

GRAPHIC DEVICE INTERPRETATION BY LOW-LITERATE ADULT ELLS: DO THEY GET THE PICTURE?

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ABSTRACT

Teachers of low-literate adult English language learners often use visual materials to teach content, but it is not clear how these visuals are interpreted by their intended audience. This research focuses on the concept of visual literacy, specifically, on the ability of low-literate adult ESL learners to identify the functions of graphic devices used in educational materials. A semiotic framework provides a basis to describe how education and cultural background can influence visual literacy. Through think-aloud interview sessions, Somali participants of varying L1 literacy levels interpreted illustrations from ESL materials. Results show lower than expected ability to interpret images and little difference in visual literacy between L1 literate and L1 non-literate participants. The author suggests that visual literacy is more dependent on experiential factors than on L1 education. Other findings include participants' tendency to bring real-world contexts to visuals and to interpret symbolic images as non-symbolic.

INTRODUCTION

Language instruction often makes use of pictures. In classes of learners with beginning English and low literacy levels visuals provide a way to convey meaning where words and print fail. Although some research has contended that pictures actually interfere with literacy development (Samuels, 1970), one might be hard-pressed to find a language teacher who does not use visuals to scaffold content or motivate learners. Visuals are also used in research contexts as jumping-off points for a variety of objectives since they are often assumed to be a universal means of communication among sighted people. What isn't always considered is that ELLs are often gaining both language and content skills, which includes visual literacy (Harper & de Jong, 2004). McCloud (1994) suggests that visual iconography offers a potential form of universal communication, but even that kind of communication must be learned. The research described in this article intended to discover how adult learners with low-literacy backgrounds interpret the visuals that are used in educational materials. Results show that images are not always understood as intended. The study focused on illustrations that make use of graphic devices that are commonly used in our culture.

This article begins with a discussion of literacy and visual literacy. Some concepts from the field of semiotics are introduced to provide a base for discussion of visual communication across cultures. These concepts are viewed with an eye toward how some learners might experience the visuals used in ESL classes. A description of a study in which participants were asked to interpret illustrations taken from an adult ESL text follows. Data and major findings of this study are presented along with implications for the ESL teacher.

Literacies

Literacy, in its most basic definition, includes the abilities to read and to write. Today there are many other uses for the term *literacy* in defining knowledge in other areas: computer literacy, health literacy, media literacy, emotional literacy, cultural literacy, information literacy, etc. *Visual literacy* is another concept that is most often defined as the ability to interpret and produce visual communication (Ganwer, 2009). Some scholars describe the development of these abilities as being analogous to learning to read and write ((Messaris & Moriarty, 2004)(Arbuckle, 2004). Arbuckle claimed, "If pictures are a visual language, then the basic visual elements we use to make a picture can be likened to the letters and words that form sentences and meaning" (p. 449). Others argue that printed language literacy involves a more clear-cut, logical system that visual literacy cannot parallel (Dondis, 1974; Kress, 1993). We can't easily point to the building blocks of visual communication as we can with written language formed, at least in English, by letters, words, and sentences. A picture is said to be able to tell a story, but the individual elements that make up that story are not easily defined.

Although we don't gain visual literacy through the systematic means through which we gain print literacy, we do gain a great deal of information through non-print visual sources. In fact, children learn to "read" pictures long before they are able to read words. They learn to recognize *logographs*, symbols that represent entire words or phrases, for instance the symbol "4" represents the word "four." Children are able to use this logographic reading to recognize signs and logos such as a stop sign, the Pokémon logo, the McDonald's arches or the desktop icon for a favorite computer game. Research suggests that this logographic reading assists in the acquisition of print literacy (Cronin et al. in Pressley, 2006).

Semiotics

In his work on what children learn when learning to write, Kress (1993) writes, "In culture — and literacy is a cultural phenomenon in simply all its facets — everything has meaning; nothing we see is without meaning" (p. 154). Letters are signs that represent sounds. Putting those signs together makes other signs: words. Other, non-alphabetic languages have written signs (logographs) that represent words directly. But as mentioned in the above discussion of literacy, there is more to communication than the printed or spoken word. We "read" other visuals as well.

Semiotics is the study of signs. Although the term includes printed material and street signs, those are only small parts of what semioticians call *signs*. A sign can be body language or even a spoken word. According to

Moriarty (2004), it is "anything that stands for something else" (p. 228). The philosopher Charles S. Peirce categorized three types of signs that can be considered in a visual semiotic context: *iconic*, *indexical* and *symbolic*. *Iconic* signs resemble the things they represent. *Indexical* signs indicate associations or concepts related to the sign. The classic example used is that of *smoke* being indexical of *fire*. The *symbolic* sign, a focus of the research described in this article, is a visual that has come to represent some concept. A mascot for a sports team as well as graphic devices such as arrows and speech bubbles can be included in this category (Moriarty, 2004).

