"I see a drawing. I think it is. . ." Investigating visual 'literacy' among adult learners in KwaZulu-Natal

Katherine Arbuckle

Abstract

This article reports on a research project in KwaZulu-Natal which investigated how Zulu-speaking adults who attended literacy classes interpreted illustrations from health education materials. Individual interviews were conducted in rural and urban areas, where participants responded to a range of pictures in order to assess the effectiveness of different approaches to communication. The research intended to discover whether dated guidelines on illustrating for readers with limited education are still useful, and to offer insights to guide the future practice of illustrators in similar contexts.

Patterns of interpretation were observed which suggested different levels of interpretation of the illustrations, revealing ways in which participants made and expressed meaning from what they saw. These levels correspond with semiotic theories of visual communication. Semiotic approaches to visual analysis provide tools with which to explore the construction of meaning. In this way the article theorises visual interpretation in the context of health education materials designed for audiences with limited education.

Introduction

This article reports on a research project in KwaZulu-Natal which investigated how Zulu-speaking adults who attended literacy classes interpreted illustrations from health education materials. Firstly, an overview is provided to contextualise the study. This is followed by a discussion of the literature relevant to the topic, in order to define what is meant by 'literacy', summarise what is known about the 'reading' of pictures, and contextualise the study in a semiotic framework of visual communication theory. The research methods employed are described, before an example from the data is presented, to enable the discussion of the findings. Lastly, conclusions summarise what these findings mean for illustrators and producers of illustrated health education materials.

Context

KwaZulu-Natal is a province with many economic, social and political challenges, including public health problems such as high rates of infection with the Human Immuno-deficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) and tuberculosis (TB) (Office of the Premier, 2012). There is an ongoing need for important information on such issues to be communicated to the public.

In education, multimodal approaches to communication can be an effective way to address diversity amongst learners at all levels of education, through combining visuals with word based texts (Archer, 2006). Illustrated educational print materials generally have definite intended meanings, which the producers attempt to make explicit, because in health education understanding the correct information could sometimes make the difference between life and death. Thus, this research sought to gain insights into the ways in which adults with very limited education interpret pictorial information, in order to maximise the communicative potential of illustrated health education materials.

In Southern Africa, education and mass media are still unevenly distributed between rural and urban areas, unlike in developed, "media saturated Western societies", and people who are not used to seeing visual media may not understand the intentions of illustrated messages (Lagerwerf, Boer and Wasserman, 2010, p.3). Figure 1 is a photograph of the view from one of the rural literacy centres, at Ndodeni, where interviews for this study were conducted. Although one does encounter the occasional billboard, advertisement or signpost including a picture, the overwhelming characteristic of this landscape is open space. There is a dramatic contrast between this open landscape and that of a developed urban area.

Figure 1:   View of the landscape at Ndodeni, near Creighton, taken from the Family Literacy Project building

Literature on visual 'literacy' and communication

Literacy and its converse term illiteracy have been recognised as insufficient concepts to describe the multimodal, everyday practice of 'literacies' which extend beyond the ability to read and write a language (Janks, 2014; Kell, 2011; Kress and Van Leeuwen, 2006). In this article, these contested terms are used with caution, with full awareness of the differences between "autonomous" and "ideological" models of literacy (Street, 2005). In this research, people's basic abilities to read word-based text has bearing on the design and use of print media and illustrations.

The official South African literacy rate now hovers at round 92.9% (STATSA, 2014, p.11), however, there is substantial agreement that the actual literacy rate among youth and adults is difficult to ascertain and is likely to be substantially lower than is officially claimed by government (Gustafsson, Van der Berg, Shepherd and Burger, 2010; Posel, 2011). Marginalised groups such as older adults, women, people with disabilities, and those living in rural areas tend to have higher rates of illiteracy (Rule, 2006). In addition, there are grave concerns about the low achievements in reading and literacy in South African schools when compared with international benchmarks (Howie, Van Staden, Tshele, Dowse and Zimmerman, 2011; Spaull, 2013). Thus public education initiatives need to take into account that the audiences of campaigns may not be able to read written text messages. Even in the digital era, locally produced

print materials have an important role to play in basic education and extension activities or media campaigns (Goldstein, Perlman and Smith, 2008; Maes, Foesenek and Hoogwegt, 2008).

