grade 4 to grade 6 range. It should be noted that no studies could be found having students in grade three as participants. Analysis of this research has determined that students in the grades 4 to 6 range show an increase in comprehension of expository text when direct instruction on expository text structure is used. Direct instruction and the use of visual reading strategies in expository text has been shown to increase comprehension (Belfatti, 2015) and (Paquette 2010). Through implementation of instructional strategies, both general education and reading specialists can amplify student comprehension when reading expository text and the pictures (diagrams)

contained within. When students are properly guided to read and interpret diagrams (including pictures) the diagrams prove useful to comprehension (McTigue, 2011). At the grade 4 through grade 6 range students are also able to supply information given in pictures which is not supplied in the text (Kucer, 2010). Since students are able to extract additional information from pictures to add to the text, it is beneficial and increases comprehension when students are provided with both expository and narrative text on a single topic (Sharer, 2001). When students are guided through and taught to properly interpret pictures within an expository text, this leads to increased comprehension. Therefore, using these instructional strategies, both general education and special education teachers should be able to impact what appears to be the most significant literacy area for this grade level group: reading comprehension

The third category of studies in the Literature Review are those examining students in the high school to college range. Both studies in this category (Leutner, 2010; Schnotz, 2014), found that comprehension of expository text increases when reading the pictures in correlation with the text. When emphasis is placed on comprehension of the text as a whole, students are able to increase knowledge and draw upon skills from other content areas which in turn increases understanding of a text and the text structure. Students can tap into other outlets such as drawing and mental imagery in order to increase and deepen comprehension of content (Leutner, 2010). Along with the ability to draw and mentally image expository text content, students would benefit from also possessing the ability to read graphics (pictures) and connect them to the words within a text. When pictures are displayed with accuracy and add to the textual information within expository text, comprehension increases (Schnotz, 2014). When textual content and pictures work together to increase information given, students are able to comprehend the content of expository text on an increased level.

Synthesis

The results emerging from the analysis of each of the three categories can now be synthesized (combined) into findings that address the research question for this study. These are presented in Figure 1.

Figure 1: Summary of Data Analysis

Research Study	Participant Grade Level	Findings Related to Reading Visuals in Expository Texts
Prekindergarten to Grade 2		
Bortnem (2008)	PreK, Gr 1, 2	found that concrete materials such as pictures help gain and hold student attention.
Mohr (2003)	Grade 1	found that book content, not illustrations, have the greatest impact on book selection.
Santoro, et al (2008)	Grade 1	found that comprehension of expository text is increased when students are provided with the opportunity to relate to the content, including the pictures.
Norman (2011)	Grade 2	found that comprehension increases when intentional instruction of graphics occurs.
Williams, et al (2005)	Grade 2	found that comprehension increases when direct instruction of expository text structure, including pictures and graphics, takes place.
Grade 4 to Grade 6		
McTigue & Flowers (2011)	Grade 2, 4, 6-8	found that science diagrams are useful when students are properly guided to use, interpret and read the information within a diagram.
Kucer (2010)	Grade 4	found that readers can supply additional information from pictures when reading informational text that was not supplied in words.
Belfatti (2015)	Grade 4	found that students are capable of higher comprehension when taught strategies for reading and understanding expository text.
Paquette (2010)	Grade 4, 5, 6	found that implementation of visual strategies increases student ability to comprehend information as well as assist in writing skills.
Sharer, Lehman & Peters (2001)	Grade 4-5	found that student's comprehension skills increase when both expository and narrative texts which pertain to the same topic are used.

High School and College		
Leutner, Leopold & Sumfleth (2009)	Grade 10	found that drawing and mental imagery increased comprehension of expository science texts.
Schnotz (2014)	University Undergraduate Students	found that comprehension increases when display and accuracy of graphics adds to information supplied in words in expository text.