Table 1. Peirce's Three Types of Sign (based on Moriarty, 2004)

Type of sign	Definition	Example
Iconic	Looks like what it represents	A photo; an illustration; an object
Indexical	Indicates the existence of something	Smoke means fire; symptom means disease; a smile means happiness
Symbolic	Stands for something, conventionally understood	A flag for a country; a line through a circle for "no"

Artistic Conventions

Literate cultures' use of the symbolic mode can be confusing to those from non-literate backgrounds. Ong (1988) said that those from oral cultures learn to think in a different way: more concrete and situational. For this reason, some of the artistic conventions that are used in visual communication are not understood by those without literacy backgrounds. These conventions are symbolic in nature, not literal or *iconic*. Artistic conventions that have developed in western cultures, but may not be commonplace elsewhere, include graphic devices, vanishing point perspective, abstract drawings, silhouettes, shading and things depicted out of scale (Schiffman, 1995). All of these artistic techniques can cause confusion. An example of how abstraction can cause confusion or even horror is how a drawing of a single body part out of context can be considered confusing, gory or simply absurd (Hill, 2008; Schiffman, 1995; Zimmer & Zimmer, 1978). A perspective drawing of a cup in the foreground and another cup in the distant background may be seen not as one near cup and one far cup, but as one large cup and one very small cup, given that the distant cup is drawn very small to show distance. Language teachers who might use a perspective drawing like this to teach the concepts of "this cup" and "that cup" would not be able to rely on the 2-dimensional representation (Hvitfeldt, 1985).

Specific graphic devices have become symbolic signs that are generally understood by the visually literate within our literate culture, part of what could be called our *visual lexicon*. Cultural codes fix meaning to those signs

(Moriarty, 2004). Those who are new to the culture will need to learn these graphic conventions in order to understand what is being communicated. Some common graphic devices are those that are familiar to readers of comics in western cultures, such as speech and thought balloons. These devices are used to add a dynamic element to static, two-dimensional images. Someone who has never seen a thought balloon might not interpret the words contained therein as being unspoken thoughts of the character they are connected to, or that there is any connection at all between the two elements. Rossiter, Derwing and Jones (2008) offered a 33-item list of criteria for evaluation of picture stories for use in L2 research. Item #14 on their list is "*Are the illustrations free of word balloons and symbols (e.g., arrows)?*" (p. 327). This research provides some ideas as to why this should be considered.

Educational Background and Visual Literacy

The visual literacy of non-literate participants is not a major area of study for second language education researchers, although some noteworthy studies have been performed (Cook, 1980; Hvitfeldt, 1985; Reis, Faisca, Ingvar, & Petersson, 2006; Strube, van de Craats, & van Hout, 2009; Whiteside, 2008). These studies give us some ideas of characteristics of these learners' visual literacy. The Reis et al. (2006) study compared literate and illiterate participants' ability to identify common objects in photographs and drawings. All participants were found to be able to better identify objects when color information was added to both photographs and drawings. The addition of color made more of a difference for the illiterate group, whose performance increased much more than did the literate group when viewing color photos and drawings. The authors suggest that since the illiterate group lacked formal education, they hadn't had "the opportunity to systematically learn to practice and process two-dimensional representations" (p. 53). In addition, Reis et al. include the idea that regular reading and writing also improve visual skills through practice of pattern recognition and scanning visual representations. The life-experiences of the illiterate participants simply required them to read very few two-dimensional, black-and-white objects. Reis et al. did not look at symbol identification, rather focused on iconic depictions of common objects.

These research findings have implications for language learning. Teaching that makes use of pictures may be less-effective than expected for some populations. Many learners are accustomed to learning in ways that don't involve the use of symbolic visuals. The research of DeCapua and Marshall (2010) has focused on how to bridge the gap between the learning styles emphasized in our culture and those of students with limited or interrupted formal education (SLIFE). Students in western educational systems are expected to learn in academic, often abstract ways,

whereas SLIFE are accustomed to learning through more real-world, pragmatic tasks. The symbolic visuals used in educational materials are often abstract signs, and in most uses are not meant to have any immediate pragmatic function for learners outside of classroom objectives. This can lead to confusion for learners who see value in learning for more immediately relevant situations.

