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Teaching visual literacies: The case of The Great American Dust Bowl

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Abstract

Teachers and students require a range of tools to engage with visual texts. Using *The Great American Dust Bowl* by Don Brown (2013) as an exemplar text, we outline four conceptions of visual literacy: rhetorical, instructional, industrial and visuo-spatial and discuss their use in our literacy education practice. In addition, we provide a brief model of a second text, *The Arrival* (Tan, 2013) and a list of suggested texts for students at different levels (elementary, middle, and high school). We argue that these tools have the potential to deepen conceptions of visual literacies and empower teachers and students to understand the many ways in which visual texts operate to send message and evoke response and engagement.

Keywords: Graphic novels, comic scholarship, visual text, visual literacy, *The Great American Dust Bowl*

Teaching visual literacies: The case of *The Great American Dust Bowl*

Where are your eyes drawn? What stands out to you? When approaching a visual image for the first time with students, our instincts often invite broad questions that draw on students' background knowledge, encouraging a range of interpretations. As former classroom teachers and current literacy teacher educators, we work with teachers to perform visual analysis regularly. The questions above are often the first ones we pose when looking at an image with students for the first time. We recognize that the rhetorical perspective on visual design is a place of comfort and familiarity for educators well-versed in reading images. Yet, this is not the only way to approach and analyze visual texts. In fact, we argue that teachers (practicing and prospective) and students deserve a range of lenses in which to choose, read, and critically respond to visual texts. How else could we appropriately meet the needs of the range of learners that come to us and engage with a range of texts within and outside classrooms? Bitz (2010) writes that "the increasing demand for a workforce and citizenry that is comfortable with multiple literacies, as opposed to one factory model of literacy, is at least one argument for why comics could have a place in an English language arts classroom" (p. 39). We believe that comics serve, not just as complex texts that invite and support multiple literacies, but that comics operate as tools to teach a range of visual literacy skills.

Young people have unprecedented access to technological and media tools that place a wealth of visual images in front of them (Buckingham, 2013). The inundation of media and its capacity for multimodal texts—where messages are comprised of both linguistic and visual images—gives educators both responsibilities and opportunities to help students develop a range of visual literacy skills (Beach & Baker, 2011). The need to develop skills as well as be

recognized as a choice maker in the process of using and creating multimodal texts is at the heart of the multi-literacy movement (Bailey & Van Harken, 2014).

Comics and graphic novels have a valuable place in higher education and within teacher preparation programs (Carter, 2014). Unfortunately, teachers do not receive the instructional support they need in order to make sense of visual texts and support their students in most classrooms (Connors, 2011; Lapp, Wolsey, Fisher, and Frey, 2011/2012). Further, the support to which they do have access often relies on only a few conceptual models, and previously learned teaching and learning strategies (Connors, 2011). Here we describe the ways in which instruction can be built using multiple conceptions of what constitutes high-quality visual text. To do this, we briefly review visual literacy scholarship. Next, we draw on *The Great American Dust Bowl* by Don Brown (2013). Using Brown's text, we outline four conceptions of visual literacy that promote understandings about how visual texts work: rhetorical, instructional, industrial, and visuo-spatial (see Figure 1). Finally, we offer an additional brief example from another text (*The Arrival* [Tan, 2013]) and offer additional suggestions for using the perspectives we present.

Defining and Describing Visual Literacies

Rowsell, McLean, and Hamilton, (2012) defined visual literacy as the ability to make accurate mental models of information and critique the visual expression of other's models of information. These mental models emerge as learners trace threads of meaning through elements of the texts in and outside school, which can result in a number of challenges. We believe learning from visuals in classrooms should be an engaging experience where students can use the skills they may already have as well as develop new ones.

In addition to cognitive processes, social and emotional elements also drive what users of text are willing to think about and the models that they can make when they see an image

(Barthes, 1981). Since the social and emotional are also critical, they must have their place in instructing students about reading and responding to visual images. Further, other elements that are presented in tandem with images, such as text and the readability of that text deserve instructional attention.

The Common Core State Standards (National Governors Association Center for Best Practices, 2010) includes visual literacy skills. For instance, students at all grade levels are tasked with evaluating sources from a variety of texts. Students cannot effectively evaluate many types of texts if they cannot make sense of the graphics, pictures, colors, and shapes. While visual literacy skills have been championed across educational settings (Hug, 2012), many teachers are unsure of whether time should be spent learning to read visual materials.

In addition, several studies suggest that teachers understand the importance of and feel confident in their abilities to use multimodal (including visual) literacies in their classrooms, but they struggle mightily to demonstrate competence in their practice (Hsu, Wang, & Runco, 2013). The teachers (prospective and practicing) in these studies had concerns about teaching visual literacies in what they consider a milieu of political and institutional restriction. However, Siegel (2012) argues that multimodality within a framework of multiliteracies is an important strategy for challenging these constraints.

Visual information is not inherently comprehensible. More often than educators realize, learners are hindered by visual information rather than assisted by it (Cook, 2006; Hannus & Hyona, 1999; Harber, 1983). For example, Schnotz, Picard, and Hron (1993), found learners who were unsuccessful in comprehending text with visual images displayed three patterns: (1) Learners did not look at a visual image in a text presented to them; (2) Learners that did look at the image did not spend enough time to learn from it; (3) Other learners were distracted by the

image and their looking occurred without learning. By contrast, students that were successful at learning from the text with images looked strategically at specific places on visual diagrams and composed mental models to facilitate understanding.