Educational materials have traditionally relied on pictures to convey key information in various ways, particularly in development work targeting adults with limited literacy skills. Visual communication has become increasingly dominant, as the rise of the 'visual' in global culture becomes a defining feature of contemporary society (Avgerinou, 2009). In well-resourced urban areas, it is easy to take this media "ocularscentrism" for granted, for it has become the cultural 'water' in which the urban, educated, and technologically advantaged swim (Rose, 2001, p.7). The ability to understand ('read') pictures is regularly assumed to be an inherent human ability (Hoffman, 2000). Many unwittingly subscribe to the 'universality hypothesis', which suggests there is little difference in the understanding of visuals by viewers with different educational levels and backgrounds) although research into visual literacy and work in development contexts suggests otherwise (Carstens, 2004). For example, a comic book about the life of Nelson Mandela "doesn't exclude people with low literacy levels" (Mohlala, 2008), and a comic on measles was developed for children because comics are "easy to read, even for less literate children" (Uys and Madlala, 1991).

The early literature on visual literacy details plentiful examples of situations where pictures have been misunderstood, "because people do not understand perspective and pictorial conventions relating to scale or size, movement and so on." (Linney, 1995, p.20). There have been many studies worldwide on how "illiterates" interpret pictures, although the findings of different studies are often contradictory, and usually lack "purposeful theoretical orientation." (Hoffman, 2000, p.136). What effect has increased exposure to visual media had on the so-called 'visual literacy' skills of people with low literacy, many of whom dwell in rural areas? Fuglesang predicted that as development progressed, fewer people would have difficulties interpreting illustrations and the problem of "pictorial illiteracy" would "vanish" (Fuglesang,1973, p.12).

All visuals which are devised and disseminated for communicative purposes represent something else, be it information, ideas, or instructions. They convey messages by mediating between the viewer and reality (Hoffmann, 2000, p.60). This applies widely, for example, to the variety of images used in advertising, to icons on computer screens, to posters promoting health- or other campaigns, and especially to educational illustrations. Educational print materials aimed at

adults with limited literacy skills typically use illustrations to support the written text and aid understanding. This is particularly true in the health sector, where pamphlets, posters and billboards address serious problems related to diseases like the Human Immuno-deficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) and tuberculosis (TB).

Paper-based print media still have advantages in contexts where the intended audiences have little or no access to electricity and computer equipment, a situation still faced in many rural parts of South Africa (Goldstein *et al*., 2008, p.73). From the design and appearance of many educational print materials, it seems there is a lack of awareness among illustrators and commercial designers that illustrations, like written words, need decoding and are more open to multiple interpretations. Moreover, in health education, for example, many concepts are complex and challenging to portray visually.

The following advice from a classic handbook on adult literacy for development sums up the early approach:

> Village people gain their knowledge through handling, creating, or looking at actual objects or events. When they see a picture, they expect it to contain what they know about the object and not only what they see of the object. A photograph or drawing of a man in which only one leg and one arm is visible will not necessarily be recognised as a man. A drawing of a truck in which only two wheels can be seen will not correspond to what people know about trucks. In an image which shows perspective, two objects of the same size, one farther away than the other, may be perceived as two objects of different sizes. . . . It should be remembered that pictures which contain shading and foreshortening may be read literally: the person may be seen to have a scarred face or a short limb, or lack the limbs which are not visible. . . . Learners need to be introduced to images and taught to read and interpret them, just as they are introduced to words (Fordham, P., Holland, D. and Millican, 1995, p.81).