Cultural Background and Visual Literacy

Our culture relies heavily on visuals — visuals that include printed words. Stein (2000) notes that some cultures rely more heavily on other semiotic modes, like gestures or spoken words; they rely less on visual images. The same information that is passed on by way of a sign or TV commercial may be passed on by word of mouth, but it can't be claimed that visual literacy is a competency only possessed by those who grew up in western society. Every sighted person learns by seeing. Where cultures may differ is in the types of visuals from which one is accustomed to gaining information. Linguist Daniel Everett (2008) describes his experience living in an Amazonian community. He says that villagers would see things in the environment, in some cases dangerous wildlife, that his eyes could not initially make out. These same villagers, when shown photographs, had a hard time understanding what they were supposed to be seeing. Photos were not part of their world. They needed to be taught how to make out two-dimensional images, just as Everett needed to be taught how to "see" in the Amazon. Indeed, we might be named the equivalent of "visually illiterate" were we to try to navigate a culture that finds meaning in other kinds of signs, one that has developed a different way of seeing. Zimmer and Zimmer's (1978) definition of visual literacy, "the ability to understand at a conscious level the visual language used within a particular culture or cultures" (p. 21), reflects the possibility of multiple visual literacies. The focus of this research can be said to look at how the visual literacies of adult ELLs affect their ability to understand the visual language used in ESL materials, specifically, graphic devices commonly used.

METHODS

A research project was conducted in order to learn more about how adult ESL learners understand the visuals that are used in educational materials. The following is a description of the methods used in this study.

Participants and Setting

The research took place at a large adult basic education (ABE) program in a suburban public school district in the upper Midwest. A convenience sample of nine learners from ESL classes participated in the study. All participants were adult Somali women. Each of the participants was categorized as a beginning or literacy level ELL. Participants' L1 literacy was also assessed. Five participants were L1 non-literate. Four participants had some L1 literacy. Participants are assigned pseudonyms. Privacy and ethical concerns are adhered to in accordance with the Hamline University Institutional Review Board.

Materials

Twelve images were selected for use in this study; each image contained a commonly used graphic device. Some of the devices were used more than once as they have multiple uses. The arrows, in this collection of images, were used to indicate future movement, show line of sight, show body movement, or draw attention to an important element in an image. Different shapes of balloons or bubbles were used to indicate speech, thought, magnification and group singing.

All of the images under investigation were enlarged versions of black and white illustrations from *Step forward intro level multilevel activity book* (Mahdesian & Adelson-Goldstein, 2008) and *Step forward level 1 multilevel activity book* (Mahdesian & Adelson-Goldstein, 2006), life-skills focused books used in ABE programs. In some cases the images were edited to better suit the purposes of this study. Each image contained one or more *iconic* signs, usually a depiction of a person, and a *symbolic* sign, a graphic device used to convey some meaning in the ESL text. In most of the illustrations all but one or two of the *iconic* signs were removed by the researcher. One reason for this was to encourage viewers to attend to the elements under focus in this study. Removal of these *iconic* elements also prevented participants from using contextual clues to find meaning, rather than using the graphic device. Except for the digits on the clock, all alphanumeric print was removed from the illustrations. As above, this was in the interest of context removal. The graphic devices used in this study and the meanings intended by their use in the *Step Forward* series are listed in figure 1.

Figure 1. Images and their Intended Interpretations

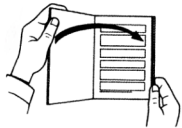
1. Bubble indicates speech.



2. Lightning bolts symbolize pain.



3. Arrow shows future movement left to right (close book).



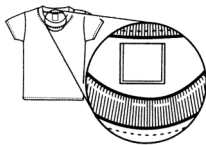
4. Bubble indicates unspoken thoughts.



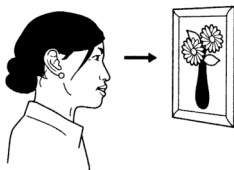
5. Arrow shows body movement (stand up).



6. Larger image shows magnification.



7. Arrow shows line of sight.



8. Shading and arrow show passage of one hour.



9. Arrow is used to draw attention to important part (corner).



10. Bubble is used to magnify/explain.



11. Bubble with musical notes indicate singing together.



12. Compass rose indicates image is a map.



The images were arranged, one per page, in an order predicted to increase in difficulty of interpretation. The order of images purposefully did not include any consecutive uses of the arrow or similar bubbles to help avoid any confusing influence they might have had.