A primary reason why learners struggle to learn from texts with visual images is cognitive load (Cook, 2006). In cognitive load theory, learners have a limited working memory, and visual representations used for instruction should be designed to reduce cognitive load. However, cognitive architecture alone is neither the only factor to be considered nor the most important; individual differences, especially prior knowledge, were also critical in determining the impact a visual representation has on a learners' cognitive structures and processes. These understandings alone offer ample reasons for taking visual image instruction seriously and for considering multiple perspectives on visual design.

The Great American Dust Bowl as a Visual Text Exemplar

We use Don Brown's (2013) *The Great American Dust Bowl* as our central visual text. This nonfiction graphic novel documents the dust bowl era, beginning in 1935. It illustrates weather patterns and tectonic plates, as well as emotional farmers in need of water, settlers pushing American Indians from their land, and the many ways people tried to adapt to the lack of rain. Visually, Brown utilizes water colors and rough, sketched lines, which create familiar images of people, places, and things without detailed features. He also thoughtfully arranges panels, gutters, and pages that meaningfully contribute to the narrative.

We position this eighty-page text as exemplar; it pays careful attention to fact and commentary, while visually and linguistically exploring historical events. Artistic choices made by Brown (2013), including symbolism, use of color and spatial arrangement, and font choices, as well as the direct quotes, maps, and diagrams make this novel a rich one for study. In addition,

this graphic novel has found its way into educational spaces along with many other graphic

novels (Abate & Tarbox, 2017; Carter, 2007; Connors, 2017). Because of these strengths, we

selected it for demonstrating the analysis using perspectives highlighted in Table 1.

The Rhetorical Perspective

The rhetorical perspective is primarily concerned with purpose and audience. Rather than

focusing on one meaning, the emphasis is on how different users make different meanings and

how different images convey underlying ideological messages (Kress and Van Leeuwen, 1996).

Comics and graphic novels, in particular, lend themselves to this way of analyzing visuals with

young readers (Carter, 2007; Connors, 2011, Author; Pantaleao, 2013; Pantaleao & Bomphray,

2011). Because of the image and text combinations, comics invite multiple ways of

interpretation. In turn, this invites readers to be draw on their own understandings in order to

make meaning, visually (Carter, 2008; McCloud, 1993).

One striking example from Brown's (2013) graphic novel, *The Great American Dust

Bow*l that can help us think through this perspective comes from page 9 (Figure 2). The page,

made up of two panels, visually and textually describes the shift in settlers in the Plains. The top

panel, which takes up about two-thirds of the page, shows several Native American families

standing and watching a hunter chase a bison on horseback seemingly out of the panel. The text

above reads "The Indians, the buffalo, the land, and the weather existed in balance for more than

a thousand years." The panel is one of the few brightly colored images of the book: the grass is

bright and light, the sky has a yellow hue overhead. The image reflects the balance described in

the text.

In the panel below, there is mostly grass, which has muddied and darkened. While the

panel above easily contained all images (aside from the bison attempting to escape his fate) in

the second panel we see a covered wagon, which protrudes, not only from that panel, but into the one above. The farmhouse in the distance is also drawn on top of the panel, rather than within it. The text described the white settlers "had pushed the Indians into reservations and slaughtered millions of bison." Visually, we see the wagon pushing out and into the upper panel, invading another's land. And the bison, while escaping being hunted, also foreshadows the lack of food and resources to come to the Plains.

There are many ways to read and interpret this page, as we have begun to do above. We can examine historical information, the author's political opinions, or the calling out of white settlers taking land. The placement of each of these panel and the subtle, but clear imagery, including the shift in colors, suggests Brown's intention to illustrate, not only historical information, but causation in the environmental disasters to come. Moving from page to page, a reader might feel tension about the seeming equation of Native Americans to buffalo; yet the term "slaughtered" is only directed towards the buffalo, not the Native American people who were also massacred during this time. It is valuable, especially when reading through a rhetorical perspective, to remember that no text is neutral, and a graphic novel is no different.

To help teachers learn about rhetorical visual grammar, questions such as What commentary is embedded in this image? What is the source or rationale for that commentary? and What do I think about that? become important. On this page, we wonder with our students: What are Brown's opinions about different groups that settled the Plains? and What is the basis for our opinion? Then, we look closer at the placement of the wagon in comparison to the placement of the American Indians and their homes and draw conclusions. We also ask more directly: What statements are being made, not just about environments disasters, but on blame-placing? Asking these questions with preservice teachers draws a critical eye to their own

reading of the word and world. This perspective helps students look at pictures from news sites about current events and critique them, to examining images around local controversies, or even sets of images around local landmarks, festivals, and celebrations.

Using the rhetorical perspective as a teacher requires careful decisions about what images to use and what background knowledge might be required for students to engage with the political and social messages embedded in texts. We recommend collaboratively approaching images through this lens for the first time. It allows the teacher leading to point out strategies students use to make meanings and notice the multiple meanings being produced. Even having conversations about use of color and spatial arrangement will influence how this page is read from a rhetorical perspective. Students might draw on their own perspectives of color and what healthy grass looks like to consider the two panels on page 9.