A close examination of the analysis presented in Figure 1 above produces the findings of this study. First is that the role of visual literacy and the reading of graphics changes as grade levels increase. For the preKindergarten and grade 1 level, graphics in expository texts help to gain and maintain reader interest and attention. At the grade 2 level, the role is as an instructional tool to help to increase students' comprehension of expository text. At the grade 4 and grade 5 levels, readers are capable of providing additional information base on supplied pictures in order to add to textual comprehension. This ability increases with direct instruction on reading strategies to increase comprehension. At the grade 6 through grade 8 levels, graphics are useful when students are properly guided on how to use them while reading. At the grade 10 level, the use of drawing and mental imagery increase comprehension ability. At the collegiate level, display and accuracy of graphics (pictures) adds to information provided within the text.

Perhaps the most significant findings of this synthesis are that students at all grade ranges benefit from direct instruction on reading comprehension strategies that specifically address the visuals in an expository text. Especially in the field of science, students can increase their comprehension of an expository text when they look for connections between information given in the visuals and the words of a text, and between information given in the visuals and their own prior knowledge of the subject. In addition, many reading strategies used for comprehending expository text structure and visuals also increase student ability to transfer knowledge into alternate forms, such as writing. All elementary general education and reading teachers would

benefit from knowing these findings. The second part of the research question for this study asks, how can educators tap into this role of visual literacy to assist struggling readers with the comprehension of expository texts. This synthesis suggests the following: increase the use of expository texts, implement research based reading strategies when reading expository text and encourage students to connect textual content with aspects of the real world in order to make connections to background knowledge. Therefore, this new knowledge will form the basis of a professional development project intended to instruct general education and reading teachers on assisting students with comprehension of expository text and text structure. This professional development project is detailed in the next chapter.

Chapter 4: Results and Application

Review of the Results

After completing a review of the literature to determine what research has been conducted to date on the role of visuals and visual literacy in the comprehension of expository texts by elementary students, this researcher has determined three key findings from this synthesis. The first finding is that the role of visual literacy and the reading of graphics changes as grade levels increase: I prekindergarten to grade 1, the role of graphics and visuals in expository texts is to connect to reader interest and attention; in grade 2, the role is to function as an instructional tool to help to increase students' comprehension of a topic; in grades 4 to 8, the role is to assist students, as a result of direct instruction, to both increase students' comprehension of a topic contained in an expository text and assist students to provide their own additional knowledge to a topic in a text; in grade 10, the role of graphics and visuals in expository texts is to inspire mental imagery or drawing that increases topic comprehension, and at the collegiate level, the role is to provide additional and accurate information to that provided by the words. The second finding is that students at all grade ranges appear to benefit from direct instruction on reading comprehension strategies that specifically address the visuals in an expository text: strategies that teach how to find connections between information given in the visuals and the words of the text, and between information given in the visuals and students' own prior knowledge of the subject, and strategies that show how to transfer knowledge from visuals to other forms such as writing. The third finding is that direct instruction and implementation of research based reading strategies increase comprehension of expository text structure including visuals.

Application of Results to Professional Development

The findings from this study have significance to general education classroom teachers and reading teachers. They can assist teachers in knowing about the role of visuals in expository texts and about appropriate instructional strategies to use with elementary students of various grade levels. Sharing the findings from this research with teachers is professional development, and the most appropriate form of professional development for sharing this new knowledge is in the form of an informational pamphlet developed for use by those educators.

Design of Professional Development Project

The design of this professional development project will be in the form of an informational pamphlet. This professional development pamphlet is intended for educators that teach general education classes and for reading teachers. The pamphlet itself will be paper-based so that teachers can post it in the classroom or keep it handy on a shelf for easy access. The pamphlet will also be available to educators as a printable pdf to allow for reprinting. The information and instruction that the educators will receive in this pamphlet will be supported by the findings from this research synthesis.

Literacy Coaching Project Goals and Objective

The fundamental goal of this professional development pamphlet is to support general education teachers and reading specialists who are working with students on learning to comprehend

expository texts of various subjects. To address this goal, the following learning objectives provide clarification and description. The first objective for teachers and specialist who read this informational pamphlet is that they will learn about strategies for direct instruction of how to read visuals appropriate for their grade range. The second objective is that participants will gain knowledge about these instructional strategies through explanations and visuals that serve as models. The third objective is that general education teachers and reading specialists will be able to incorporate these direct instruction strategies successfully into their teaching in order to support their students with comprehension of expository text through understanding the graphics and visuals.