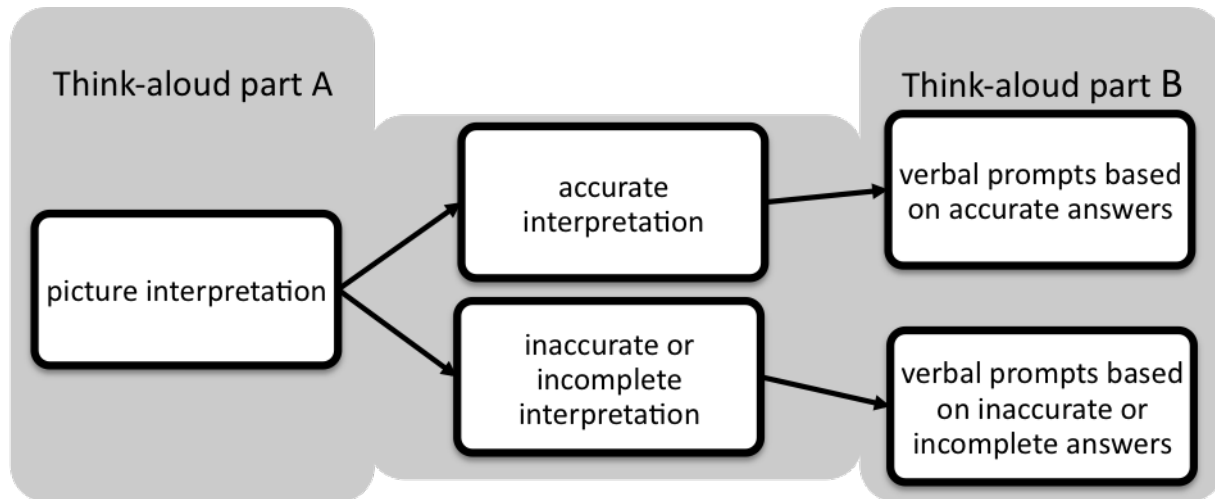
Procedure

To learn more about the visual literacy of the participants, a one-shot interview and "think-aloud" session was conducted. The session was administered by an L1 interpreter under the direction of the researcher. The first part of the session was a demographic interview. The data collected for this portion did not reveal significant findings, therefore this article focuses on the results of the think-aloud session.

The second part of the interview is a kind of think-aloud session. In a true think-aloud session, a participant does some task and describes what is going on in her mind as she does so. As described by Mackey and Gass (2008), this way a researcher can gather information about how people solve problems. For this study the articulation of the thought process was not in focus, rather it was more of a picture narration to tell whether the participant had certain graphic devices in her visual lexicon. The participant was shown 12 illustrations, one at a time. The L1 interpreter asked the participant to interpret each illustration and made note of responses. Verbal prompts were used to elicit responses and the L1 interpreter gave English interpretations of L1 responses. Based on these interpreted responses, the researcher guided follow-up questions. Whether or not the participant correctly identified the meaning of the graphic device, the L1 interpreter used follow-up questions to gain more information about what the participant saw in the picture, and how she made meaning from the illustrations. Responses to these prompts provided qualitative data beyond simply determining whether a participant understood an illustration. They provided some insight into why she did or didn't understand. Follow-up questions also helped clarify what was understood and how participants came to have a given understanding.

The think-aloud session for each illustration had two parts, think-aloud part A: a quick determination of whether the participant understood how the graphic device was being used, and think-aloud part B: the follow-up prompts to gain more qualitative information [see figure 1].

Figure 2. Diagram of think-aloud verbal protocol.



When a participant offered an accurate interpretation, the interviewer directed follow-up prompts related to why a participant gave that particular response, what clues she used to determine the meaning and where else she had seen the graphic device used before. When a participant offered an inaccurate or incomplete interpretation, follow-up questions prompted the participant to make further guesses as to the meanings of the signs and explanations of what had influenced these responses.

The L1 interpreter facilitated the session in Somali. The participant was encouraged to respond in either Somali or English, since the goal of the study was to determine whether the participant understood the drawings, not whether she could respond to them in any particular language. Students were allowed to use either Somali or English in the think-aloud in order to prevent inadequate L2 vocabulary from inaccurately reflecting a lack of understanding.

Data Analysis

Upon completion of the session, the L1 interpreter and the researcher became co-raters and immediately discussed each participant response. Notes were compared and determinations were made as to how accurately a participant interpreted each image. Based on notes taken throughout, co-raters discussed how each participant responded. Each response was coded as *yes*, *no*, or *incomplete*. *Incomplete* was recorded if a partial response was given or if there was a difference in opinion between co-raters as to whether the participant accurately interpreted the graphic devices. The L1 interpreter also provided cultural insight as to why a participant may have described an image a particular way. Video recordings were made for later review of both the think-aloud sessions and the post-interview co-rater sessions.

RESULTS AND DISCUSSION

The following section presents and interprets the data that was collected for this research. Major findings are described concerning the interpretation of iconic and symbolic signs, the role of context in illustrations and the ways in which classroom and real-world influences affected participants understanding of the images used in this study.

The results of the interpretation of images are divided into two parts. The first part is shown as quantitative data on whether participants accurately interpreted the graphic devices in each image. The second part is a discussion of qualitative data, providing deeper descriptions of participant interpretations. This data is provided in summary form as well as through the inclusion of noteworthy individual think-aloud session responses.