Kress and Leeuwen (1996) positioned their framework of visual grammar as a concept to think about how systems (in this case, images as visual systems embedded in other visual, social, and political systems) convey meaning. This move beyond meaning to meta-meaning brings critical reading and critical scholarship to the heart of visual image comprehension. It also requires readers to use their knowledge and experiences to read visual texts and their embedded systems. We love to begin examining such images by asking: Where are your eyes drawn? (Author). There are many answers to the question, which can immediately be followed up with Why do you think that is? Regardless of the what and why, this way of asking and answering questions encourages a self-awareness of reading images and the ideas behind them.

The Instructional Design Perspective

The instructional design perspective distinguishes relationships between texts and images. We draw on Mayer's (1993) classification system for instructional images (See Table 2).

This tool was initially designed to evaluate visual materials in print textbooks (Mayer & Gallini, 1990; Stern, Aprea, & Ebner, 2003). However, we believe that understanding a variety of image-text relationships supports teachers and readers beyond evaluating texts. Understanding that there are a variety of image/text relationships is not automatic. But by asking, "Is this image related to the text? ... How?" we aid readers who struggle with using images to support text reading or vice versa Mayer's classifications are decorative, representational, organizational, and explanative, which will be explored in detail below.

The Great American Dust Bowl offers multiple ways to illustrate these classifications. Across pages 44-45 of Brown's (2013) graphic novel is a section of the United States map, which includes the edges of Colorado, New Mexico, Texas, Oklahoma, and Kansas (See Figure 3). Each state is each labeled and drawn as if we are looking up at part of a map from an angle. Where these states merge, the earth lifts into a bowl-shape, and the words Dust Bowl appear, in almost 3D letters. The text reads:

> The worst of the dusters and black blizzards were found in a rough circle covering parts of New Mexico, Colorado, Oklahoma, Kansas, and Texas. The news reported Robert Geiger called it the "Dust Bowl of the continent." The name stuck.

Across the map, which fills both pages, are figures, which include a truck, a house, and cattle. These are what Mayer would call decorative images. Decorative images fill space on the page without enhancing the message of the text. Complex cognitive processes are not associated with this type of visual material. While each of these figures provided context for the space of the dust bowl, they do not support the printed text in any direct ways.

The reading of the map and text is supported by the labeling and drawing of state lines on these pages (44-45). Further, the small, full-sized map of the United States in the upper right

corner also helps readers to visualize and understand where the places listed in the linguistic text exist. These organizational images depict relationships between or among elements. Cognitive processes of selecting and organizing are required to process these images. Readers must do the work of connecting the small US outline with the larger portion of the US map on the pages.

An example of representational images comes from pages 6-7 in *The Great American Dust Bowl*. Representational images portray a single element of the accompanying linguistic passage. For example, there is an image of the world at the top of the page with dotted lines cutting through it, labeled "tectonic plates." Readers of representational images use the cognitive processes of selection to unite the visual dotted lines and the accompanying labeling linguistic material (See Figure 4).

Finally, explanative images bring about the most learning because they require the most types of cognitive processing (Mayer, 1993). They require the selection, organization, and integration of information. Below the image of the world, described above, we see an example illustrating and explaining the creation of the Rockies, due to shifts in plates. In three-paneled successions, readers watch the movement of tectonic plates, the depletion of water, and the rise of the Plains. The linguistic text describes the movement of the plates, name the bodies of water, and explain the changes to the earth's surface in detail.

Each classification has a different purpose and requires different cognitive skills to process. Mayer (1993) found that less than 10 percent of the illustrations in the texts he analyzed were explanative in nature. The highest percentage of illustrations was representational. Although his work argues against word-for-word repetition of information in linguistic text and illustration, Mayer still advocates that visual images and linguistic texts are optimal when they

support one another. Mayer's work demonstrates that visual images in educational textbooks do not all possess the equal potential for helping readers make sense of the image.

Understanding the relationships between images and texts aids in selecting textbooks and other instructional materials for lessons. It also helps learners identify why they are frustrated while trying to make meaning with images that may be only decorative. The notion of relatedness to the text can serve as a valuable tool for helping learners identify why they are frustrated while trying to make meaning with images. Armed with the understanding of these relationships can support readers in meaning-making and acknowledge the variety of choices authors, illustrators, and publishers made with creating a book. As readers consider the work they must do to read and make connections, they might also ask why text and images choices were made and consider how they might improve them.

The Industrial Design Perspective

Teachers quickly become comfortable with the idea of using images when they are related to the linguistic text. But we also want to prepare them to use and learn from images where there is little to no text. The industrial design perspective helps readers to focus on images that are primary in a text, while also attending to elements that make an image attractive to an individual that cannot be quantified. The central relationship in industrial design is between the designer and the user. This concept is represented as a continuum of artificiality (Krippendorf, 2006), which is the degree to which a user of the image can be expected to translate it into something that makes sense in real life. Good industrial designers anticipate how users generally will interact with a design cognitively and emotionally while acknowledging that there will be a range of reactions to their final products.