Similarly dated local work found that restricting shading (particularly on faces), the use of photographs, and a careful or limited use of background detail were recommended for people who could not read (Sejake 1993). Criteria for "visual perception and preference in illiterate people" included clarity and context (including viewers' "own experiences", and "self-relevance"), and mentioned the need to distinguish between urban and rural dwellers, while cautioning not to assume visual literacy amongst urban dwellers (Sejake, 1993, p.25). The extent to which rapidly changing and evolving media has penetrated the deep rural areas of KwaZulu-Natal since 1993, and the effects of this, is one of the motivations for this study.

More recent research affirms that illustrations have the potential to focus attention, support understanding, aid recall, and, using the example of health, encourage adherence to treatment. However, sometimes illustrations can be confusing and have the opposite of the desired effects (Houts, Doak, Doak and Loscalzo, 2006; Katz, Kripalani, and Weiss, 2006). Gaede (2010) reports that people with low literacy had difficulty with recognising objects in nutrition education materials. Even so, object recognition does not equate with being able to interpret the intended meaning of the objects depicted (Hoogwegt, Maes and Van Wijk, 2010; Boling, Eccarius, Smith and Frick, 2004, p.189; Bruski, 2011, p.88; Carstens, Maes and Gangla-Birir, 2006, p.222). It is notable that more recent investigations tend to shift focus away from technical concerns of matching different illustrating styles to particular audiences, towards theorising visual communication and meaning-making (for example, Gaede, 2010; Bruski, 2011).

Visual communication theory

Semiotic approaches to communication consider the production and exchange of meaning (as opposed to transmission), to account for how people interact with texts and visuals to create meaning (Fiske, 2011). Semiotic analysis requires understanding of the types and structures of visual signs, combined with the notion of layered meaning making in terms of denotation (a sign's literal meaning), and connotation (ideas and values associated with sign) (Barthes, 1977).

C.S. Peirce (1932) described signs as being triangular in nature, consisting of a relationship between the sign itself, the object to which it refers, and the interpretant of the sign, seen in the diagram below.
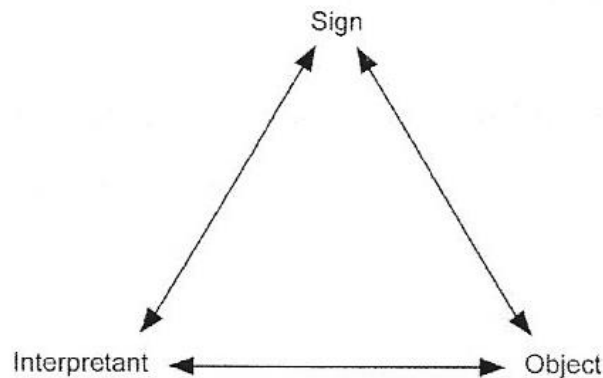
Figure 2:   Peirce's elements of meaning (Fiske, 1990, p.42).

The object and the sign together produce the interpretant. The latter is not the viewer/reader of the sign, but rather "a mental concept produced both by the sign and by the user's experience of the object" (Fiske, 2011: 40).

Peirce (1932) identified fundamental sign categories as the icon, the index and the symbol, also usually depicted in a triangular relationship, as in Figure 3, and most signs are combinations of the three types, although one of the types is usually dominant.
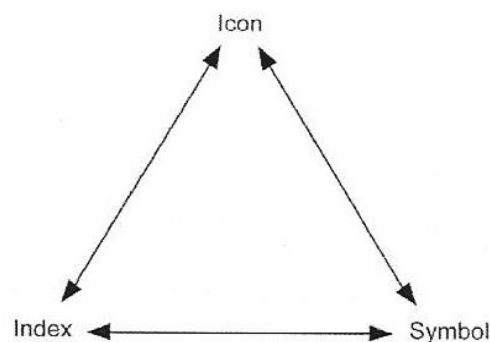
Figure 3:   Peirce's categories of sign types (Fiske, 1990, p.47)