Of the 12 images, only four were judged to have been fully and accurately interpreted by a participant. For the majority of the images, participants had little trouble describing the non-symbolic elements, but the symbolic graphic devices made accurate interpretations of the images problematic. No participant was able to accurately interpret images #3, #4, #6, #8, #9, #10, #11 and #12 as intended by the publishers of the materials from which they came. No participant had even a partially correct interpretation of the graphic device used in image #6. All other images had at least one accurate or partially accurate interpretation by a participant. Table 2 shows participants' accuracy of interpretation for each graphic device.

Table 2. Participants' interpretation accuracy

	image	1	2	3	4	5	6	7	8	9	10	11	12
name													
Basro		yes	yes	inc.	no	no	no	yes	no	yes	inc.	inc.	no
Farhiya		yes	yes	no	no	no	no	yes	no	yes	no	no	inc.
Deka		no	yes	no	no	yes	no	yes	no	yes	no	no	no
Ifrah		yes	inc.	no	no	no	no	yes	no	yes	no	inc.	inc.
Khadra		no	inc.	no	no	yes	no	yes	no	yes	no	no	no
Hani		no	yes	no	no	no	no	yes	no	yes	no	inc.	no
Asha		no	yes	no	no	no	no	yes	no	yes	no	no	no
Geni		no	no	no	inc.	inc.	no	yes	no	yes	no	no	no
Ebyan		no	no	no	no	inc.	no	no	inc.	no	no	no	no

Note:

yes = participant interpretation of graphic device matched meaning intended

no = participant interpretation of graphic device did not match meaning intended

inc. = participant's interpretation was deemed incomplete or partially accurate

No participant was able to accurately interpret more than three images. The participant who performed best accurately described the function of the graphic device in three images and had partial accuracy in three more images. Each of the nine participants rated at least two partially correct or two correct. A summary of results is shown in table 3 below.

Table 3. *L1 literacy and number of images accurately interpreted - as ranked by number of accurate interpretations*

Name	L1 literacy	yes	incomplete	no
Basro	L1NL	3	3	6
Farhiya	L1L	3	1	8
Deka	L1L	3		9
Ifrah	L1NL	2	3	7
Khadra	L1L	2	1	9
Hani	L1NL	2	1	9
Asha	L1L	2		10
Geni	L1NL	1	2	9
Ebyan	L1NL	0	2	10

note:

L1NL = First language non-literate

L1L = First language literate

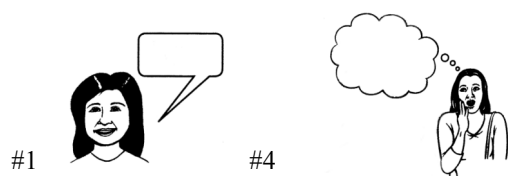
L1 literacy was not a clear factor in visual literacy. The participants with both the greatest number of accurate interpretations and lowest number of accurate interpretations were L1 non-literate. The L1 literate participants showed greater mastery of arrows as graphic devices; the L1 non-literate showed greater familiarity with bubbles as graphic devices.

Iconic and Symbolic Signs

The categorization of signs proposed by Peirce can be used to discuss elements of the educational illustrations used for this study. The iconic signs, those that look like the things they represent, presented little problem for participants. In most cases the iconic signs represented people doing some action. There were often both iconic and symbolic elements used to convey meaning in the images, and participants used a combination of these elements to find meanings. The symbolic elements, graphic devices, were more problematic than the iconic signs. Often symbolic signs were interpreted as iconic.

Participants' ability to accurately describe the functions of the graphic devices used in this study was much lower than expected. Basro and Ifrah were better able to recognize the symbolic signs than the rest of the participants. Although some very telling data were obtained through the inaccurate interpretations of the

participants, for the purpose of this article, the responses of the two participants who showed the greatest mastery are the focus of the discussion of the results.



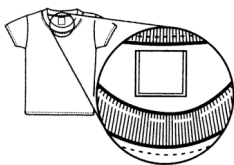
Both Basro and Ifrah were aware of the function of the bubble as a symbol for speech and recognized most uses of the arrow as an indication of direction, but there were some exceptions that were typical of responses given by other participants. A tendency was observed for participants to interpret unfamiliar symbolic signs as iconic signs. Image #4 depicted a thought bubble emitting from a woman's head. Basro interpreted this not as a symbol, as she did the speech bubble, but as air coming out of the woman. Four other participants also gave indications that the bubble was a physical object that was causing distress to the woman. One participant said it was a cloud and raindrops hitting her on the head.