Malamed (2009) identified six principles for attending to the ways in which users of a visual image might be supported (see Table 3). Her principles are (1) organize for perception, (2) direct the eyes, (3) reduce realism, (4) make the abstract concrete, (5) clarify complexity, and (6) charge it up (do something unexpected for emotional impact). Malamed's principles attend to the context during the creation of the image, which includes what the designer wants to convey, and the capabilities of the media or modality for display.

In using Malamed's principles, readers are allowed to be moved emotionally or sustained intellectually by what they see instead of learning discrete ideas and concepts. A simple exercise where preservice teachers look at infographics, signs, tables, and pictures and then talking about what is interesting or pleasurable and why can start many fruitful conversations around these issues.

Returning to *The Great American Dust Bowl*, the images of the dead cattle on page 11 might be disturbing or evoke sadness. On page 15, the family sitting in muted tones also evokes sympathy as might most of the sad faces in the text. However, the picture of the dirt leaking through the roof on page 35 is more humorous than sad. A man sits in a chair holding the a newspaper below while staring upward. But then, the very next page (36) shows a car driving along a fence with more dead animals lying about. All through the book, there are ample opportunities to feel various emotions and think about which images evoke the strongest emotions and why.

In addition, it is worth considering which images are supposed to be more realistic and which ones are supposed to be more abstract. For example, the image on page 39 depicts large ships sailing through the dusty air. The text description reads: "Enough dust to fill 1,500 modern supertankers blew East." This page is clearly a reduction of realism in order to make a point

about how much dust there really was during the time period. The last page (77) features a renditions of the famous Farmer's Daughter painting by Grant Wood (1930). The original painting of a farmer and his plain daughter is supposed to personify the Great Depression. In Brown's revision, the characters, pitchfork in hand, stare upward at the sky. The text describes subsequent droughts in the area, even after *The Great American Dust Bowl* had officially subsided. The use of these characters clearly symbolizes the downtrodden and the sky's as an antagonist--completely unwilling to cooperate. This way of reading such images invites readers to focus on their emotional connections, rather than the content at hand.

When considering the industrial design perspective in developing lessons and curriculum, the emotional edge moves to the forefront. Questions like "Do I like this image?" "How does this make me feel?" and "Why does this image make me feel this way?" are important for looking at design from this perspective This line of thinking can be applied to any class or subject. For example, a group of social studies teachers could review multiple maps of the United States and then ask the students which one they liked best. In a science class graphics of cellular process, food chains, and carbon cycles might generate the same types of discussion. The learners could then do formal critiques of these images, write plans for improvements, or generate new ones using the elements that will answer the questions they think are important.

The Visuo-Spatial Processing Perspective

Most teachers realize that looking at words requires processing to make meaning, but they do not always realize that how the words are shaped, colored, and laid out requires fundamental visual processing skills. These ideas are crucial in the visual processing perspective (see Table 4).

Individuals looking at the same image will see it differently because our brains are different (Lehmkuhle, Garzia, Turner, Hash & Baro, 1993). The eyes and brain work together to search randomly until they form a spotlight of attention (Treisman, 1988) on some interesting object. During the scanning process, the brain learns about the objects' form, color, depth, motion, and size (Vidyasagar & Pammer, 2010). When individuals have trouble processing images, these delays are caused by the brain's inability to organize what the eyes have seen. Thus, processing deficits are associated with many common types of disabilities such as dyslexia (Casco & Prunetti, 1996; Tallal, 1980). In particular, visual span, or the amount of an image that can be processed has implications for reading (Facoetti, Ruffino, Peru, Paganoni, Chelazzi, 2008). Learners that struggle with visual sequencing, visual discrimination, and visual memory typically have a shorter visual span and thus are often identified as having various types of learning disabilities. Compensating for these visual processing delays requires curriculum modifications as support. Even individuals without disabilities will benefit from learning from images that are less dense,

The visuospatial framework represents the bare minimum of what teachers can do as they think about which visual images to select for classroom use or to troubleshoot about reasons why students would not be successful in learning from a visual image. Perhaps the image is not large enough for all to see. Perhaps it is too busy to make sense of, or the colors or shapes are distracting. van Garderen and Whittaker (2006) offered practical examples of how to incorporate visual-processing in a class with students who have specific learning disabilities. They advocated for lesson designs that attend to the size and number of visuals and allow for individuation in visual presentation. For example, they said that visual materials should be made available in both black and white and color and learners should be able to change all fonts and image sizes.

The visual processing perspective highlights the need to assist users of visual images by displaying them as plainly as possible. It is also necessary to minimize the use of images with multiple small elements that clutter together. Finally, images in a visual field should be immediately relevant to the content of the message. While these principles certainly apply to anything that would enter a person's visual field, it is particularly the case when reading on a computer screen since reading from a computer screen is more taxing on the eyes than reading a regular page (Chu, Rosenfield, Portello, Benzoni, & Collier, 2011). Learners with many types of disabilities rooted in visual processing will process the screen image even more slowly.

In the case of The Dust Bowl, there are subtle font changes. On page 11 (as well as others) Brown used one font for the narration and a slightly different one when people are talking. Some readers may miss this detail because their brains are not attuned to focus on the difference, but if a teacher pointed it out, they might see this. After this detail is noticed, it is important to think about why the decision was made to make the fonts different. However, if students do not even realize there is such a difference, or they cannot tell the difference, they cannot engage in what are considered higher order processes.