An icon is similar in appearance to the object that it represents, and is thus an essential part of visual communication. There are three different categories of icon: images, diagrams, and metaphors (Peirce, 1932). Images share basic

qualities with the object, while diagrams and metaphors are more abstract and conceptual. A diagram need not look like the object(s) it represents but its parts correspond to the parts of the object(s), showing only the elements that are vital to the intended meaning of the object, and leave out the rest. By supressing certain details, a diagram "allows the mind to more easily think of the important features" (Peirce, 1998, p.13). A metaphor represents the characteristics of its object through a parallelism in something else (Peirce, 1932).

An index represents its object through a real connection, or by causing a mental association with the object. Common examples include smoke indicating fire, or paw prints showing that an animal passed by, or fever being symptomatic of illness. The sign type 'index' is sometimes described as 'symptom', for example, in Maes *et al.* (2008). In such cases, there is a physical relationship between the sign and its object, often a situation of cause and effect.

A symbol has a meaning determined by convention, that is, a rule that users of the sign share. The appearance of symbols is often arbitrary, that is, they do not look like the thing they represent. Examples of symbols include the red cross on ambulances, the red ribbon for HIV/AIDS awareness, and many logos (Fiske, 2011; Rose, 2001) Any sign is to some degree conventional, even 'realistic' icons, and agreed upon conventions are seen as the social aspect of signs (Bryson, 1991; Fiske, 2011). The meanings of certain signs are more subject to indeterminacy than others, allowing wide variations in interpretation, and this applies particularly to visual signs (Gaede, 2010).

According to Barthes (1977), meaning is layered, firstly through denotation (what or who is being depicted, or a sign's literal meaning), and secondly by connotation (what ideas and values are expressed, through a sign's associated meanings). Denotation as "the common-sense, obvious meaning of the sign" (Fiske, 1990), but connotation is far more complex, working on many levels and in a cyclical relationship with denotation. Moriarty (2005, p.231) summarises, and affirms the link with Peirce's concepts:

> A connotative meaning is "cultural baggage" attached to or associated with the object. It is derived from past experiences or repeated associations between a sign and its object. Barthes' theory is that there is a first and second level of meaning. Denotation is the starting point; meaning making then shifts to the second level where connotation takes over and delivers a richer experience of the meaning by engaging Peirce's interpretants.

Thus, viewers' individual experiences, culture and social background influence how they interpret images. The complexity and indeterminacy of visual meaning is described as 'polysemy', and images are considered to be polysemous, that is, more open to interpretation than written text (Barthes, 1977; Rose, 2001).

The most common method of addressing this is to include explanatory text with images, in the form of captions, known as anchorage (Barthes, 1977). Thus visuals encountered in daily life are often accompanied by written text (such as captioned photographs) or spoken words (in the case of television and online digital media, for instance). Barthes (1961, in Fiske, 1990) suggests that captions control the connotations an image may have, by narrowing the range of possible meanings (Barthes, 1961, in Fiske, 1990).

The concept of anchorage is relevant to this study because the research investigates illustrations that were originally developed to appear in written materials aimed at low-literate audiences. If all visuals, including illustrations, are polysemous, then what happens to pictorial interpretation when audiences are unable to read and understand the anchoring text?

Methods and process

The field of visual communication studies is interdisciplinary and fragmented (Hoffmann, 2000, Carstens *et al*., 2006) as is visual research which can mean different things (Rose, 2001; Mitchell, 2008). To address such complexities, the interpretivist paradigm and a qualitative approach to the research design was used, for its flexibility and the capacity for 'thick' narrative descriptions of participants' interpretations (Geertz 1973, in Cohen *et al*., 2011). Researching visual communication is not necessarily the same thing as doing what many understand to be *visual research*, in that data was not collected from participants using visual methodologies. The study was guided by the assertions that the meanings of an illustration can be studied at different sites – the image itself as a site, the site of production (where it is made, for what purposes), and the site of audiencing (how, where and by whom it is seen and interpreted) (Rose, 2001). A mixed methods approach to analysis, dubbed "hybrid semiotics" (Penn, 2000, p.242), explored the viewpoint of message receivers, and analysed the cues in the message to understand how the message is presented and how it is interpreted (Moriarty and Sayre, 2005).