Image #10 shows a man who is shopping, holding a piece of paper. In the original illustration the bubble attached to the paper shows a list of items for purchase. Not one of the participants interpreted the bubble in that way. Only Basro interpreted it as a symbolic sign, but as an indication of speech. All the others who made an attempt to interpret the sign gave interpretations that indicated that the bubble was an iconic sign. Four participants said that it could be a door. There were three interpretations that related to the object in the man's hand: an access card reader, barcode scanner and grocery checkout.



Most participants recognized that the lightning bolt lines coming from the woman's head in image #2 represented a symbolic sign, either meaning pain or fever. Basro cites having learned the sign in ESL class. Though this sign had certainly appeared in her coursework, Ifrah didn't recall this interpretation. She saw "something going into the ears" or "going out of the head." If Ifrah saw the lines as being something physical going in or out of the woman's head, it appears that she interpreted symbolic sign as iconic.



#6

The magnification graphic device used in image #6 was not accurately interpreted by any of the participants. All participants recognized the iconic T-shirt sign, but the symbolic sign caused confusion. All of those who offered interpretations for the magnifying circle mentioned circular iconic signs, such as a ball, a tire or a speaker.

The Roles of Context

Participants didn't easily interpret the symbolic signs used in the illustrations. Despite this, many times the participants were able to understand an illustration, anyway. Other contextual elements often provided the clues necessary to accurately interpret a picture. For example, all participants gave interpretations for image #2 that indicated that the woman was experiencing some discomfort or sickness, but four of them cited only iconic signs as reasons for the interpretation given. They didn't need to understand the symbolic sign for pain. The hands and facial expression were sufficient clues to communicate the concept.



#5

The iconic context can be all that is necessary to interpret an illustration or give clues as to the meaning of a symbolic sign, but in some cases the iconic context can lead to a misinterpretation of a symbolic sign. An example of this phenomenon was observed in how participants described image #5. All participants said that the man was

either getting up or sitting down, but when asked about the meaning of the arrow sign, five participants said that it indicated that the man was having back pain. Participants cited the position of the man's hands as the reason for the interpretation of his bodily movement. His bent body and the symbol at his back were clues that led to the interpretation of pain. Both Basro and Ifrah noted the man's body and the position of his hands on the armrests as indications that he was getting up, but both participants said that the arrow meant that the man was in pain. Only two participants offered unequivocal interpretations of the arrow as indication of upward movement, but the iconic context was enough for the other participants to understand movement in some direction. This image presented a strong example of one symbolic sign being consistently interpreted as another symbolic sign.

In cases when a participant didn't understand the symbolic sign, they often used the context created by the iconic signs to come up with logical, even resourceful interpretations. Although participants did not understand the use of the magnification bubble in image #10 as intended, they easily identified a man who is shopping. This understood context was used to create meanings related to the iconic context of shopping. Participants made creative interpretations for the sign (a barcode scanner, an exit, an entrance, a shopping cart corral) that fit in with the grocery store context. Using the iconic context in image #4, the woman's facial and body language, four participants interpreted the thought bubble as a physical object that was the source of the woman's apparent distress.

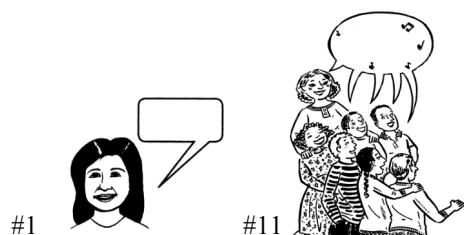


Image #11 featured two graphic devices, the multi-stemmed speech bubble and the musical notes which together indicated group singing. Again, no participant interpreted the picture as such, but with some prompting Hani said that the bubble was "what they are screaming from their mouths." This is noteworthy because Hani was not able to interpret the more simple speech bubble from image #1. It seems that the greater context of image #11, the people with their mouths open, provided sufficient context that was absent from image #1. Ifrah said that a teacher and students were talking or singing and that the bubble was what they were saying, but when asked why she thought they were singing she said it was because they were facing the same way like a choir. She made no mention of the musical notes. Basro also recognized the group as having a family conversation but that not everyone was speaking since the number of stems on the bubble (not her terminology) didn't match the number of people.

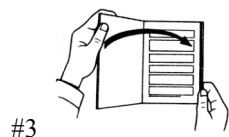
Interestingly, she also suggested that they could be *listening* to music; so it's possible that she recognized the symbolic musical notes but didn't relate them to the bubble to produce the *singing* interpretation.

The results of this research suggest that context influences interpretation of graphic devices. For the purposes of this research, much of this important context, including all words were removed. Had the unaltered original illustrations instead been used, participants may have shown a greater ability to interpret the images as intended.