Proposed Audience and Location

This proposed professional development project is for the professional audience of general education elementary classroom teachers and reading specialists. They will have access to the educational pamphlet through a shared teacher-based website provided by school administrators within local districts. An archived version of this pamphlet will be accessible at any time, and may be reprinted and utilized by educators and school administration for unrestricted use as needed.

Proposed Project Format and Activities

This professional development will take the form of a paper-based informational pamphlet. The pamphlet will include an overview of the purpose and intent of the professional development. Included in the pamphlet will be a summary of the data analysis (represented in Figure 1 above).

The pamphlet will then direct users to the appropriate grade range they are instructing. Included in this portion of the pamphlet will be explanations of both the instructional strategies most appropriate for their grade range, and the visual literacy skill those strategies support. Within the explanations, the pamphlet provides exemplar pictures to aide in implementation. Following the explanation/picture pages, the pamphlet provides a listing of supplemental resources. These supplemental resources include websites, videos and materials to utilize when implementing the instructional strategies addressed throughout the pamphlet. At the conclusion of the pamphlet, the users will be directed to a discussion board where they may make comments or engage in some interactive discussion with other educators who have also read the pamphlet. Visitors to the discussion board will also be encouraged to provide feedback, commentary, evaluation on the pamphlet itself or on their experiences of implementing in their classrooms the information contained within the pamphlet.

Proposed Resources for Project

The appropriate resources for this professional development pamphlet include online internet access and a computer (or similar technology device) for participants as well as a printer to allow for printing of a pdf version of the pamphlet. Preparation of the pamphlet will require design time and time to search for and select appropriate resources and webpages that support or demonstrate the information and instructional strategies covered in the pamphlet.

Proposed Evaluation of Project

Following the reading of the pamphlet, teachers and reading specialists will be directed to an online survey site where they will be asked to complete a survey measuring the effectiveness of this professional development experience. The survey will seek to determine if the information was clearly presented, if the instructional strategies were explained and modeled appropriately and effectively, and if the educators would personally use these instructional strategies to support their own students with comprehension of visuals in expository text.

Project Ties to Professional Standards

This professional development project ties to the Professional Standards of the International Literacy Association (ILA) because their Standard 6 requires educators to “recognize the importance of, demonstrate, and facilitate professional learning and leadership as a career-long effort and responsibility” (IRA, 2010). Educators who self-select to read this pamphlet voluntarily participate in this professional development and will meet this standard by demonstrating professional development as a professional responsibility. This professional development project also ties to the New York State Common Core Learning Standards (CCLS). The CCLS include standards within the following literacy areas: “reading literature, reading informational text, reading foundational skills” (CCLS, 2015). Applying the findings will enable teachers to support student learning within these literacy areas, and guide students to meet the objective of specific standards, such as “anchor standards for reading literature, informational texts, and foundation skills” (CCLS, 2015).

Chapter 5: Discussion and Conclusion

Overview of Study and Findings

The Common Core State Standards (CCSS) English Language Arts for New York State have a set of standards for Reading Informational texts (RI). RI Standard #7 requires Kindergarten students to “describe the relationship between illustrations and the text in which they appear” (Common, 2012, RI. K.7), and by the time students reach grade 6, they are required to “integrate information represented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding off a topic or issue” (Common, 2012, RI. Gr6). Moving from an understanding of the relationship of pictures to words to the contribution of pictures to a topic requires some visual literacy skills. However, ability to understand and teach visual literacy skills may be unfamiliar to elementary teachers who have been taught to focus only on the words of a text as a source of information. Thus the topic of visual literacy and the role of visuals leads to the question, what is the role of visual literacy knowledge when reading pictures in an expository text, and how can educators tap into this role to assist struggling readers? The most appropriate way to answer this question was with a research synthesis. The exhaustive literature review and subsequent synthesis for this study produced three findings. The first is that the role of visual literacy and the reading of graphics changes as grade levels increase, from connecting to a reader’s interest and attention in the prekindergarten to grade 1 levels, to inspiring mental imagery or drawing that increases topic comprehension in grade 10, to providing accurate and detailed information in addition to that provided by the words at the collegiate level. The second finding is that students at all grade ranges appear to benefit from direct instruction on reading