This is congruent with a theoretical standpoint which recognises that audiences are not mere recipients but active makers of meaning, influenced by the intertextuality of other messages and experiences in their contexts.

Twenty-three individual interviews were conducted, twelve in rural areas and eleven in urban centres. The participants were all adults registered to do Level One mother tongue Zulu literacy courses at adult literacy centres. Four different organisations participated, in order to minimise the influence of a particular organisation's approach on the results.

Sixteen of the participants were female, seven were male. Their ages ranged from nineteen years to seventy-six years, the majority evenly spread between twenty to forty years of age. Fourteen of the participants reported no formal schooling at all before joining the adult literacy class, and, somewhat surprisingly, half of these were among the urban group, and the youngest was twenty years old. Since formal education has in principle become more accessible to all, one does not expect to encounter young adults with no schooling at all.

Participants were interviewed individually, away from the others. Each participant was shown twenty-four depictions on which he or she offered comment and interpretation. The interviews were conducted in Zulu through an interpreter, and recorded using a digital audio recorder and handwritten notes on a form.

Illustrations from existing health education materials were separated from their accompanying text, in order to more clearly assess if and how the visuals could stand alone and convey the intended meaning. The decision to investigate the images on their own was taken with some trepidation, because most of them had been developed to be 'read' with text, in a complementary relationship. However, the wish to discover more about how images may be interpreted by those who are not able to read written verbal texts superseded this concern and potential limitation.

The illustrations were grouped for two different purposes: one group of drawings was chosen in order to assess styles of depiction, such as black and white line drawing versus shading versus greyscale tone. The other group assessed different ways of portraying content, such as 'realistic' iconic images compared with those operating at more indexical or symbolic levels (Fiske, 2011, pp.45–46). In each group were several sets of drawings, each set

offering alternative ways or styles of depicting the same subject matter and message. The different sets of pictures were mixed up and interspersed with each other, in an attempt to lessen the cumulative effect on comprehension of viewing several pictures consecutively which depict the same subject in different ways. The interview transcripts were analysed inductively, and the patterns that emerged led to further semiotic analysis of the illustrations themselves, in order to deepen the analysis of meaning-making which included message producers and receivers.

An example

This set of three illustrations (Figures 4, 5 and 6, below) depict the Human Immuno Deficiency Virus (HIV) using different approaches to show the message content. In practical terms, the purpose of depicting the virus is not to create an accurate visual representation, as it is not critical for people to be able to identify by appearance something never ordinarily visible due to its microscopic size. However a variety of depictions of the virus' structure and outward appearance are used in treatment literacy materials and training programmes, to aid conceptual understanding of the manner and speed with which HIV reproduces itself in the body and the implications this has for treatment. In tests conducted prior to the commencement of the research, it was clear that an out-of-context image of the virus was extremely likely to be incomprehensible, and therefore the images in the research needed to have some recognisable context or object.

The first picture in the set showed a woman standing next to a board, gesturing to a paper with a typical drawing of the virus on it. As a visual cue, the woman wears a T-shirt with the slogan 'Stop HIV' and a ribbon – supposed to be the red AIDS ribbon logo. (The intended interpretation would include the following: A woman is standing at a board. She has an AIDS ribbon on her T-shirt, and she is pointing to a picture of HIV. She is teaching others about HIV.)

Figure 4:   First depiction of the virus

The next picture in the set depicted a man, looking serious and thoughtful, with a large, detailed depiction of the virus hovering near his head, as he contemplates his HIV status – in other words the virus is there to show what he is thinking about, almost like a thought balloon.