Classroom and Real-world Influences

Both Basro and Ifrah are L1 non-literate, but their visual literacy was shown to surpass that of their L1 literate colleagues. It appears that knowledge of the graphic devices used in this study came from exposure through both academic and non-academic means. There were three participants who identified the sign in image #1 as an indication of speech. Basro mentioned how as a child in Somalia she had seen the sign used in the comics section of her father's newspaper. Ifrah had seen it used in her children's books. Two of the three also mentioned having seen the sign used in ESL class materials. This previous exposure also led some participants to transfer their knowledge of the *speech bubble* to bubbles used in other images. Ifrah mistakenly interpreted the *thought bubble* in image #4 as indicating spoken words. Although image #10 uses a bubble to magnify or explain a smaller image, Basro saw the bubble as indicating what the man was saying. She said that he was reading aloud the paper in his hand. Though Basro and Ifrah didn't recognize the bubble used in combination with musical notes in image #11 as an indication of singing, they both recognized the multi-stemmed bubble as showing speech by a group of people.

One limitation of this study could be seen as coming from recent classroom exposure to some of the graphic devices used. The previous month's curricular focus on issues of health was likely to have had some influence on participants' interpretations. Although the exact illustration of the woman experiencing pain was never used in class, similar images would have been fresh in the minds of participants, leading to greater numbers of accurate interpretations of the symbolic signs in image #2. Conversely, this influence may have also led to the number of inaccurate interpretations of image #5. The arrow sign near the man's back was confused for other types of lines that are used to show pain in line drawings. While this influence may be considered a limitation for this study, it can also be seen as evidence that the graphic devices used in educational illustrations are indeed learnable and transferable to other contexts, if not always accurately.



As mentioned above, familiarity with graphic devices can come from exposure both in the classroom and from outside of the classroom. Some outside-of-class exposure may have led to interpretations that reflect real-world uses of the graphic devices, interpretations that contradicted the meanings intended by the publisher. An example of this was seen in the interpretations of image #3. Six of the nine participants gave interpretations that indicated that the arrow on the book was visible to the person holding the book. Four participants, including Ifrah, stated that the arrow indicated a place for a person to write something. The study's L1 interpreter conjectured that the participants' experience with government and social services agencies, who often use stickers with arrows to indicate where a client needs to sign, influenced their interpretations. Although the symbolic sign was meant for the viewers of the entire image, a majority of the participants saw a more practical interpretation — as most likely still as a symbolic sign but for the benefit of the person in the illustration. This *real-world* interpretation is consistent with DeCapua and Marshall's (2010) contention that students with limited or interrupted formal education tend to find more value in pragmatic situations than in symbolic ones that have little bearing on the immediate.



Another example of real-world practicality interfering with the intended meaning can be seen in how participants responded to image #9. The illustration was intended to communicate the concept of *corner*, yet seven of the participants described the arrow as indicating how to enter the building. One reason that may have caused participants to see the arrow pointing to the entrance is that there is a legitimate, *real-world* reason for an arrow to be pointing to a door, so that one can find the way in. It's hard to think of a practical reason why an arrow would direct one to a corner, the meaning intended by the illustrator.

Limitations

One limitation to the study was related to the convenience sample of learners who participated in the study. The study intended to have two equal-sized groups of participants with similar characteristics and two clearly different L1 literacy backgrounds. Unpredictable attendance on data collection days and a scarcity of L1 literate beginning learners made the ideal sample unavailable.

This study was limited, in some ways, by the difficulty of the image interpretation task. It's hard to consider a test valid if none of the test-takers got even 50 percent correct and most did much worse. Although these misinterpretations provided interesting information on how beginning adult ELLs see symbolic signs, the fact that so few of the graphic devices were accurately interpreted made other data unavailable. For example, more information about how and where participants learned about the graphic devices was sought, but since they had not yet acquired that knowledge in most cases, that line of questioning was rarely employed.

The participants' responses were likely influenced by the curriculum of the previous month. Most classes had just finished a health care unit, and consequently health-related pictures were fresh in participants' minds. As mentioned earlier, this likely helped participants accurately interpret the *headache* symbol in image #2. The recent exposure to health-related pictures also may have led to some inaccurate ideas. Participants mentioned health-related interpretations for images #4, #5 and #12.

Participant affective factors may also have interfered with data collection. Some participants were more willing to speak and to take guesses when unsure, which resulted in some interesting data. Others were more reticent and only described images when they were confident of their answers. Also, two participants may not have performed as well as they could have due to clearly being distracted by the L1 interpreter's note-taking.

IMPLICATIONS

Iconic Images in Context are more Reliable

In the present study it is clear that symbolic signs are less easily recognizable than iconic signs. When pictures rely on unfamiliar graphic devices to convey meaning, it can cause confusion. If teachers can choose to employ images that rely more on iconic imagery, students may be more likely to understand the meanings intended.