There are also places in the text where the font is distorted or difficult to read. On pages 26-27, the font is swirled into the dust as it blows through the page. On page 47, part of the text is white on a black background and then less than an inch down, there is black text on a white background and remember, the font is slightly different. Some students will be able to read the black/white contrasts easier than others.

Images are also distorted. One example is on page 21, where there is a silo that is very small and very dark in the bottom-left corner. Another example is of page 25 where the dust is covering a man carrying a candle and his outline becomes gradually fainter. Of course, this is the

point--to use visual images to give the sense that the dust has greatly reduced visibility. However, some students are better positioned to see and process these details than others.

The final piece of helping teachers learn to use this perspective is to suggest ways that they can equip the children they will teach to engage visuals. For example, teachers can learn to help students advocate for themselves with questions like: How can I change this image to help me learn from it best? As additional practice, teachers can show students how to manipulate objects on screens, how to block off information with paper as a mask on printed pages or overlay plastic sheets to reduce visual noise.

Final Thoughts

Frameworks from any of these perspectives (or combinations thereof) might be very helpful to offer educators rich curricular opportunities to support the development of visual literacy skills. However, much of what is available for thinking about visual images was developed in various disciplines for adult readers. Therefore, allowances and consideration have to be made when thinking about how to support prospective and practicing teachers' work with children of various ages engage with visual literacies. Those allowances include using age-appropriate materials, using looping strategies that revisit visual literacy concepts multiple times, and thinking about children's logic patterns. What looks good to young people and how they feel about it may differ from adult norms, which means that comics must be integrated more fully into classrooms, rather than a one-time unit at some point during the year (Carter, 2008). In addition, these patterns and preferences may change during a school year. Just as we have done here, we recommend teaching and engaging with these visual designs alongside texts like *The Great American Dust Bowl*. While we found that comics have much to offer by way of exploring

and learning visual design concepts, there are many other texts and mediums that can support readers' engagement in visual literacy processes.

One such example is *The Arrival* (Tan, 2006). In the novel, a man—The Arrival—leaves his family and immigrates to a new land—one whimsically and fancifully illustrated to be placeless, while evoking a strong sense of place. As an Arrival, he works to meet new people, find work, food, and a place to live safely in the hopes of eventually bringing his family to his new country. This wordless graphic novel offers opportunities to demonstrate the range of pedagogical possibilities that emerge from engaging with the various frameworks and serves as a text that can illicite engagement in ways that compliment and contrast work with *The American Dust Bowl*. Further, it is a text that is accessible to a range of readers in elementary to university settings. Table 5 offers questions that would engage students in the various frameworks of visual analysis.

We believe there are many ways we as teacher educators can engage with visual design—whether drawing from a single perspective or multiple ones. Our on-going work is to include these ideas in our university-level teacher education courses so that teachers can, in turn, use these activities and questions with students in their classrooms. Other teacher educators might design protocol or procedures students could use to interview each other about how they interpret images in *The Great American Dust Bowl* or a similar text. Students could even be involved in the design of such an assignment. Through considering different backgrounds, colors, and font sizes for conveying a message with various combinations of texts and words, students could also explore their own creations and compositions together. Students can also view a variety of versions of certain texts and identify which are easier to read while discussing why that might be the case.

Drawing on texts outside the classroom, students might locate images of the same news event and talk about which image represents the event more effectively. Teacher educators could ask which images elicit stronger emotional reactions (sadness, anger, laughter). Inviting students to look up images in textbooks and identify which images are linked closely to the text and which are merely decorative is another way to empower them to critique and ultimately understand their school resources more deeply. Students could then design new visual material where decorative images appear, even using the visuo-spatial guidelines as a model. Taken together these activities support students in taking ownership over the meaning they make from text while also engaging in disciplined and systematic critique. Table 6 offers suggestions for graphic novels for elementary, middle, and high school students that would make excellent choices for these types of analyses.

In sum, educators desiring to make use of visual design tools should consider how visual images contribute to their other learning goals and what materials they have access to when planning instruction. There is no expectation (from these authors, at least) that visual design perspectives should remain locked into their own disciplinary categories, either. Remixing and repurposing the tools in the various frameworks offer genuine opportunities for invention in classroom spaces. In addition, there are cultural considerations for reading comics produced in different countries, which we had not explored here (Cohn, 2013). Using visual tools designed explicitly to instruct students on visual literacy can provide opportunities for rich and meaningful curriculum that supports a range of readers and texts.