The picture was developed with input from members of a local HIV support group who recommended the 'scary monster' facial features on the virus shape. (The intended interpretation would include the following: This person looks worried. He is thinking about this scary HIV virus and wondering if he is infected, or, he knows he is infected.)
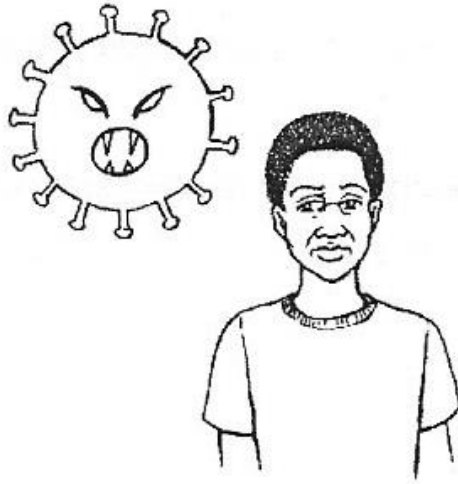
Figure 5:   Second depiction of the virus

The last image in the set attempting to depict HIV had been used to illustrate material on the immune system and HIV, and is visually and conceptually demanding because it attempts to show the reality of something that cannot be seen with the naked eye. The illustration had been supported by text in Zulu, the mother-tongue of the target audience, and was recognised from the outset as being likely to be misinterpreted or ignored due its unfamiliar nature. The image featured a hand with a cut on the finger, bleeding, with a drop or patch of blood. A circular shape contained a representation of a microscope image of blood cells including different types, along with HIV. (The intended interpretation would include the following: *This hand has a cut on the finger and is bleeding. This arrow points to the blood and shows us what is in the blood: cells, and viruses/HIV. HIV can spread in blood.*)
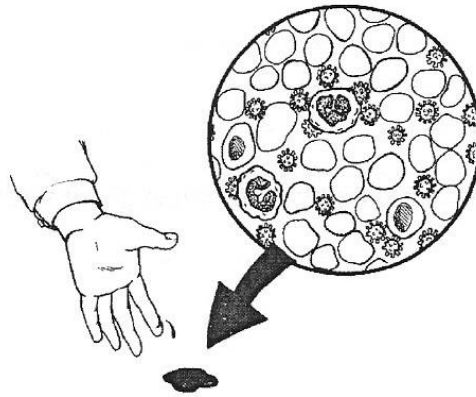
Figure 6:   Third depiction of the virus

These three images representing HIV can be summed up in the following way: Figure 4 attempts to show a depiction of the virus by contextualising it in the familiar life situation of a workshop or training session where indeed such a depiction may be used. Figure 5 attempts to show HIV using a metaphor, personifying the virus as a monstrous presence which weighs on one's conscience. Figure 6 conflates types of representation to depict in simplified terms the literal context of where HIV is found, and attempts to show both what can be seen (blood) and what can be known but not easily seen (what blood is made of).

Findings

During the interviews it became clear, as fully expected, that few of the illustrations conveyed the intended meanings on their own, without discussion or prompting, and that the participants indeed brought their own experience and differing skills to construct alternative but plausible interpretations. Many of the unintended meanings which participants attached to the illustrations were not isolated, in that quite a few of these misinterpretations were similar. Both repeated and isolated unintended interpretations were interesting.

Initially, it was illuminating to examine the alternative readings of the illustrations, and there is a diverting novelty factor in the unexpected interpretations. For example, the HIV 'monster' hovering metaphorically in

Figure 5 was identified as a watch (by four participants), a sun (five participants), and by one as a pig or porcupine head. One participant remarked on the fact that the person in the drawing had no arms and half a body. Four participants articulated that they saw eyes, mouth and/or teeth but did not identify what the owner of those features might be.