In this research some of the images were interpreted as intended even without a participant needing to understand the graphic devices used. The context of the picture, body language, facial gestures, or setting, was all that was needed. For example, image #2 used redundant signs, both symbolic and non-symbolic, to convey that the

woman had a headache. For some students the iconic signs provide enough information to convey the meaning. Other students might use the iconic signs to figure out what the symbolic sign means. Iconic signs provide context for understanding symbolic elements. In this study much of the context was removed from the images, including all text. Most of the illustrations were altered from how they might normally be seen in class. The fact that there were four participants who were not able to interpret any of the four *bubbles* used in this study suggests that the inclusion of words, or the greater context under which these bubbles are regularly encountered is what makes these materials intelligible when students are exposed to them in class. Educators and producers of educational materials should be careful to include enough context in illustrations so that symbolic signs alone are not relied upon to convey meaning.

Teaching and Learning Visual Literacy

The task that participants were asked to perform proved to be more difficult than expected. It's not clear that the context removal applied to the images was to blame. It may be that the illustrations, even presented as intended, are not easily interpreted across cultural and educational backgrounds. Teachers cannot assume that students from diverse backgrounds share the same visual literacy concepts. Given that so many of the participants in this study were unable to interpret the functions of the majority of the graphic devices, a teacher might infer that he should avoid using graphic devices in language instruction. But to the contrary, since these graphic devices are common in our culture they could be considered essential knowledge. Full literacy includes visual literacy. Symbolic signs can be added to learners' visual lexicons along with other content being learned. Teachers of students from backgrounds that rely less on 2-dimensional visual communication may choose to explicitly draw attention to these devices as they are used in relation to learning objectives. Whiteside (2008) suggests that learners could benefit from "a basic orientation to texts, pictures and to the implied relations between the two" (p. 106).

Participants gain visual literacy from a variety of sources. Some participants cited school, specifically our ESL classes, as sources of their knowledge of the graphic devices under focus in this study. Most participants mentioned knowing about arrows from street signs. Basro and Ifrah learned about speech bubbles through comics and kids books. As mentioned above, participants' real-world experiences influenced their interpretations of "school-world" images. Though these signs may not have been part of everyone's daily life in Somalia, the fact that they have been learned through a variety of educational and non-educational sources points to the fact that visual literacy is learnable, and therefore teachable, and that formal education is not the only way of gaining visual literacy.

As learners in ESL classes are exposed to symbolic signs that they do not understand, they will use whatever background knowledge they have to understand what they see. Teachers can expect creative, even ingenious interpretations, as was seen in the data collected for this study. If a learner had never seen a thought bubble used before, she'll relate it to the most similar thing she had seen; in this study participants saw a cloud or an exhalation of air. The interviews showed that learners will also use the context of the image and relate it to their own lives. These real-world situations can serve as jumping off points for teaching the symbolic, as suggested by DeCapua and Marshall, bridging the gap between a more familiar pragmatic way of learning and, the more often, abstract way they are expected to learn in class.

Visuals are especially Useful with Low-literate Learners

Consideration of the fact that Basro and Ifrah, the two participants who successfully interpreted the greatest number of graphic devices were L1 non-literate may suggest that there is something special about how they see images. Though this research has demonstrated that the symbolic signs commonly used are not universally understood, visuals are very effective instruments in communicating meaning. The images used in this study were all black and white line drawings, which research suggests would lead to lower image interpretation ability among non-literate participants (Reis et al., 2006). In the current study, two of the participants among the least formally educated showed the greatest visual literacy skills. As non-readers, they may have developed better *logographic* reading skills. As this kind of student begins to gain literacy skills, images can be important common grounds from which to begin. On the other hand, the participant with the fewest accurate interpretations was also L1 non-literate. This underscores the need to be aware of varying visual literacy among adult learners, even those who appear to be from similar backgrounds.

The findings of this study offer some considerations for the design or selection of images for use with L1 non-literate adults. The Reis' et al. study suggests that illustrations of objects are more easily interpreted when they are drawn with color, while the current research points out that iconic signs within those images are much more easily interpreted than symbolic signs. The consideration of the presence of symbolic signs, as Rossiter et al. suggest (2008), can inform selection of instructional and research materials that contain illustrations.

CONCLUSION

In this research the images from ESL educational materials were examined. This examination was focused largely upon symbolic signs, the understanding of which may often be taken for granted. Findings suggest that while iconic signs are more reliably understandable than symbolic signs, those iconic elements provide context that aids in interpretation of illustrations, including the functions of the symbolic elements. The responses of Basro and Ifrah provide examples of how real-world learning can trump formal education when it comes to interpreting graphic devices.

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