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Table 1

Characteristics of profiled perspectives on visual design

Perspective (Developers)	Pedagogical Questions	Strengths	Weaknesses
Rhetorical (Semiotic linguistics)	What commentary is embedded in this image? What is the source or rationale behind that commentary? What do I think about that?	Emphasizes multiple meanings; encourages use of metacognitive skills like inference and connection	Requires background knowledge to make multiple meanings; concepts may require simplification of some definitions.
Instructional Design (Educational Psychologists)	Is this image related to the text? How?	Focuses on learning from image; highlights relationships between image and linguistic text.	Privileges relationships between image and text; validity not rigorously tested with adolescents.
Industrial Design (Industrial Designers)	How do I feel when I look at this? What does this image help me understand/do?	Validates designer goals; concerned about visual processing	Inattentive to exceptional users; certain aspects are vaguely defined
Visuo-spatial (Neuroscientists)	How can I change this image to help me learn best?	Focuses on exceptional users, including adolescents; highly specific	Leaves little room for user interpretation; highly prescriptive

Table 4

Varying levels of attention to visuo-spatial processing

	Optimal	Minimal	Negligible
Scope	Main topic with 2-2 subtopics.	Main topic with more than 2-3 subtopics.	Many topics and subtopics.
Size	Image contained on one screen, rather than multiple and is at least four inches wide.	Image contained on one screen, rather than multiple; may require users to scroll around on screen but is at least four inches wide.	Image contained on multiple screens, or requires users to scroll around on screen, and/or is less than four inches wide.
Density	Objects within image are distinctive and essential to the overall image.	Objects within image clutter in the space of the image but are essential to overall image.	Objects within the image clutter together in the space of the image and are non-essential to overall image.
Formal consistency	Distinctions between objects made with sharp, straight lines and dark colors, rather than slanted or curved lines or lighter hues. Patterns of presentation consistent throughout the image.	Distinctions between objects made with sharp, straight lines and dark colors, rather than slanted or curved lines and lighter hues, but patterns of presentation inconsistent throughout image.	No discernable distinctions made between objects; patterns of presentation inconsistent throughout the image.
Importance	Image essential to comprehending linguistic text.	Image related to linguistic text.	Image has no discernable instructional purpose.

Table 2
Meyer's (1993) Classification of Images in Instructional Materials

Type of illustration	Function	Cognitive processes
Decorative	Fill space on a page	None
Representational	Depict single elements	Selection
Organizational	Demonstrate relationships	Selection, Organization
Explanative	Elucidate a system	Selection, Organization, Integration