In such cases, where alternative interpretations become the rule, it is more of a novelty when an explanation approaches the producer's intended meaning. One participant described Figure 5 thus: "I see a drawing. I think its blood cells. This man, I think he is now sick." An almost 'correct' interpretation seems startling amongst the majority of alternatives expressed. In this case the participant was an urban woman, aged forty-four, who reported no prior formal schooling. If her explanation of the picture cannot be linked to formal education levels, then it seems likely that close personal experience combined with increased exposure to visuals and health resources in an urban context equipped her to make this interpretation. (The interview process in this study had not allowed for deeper exploration of factors contributing to particularly significant responses, and one may but speculate and build this consideration into future studies.)

Regarding Figure 6, the hand in the picture was named as such by all but one participant, who noted only that the arrow looked like a road sign, and said of the drop of blood from the finger, "This looks like a hat. I don't know what it is." Eight participants openly stated that they didn't know what the circle with shapes inside was. Other responses signifying confusion yet attempting to assign a description included "a circle with many things, they look like worms", "a finger pointing to something from a river", ". . . it's either a honeycomb or a cake", ". . . a spear pointing. Looks like it's pointing at a dish" (indicating blood drops), and "Sun, clouds, a heart and a star" .

The shapes inside the circle were identified as flowers, trees, and stones, while "decorations" were mentioned several times. A seventy-year old rural woman participant offered a beautifully logical interpretation possibly reflecting experience of craft-making: "This is a hand. A round thing with decorations. The hand is decorating the round thing." Although not mentioned, it is likely the blood drops represent paint in this interpretation. Only four out of twenty-three participants mentioned that the hand was cut or bleeding. Against expectations, one of these inferred the intended message: "A cut, blood flowing, looks like they want to show that he is infected, the infection can be transmitted to the people through the cuts in the hand."

Of the three illustrations in this set, Figure 4 was the least problematic in terms of generating an initial surface description of the subject matter. All of the participants could give a reasonable surface description of the image which coincided with the illustrator's intention. All could see a woman. All but three identified the board (one said a "box", one did not mention it specifically, and one said "I don't know what this is.").

Eighteen of the twenty-three participants inferred that the woman was teaching. Eleven mentioned HIV as the theme of the woman's activity, due to identifying the ribbon on her shirt as the sign for HIV/AIDS – five mentioned reading the word 'stop' written on the shirt. Only one participant clearly identified the object pictured on the board as HIV: the urban female participant with the highest level of formal schooling said, "I think she is showing some kind of virus, maybe HIV because she is wearing a sign that says 'Stop HIV'." Responses which suggest the participant was referring to HIV without openly identifying the attempted representation of the virus within the 'teaching' illustration were as follows: "destroying cells in the body" and "explaining about soldiers" a metaphor used locally by healthcare professionals when explaining the immune system to HIV-positive patients. Alternative descriptions of the virus included "a flower she has drawn", "a bird's nest, getting old, or a heart", and "looks like a tortoise".

Summary

None of the illustrations in this set were really successful at communicating their intended meaning. However, Figure 4 was better understood than the Figure 5 and Figure 6, in that 8 of the urban participants and 3 of the rural participants interpreted it as intended. No participants actually named HIV with reference to 5 or 6, and both these illustrations were poorly understood.

Figure 4 was the most 'literal', analogical representation. It contextualised the depiction of HIV in a possible real-life scenario. The indexed training situation was understood by 78% of participants. The inclusion of the ribbon symbol helped 48% of participants to make an association with HIV, however, only one participant out of all 23 actually suggested that the picture on the board represented the virus HIV.

The vast majority of participants interpreted the scary creature in Figure 5 very literally, whereas, the intended interpretation relied on the metaphor of HIV as a scary creature, figuratively hovering over a person like a thought bubble.