comprehension strategies that specifically address reading the visuals in an expository text, and the third finding is that direct instruction and implementation of research based reading strategies increase comprehension of expository text structure including visuals. These findings appear to align very closely with the CCSS-RI Standards and are thus relevant to the professional development of elementary general education and reading teachers. These findings will be dispersed to those educators through a professional development project in the form of a paper-based informational pamphlet.

Significance of the Findings

These findings are significant to the field of classroom practice because they can impact teacher performance in the classroom. The instructional strategies identified in the findings can allow teachers to provide appropriate support and instruction when working with visual literacy and the role of graphics in comprehension of expository texts. These findings are also significant to the field of literacy because they provide a research-based justification for the direct instruction of strategies for reading visuals in expository texts.

Limitations of the Findings

The findings for this study do have limitations. One is that they are based on the existing research, and that research into the role of graphics for comprehension of expository texts has proven to be very scarce. Therefore, although research has been conducted at various grade levels, the low number of specific studies in each grade range placed a limitation on the synthesis results. For

example, many of the studies found focused on elementary age students; there was limited empirical research with middle school age and adolescent/adult participants. Only one study was found for the high school level. As time passes, perhaps more empirical research will be conducted in each of these grade ranges in order to provide a stronger more complete picture for what appears to be a changing role of visuals across the grade ranges.

Conclusion: Answer to the Research Question

The research question that began this research study is, what is the role of visual literacy knowledge when reading pictures in an expository text, and how can educators tap into this role to assist struggling readers? After conducting this study and performing a research synthesis, this researcher determined three findings: that the role of visual literacy and the reading of graphics changes as grade levels increase (from connecting to a reader's interest and attention all the way to proving accurate information additional to the words); that students at all grade ranges appear to benefit from direct instruction on reading comprehension strategies that specifically address reading visuals in an expository text; and that direct instruction of research based reading strategies increases comprehension of expository text structure including visuals. Together these findings provide this answer to the research question. The role of visual literacy knowledge when reading pictures in an expository text changes over time and across grade levels, and educators tap into this role by using direct instruction of research-based comprehension strategies to teach students how to read visuals in ways appropriate to students' grade level.

Recommendations for Future Research

The limitations of the findings of this research provide a basis for these recommendations for future research. The first recommendation is for research that explores comprehension of expository text with visuals at the grade 3 level, and the second is for this type of research specifically targeting students at the middle school and adolescent/adult age range. A third recommendation is to research the integration of the role of visual literacy and direct instruction of comprehension strategies for graphics and visuals in expository texts.

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Appendix A: Outline of Professional Development Project

A paper based informational pamphlet will be supplied to local districts in order to provide educators with beneficial information regarding the role and comprehension of visuals in expository texts across the curriculum. The pamphlet will include the research findings from this study and an explanation of how they apply to each elementary grade level. The pamphlet will also contain examples of research based strategies to implement when teaching comprehension of visuals and expository text structure. Emphasis will also be placed on the role of background knowledge and effective ways to tap into student's prior knowledge using the reading of visuals. The back side of the pamphlet will contain a listing of additional resources including, relevant websites and videos that demonstrate the strategies presented.

Appendix B: Evaluation of Professional Development Project

Evaluation of the informational pamphlet will be supplied by those who access the document. The evaluation will take place via a web based survey which educators can access at any time. The survey results will assist this researcher in evaluating the learning objectives for the pamphlet and the effectiveness for teachers of the information contained within this pamphlet.

Sample questions will include but are not limited to:

- How beneficial was this information for you when you related it to the reading of expository text in your classroom?
- How beneficial do you feel these given instructional strategies were to you in your teaching situation? Did you try these strategies with your students?
- Did the visuals of this pamphlet appear to convey accurate and additional information beyond the words of the pamphlet?
- Is there additional information you would like to have had but was not conveyed in this pamphlet?