Table 3
Malamed's (2009) Principles of Industrial Visual Design

| Principle	Description
Organize for perception	Prominent features obvious; textures separate ideas; objects logically grouped.
Direct the eyes	Objects positioned strategically; emphasis correctly placed; movement depicted when necessary; eye gaze exploited; visual cues present.
Reduce realism	Visual noise eliminated; silhouettes employed when possible; easily recognized symbols used; line art present where applicable; quantity of objects not overwhelming.
Make the abstract concrete	Big picture views offered, data displays describe phenomena; information displays relationships; maps adhere to convention; timelines adaptable to different time conceptions (linear, cyclical, and spiral).
Clarify complexity	Explanations presented as segments and sequences; focus on clarity rather than simplicity; inherent structures, such as hierarchy developed.
Charge it up	Emotionally salient material managed; narratives enhance illustrations; visual metaphors comprehensible; novelty and humor appropriately employed.
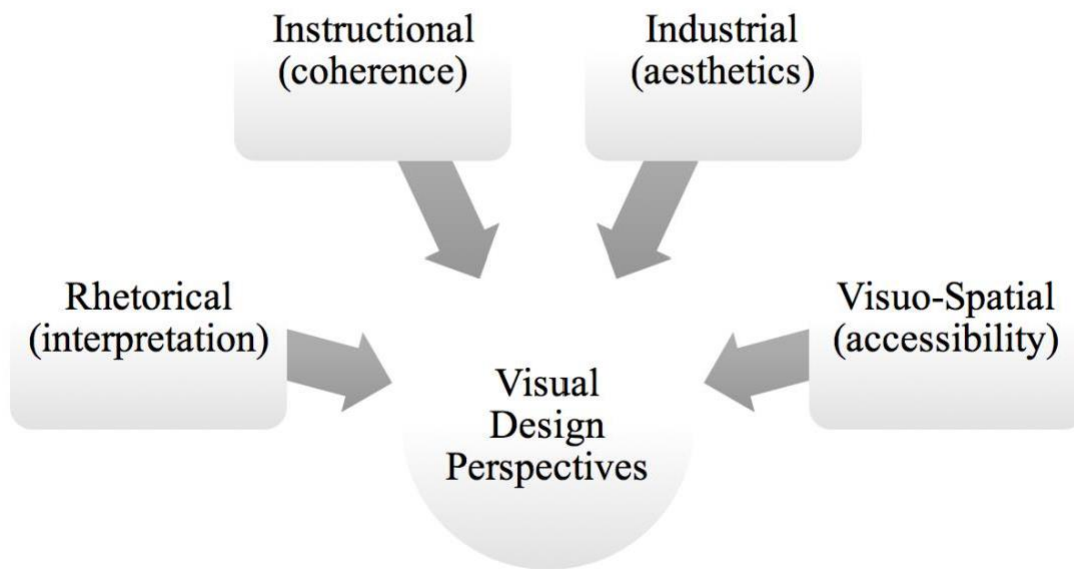
Figure 1.
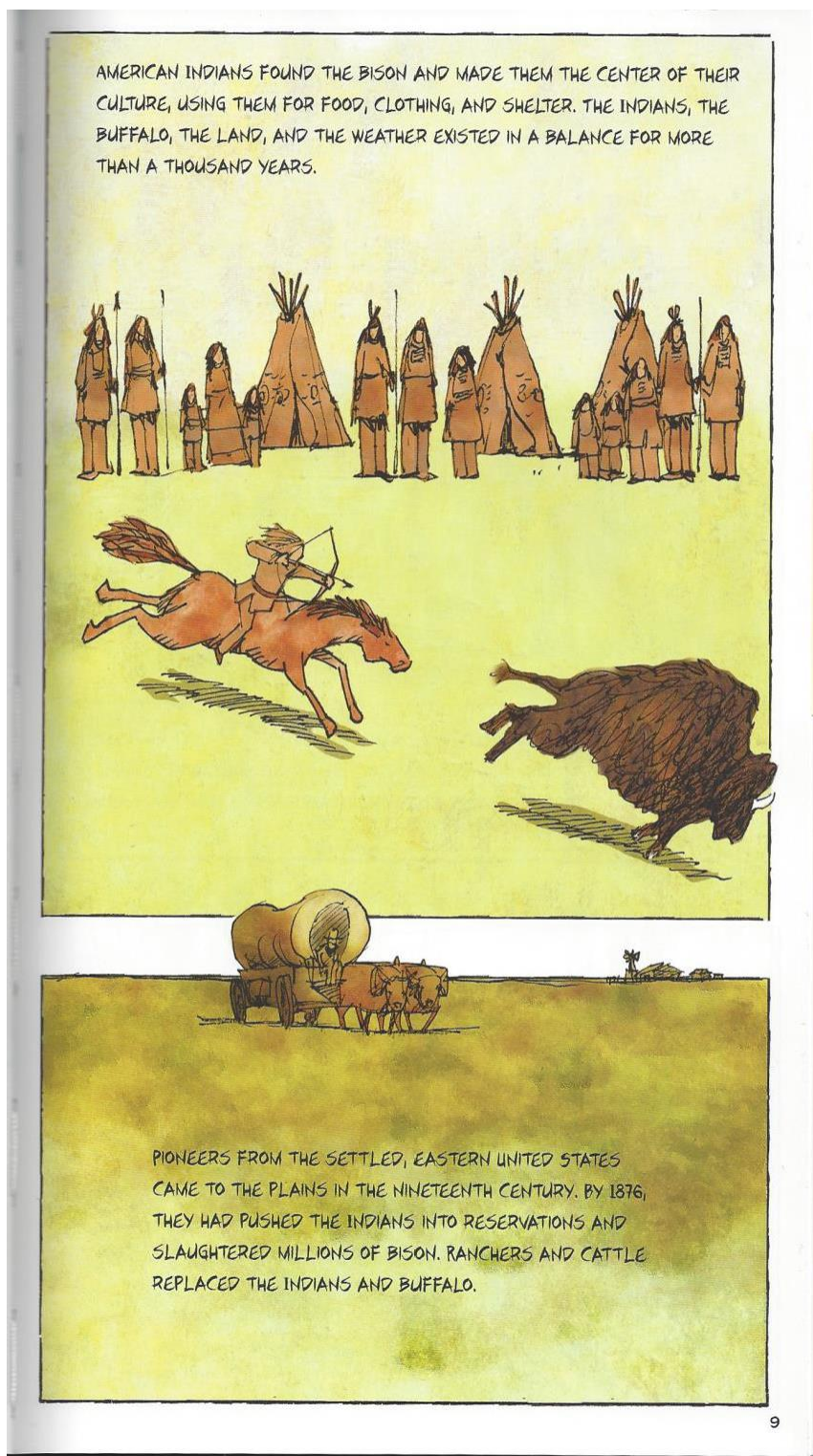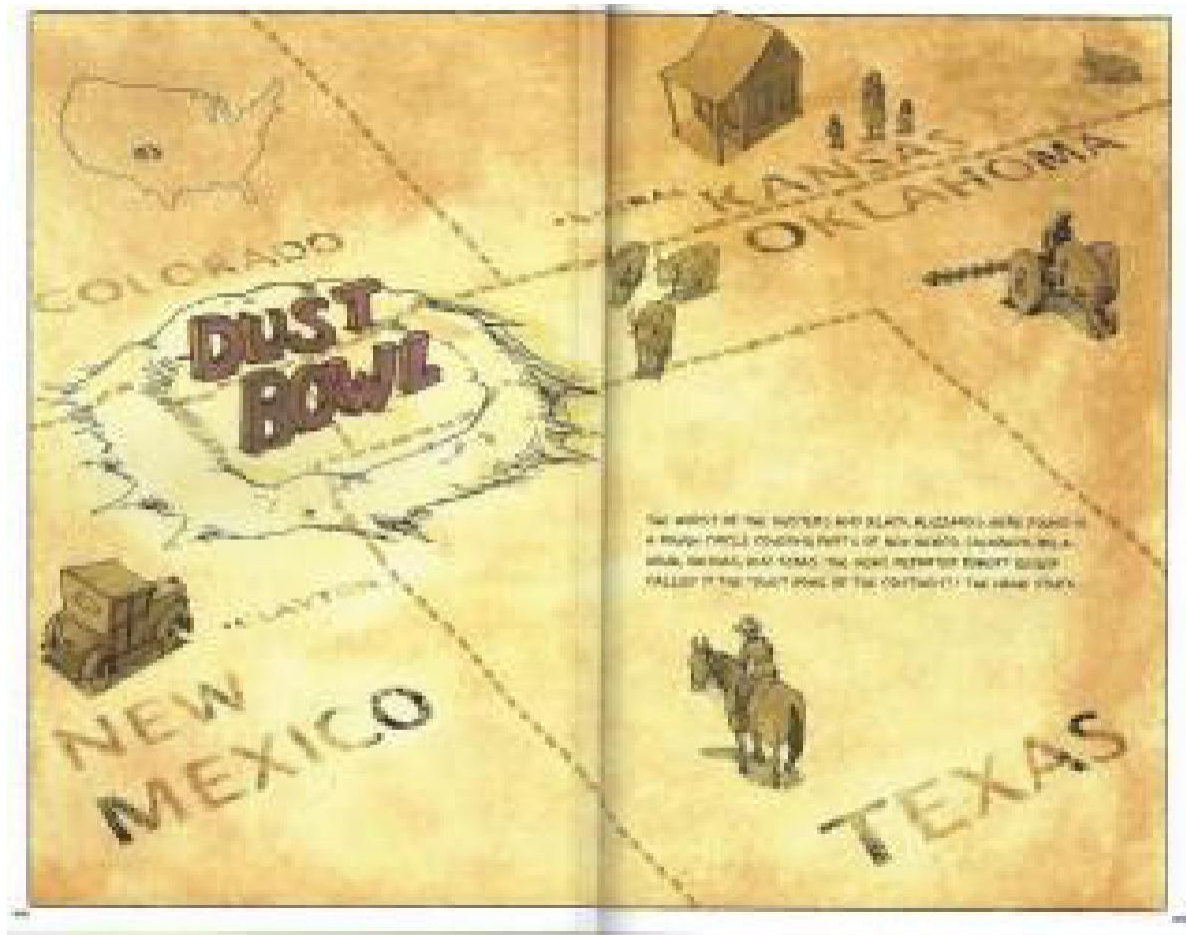Visual design perspectives for analyzing comic images

Figure 2.
Depictions of settlers
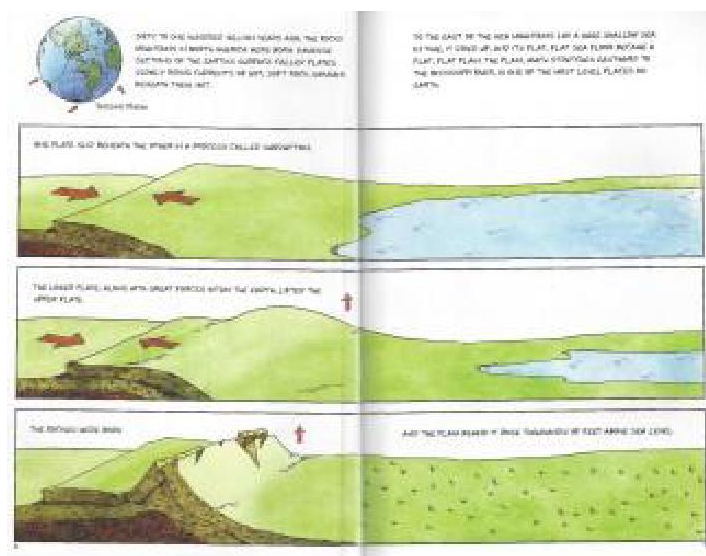
Figure 3.
Map of the dust bowl

Figure 4.
Embedded informational text

Table 5
Questions for Analysis of The Arrival (Tan, 2013).

Visual Perspective	Starter Pedagogical Questions
Rhetorical	What are the underlying assumptions about immigrants and immigration in this book?
Instructional	The language in this book has been designed to mimic the experience of seeing a language one does not understand. What words do you imagine the various signs and documents would say, given the visual information?
Industrial	What elements of text do you think are supposed to make you feel empathy for the immigrant? Are they successful at making you feel empathy?
Visuo-Spatial	Choose a page of the book. Is this page busy with images or does it only have a few? Are there any images on the page that are too small or too dark to understand? What would help you access all the parts of all the images better?

Table 6
Suggested Additional Reading

Suggested Comic Reading
Elementary School
Aguirre, J. A., & Rosado, R. (2012). *Giants beware!* New York, NY: First Second.
Camper, C., & Gonzalez, R. (2014). *Lowriders in space*. San Francisco, CA: Chronicle Books
Staake, B. (2013). *Bluebird.* New York, NY: Schwartz & Wade Books.
Middle School
Bell, C. (2014). *El Deafo*. New York, NY: Amulet Books.
Brown, D. (2015). *Drowned city: Hurricane Katrina & New Orleans*. New York, NY: Houghton Mifflin Harcourt.
Stevenson, N., Ellis, G., Allen, B., & Watters, S. (2015). *Lumberjanes*. Los Angeles, CA: BOOM! Box.
Wicks, M. (2015). *Human body theater.* New York, NY: First Second.
High School
Leatherdale, M. B., & Charleyboy, L. (2017). *#NotYourPrincess: Voices of Native American women*. Toronto, CAN: Annick Press Ltd.
Lewis, J., Aydin, A., & Powell, N. (2013). *March (books one, two, and three).* Marietta, GA: Top Shelf Productions.
Yang, G. L. (2013). *Boxers & saints*. New York, NY: First Second Books.