Figure 6 was confusing to most participants, and again the majority attempted to interpret it very literally. Semiotic analysis of the illustration revealed that it is very conceptually taxing, because it conflates sign types to depict in simplified terms the literal context of where HIV is found, and attempts to show both what can be seen (blood) and what can be known but not easily seen (the cells which make up blood). In the light of this, the fact that one participant did manage an almost 'complete' intended interpretation seems incredibly surprising.

Discussion

Reported education levels seemed to influence participants' abilities to interpret pictures, but not as significantly as expected. Findings suggest that rural participants were more likely to misinterpret illustrations containing symbols and unfamiliar objects, and tended to focus on describing surface details. Even though urban participants were more likely to discuss the connotations of illustrations, they often misinterpreted the intended message. Previous background knowledge and experience of the subject matter of the illustrations seemed to be the factor that most enabled participants to infer the intended meanings of illustrations.

The variety of responses to each illustration in the set (and similarly, for the other sets of illustrations not discussed here), revealed different levels of interpretation of each illustration.

Figure 7:   Illustration of a man coughing with a painful chest, from a publication on TB

The first level was a surface description of the image, the objects or shapes the viewer could identify. As an example, see Figure 7, (another illustration from the study) described thus: "This is a picture of a man with his hand on his mouth, and his other hand is on his chest." The next level was an initial interpretation of the surface description, based on the viewer's knowledge and experience. To continue with the above example, "He is coughing, it looks like his chest is sore." and an alternative interpretation mentioned was, "He is singing or praying." This could be followed by further levels of interpretation and inference, to create a narrative and/or conceptual understanding from the initial descriptions and interpretation. For example, "This man is sick with 'flu or TB."

These levels of viewer interpretations demonstrate the layering of meaning within images described in Barthes' concepts of denotation and connotation (Barthes 1977). While most participants could identify iconic depictions of people and objects, far fewer participants described what these depictions were intended to mean. The purposes of the illustrations were often unclear, or open to different interpretations. The polysemous nature of visuals described by Barthes (1977) was clearly demonstrated, as these illustrations were revealed to have a wide latitude of interpretation (Gaede, 2010), and were mostly interpreted in unexpected ways. When comparing the intended meanings with the participants' interpretations, it seemed clear that sign types which relate more directly to the object (content) of the message increased the likelihood that participants succeeded in decoding the intended meanings. It was clear that recognising objects and people in an illustration is not the same

as interpreting the intended meaning of the illustration, supporting the notion that the complex underlying ideas of many health messages are difficult to share through visual communication alone (Hoogwegt *et al*., 2010).

While there were notable differences between urban and rural participants' interpretations, there is a risk of creating a false dichotomy if these are overemphasized. There is diversity between urban and rural environments, and the availability of health (and other) resources, as well as the number of visuals encountered in daily life. Peirce's interpretant, is produced by the sign, and the viewer's associations with the sign and its object, i.e. the message or thing the sign represents (Fiske, 2011). This fulfils a vital role in understanding how audiences in diverse contexts interpret certain signs differently, but not others. It also accounts for the few instances where participants who reported no schooling at all interpreted cognitively challenging illustrations astonishingly 'correctly', congruent with findings that literacy levels exert less influence on pictorial interpretation abilities than previous experiences (Bruski, 2011).

Conclusion

The participants in this study seldom interpreted the illustrations according to their intended meanings. Among the possible explanations for this are signifying factors within the illustrations, and external factors to do with the participants and their context, including:

● the viewer's context background knowledge/life experience

● the information or message that is to be communicated

● how that information is portrayed visually in the illustrations

These common factors are explained by semiotic theories of visual communication – how signs and people make meaning. For the message of an illustration to be successfully communicated, the above three factors need to relate closely to one another, similar to the manner in which Peirce's elements of meaning interrelate.

Illustrations (and visuals more generally) have great potential to communicate, but they also have serious limitations as conveyers of complex

health messages. This is especially true when audiences have limited basic literacy skills. The cautions and guidelines issued to illustrators in decades gone by retain some value. However, semiotic theory shifts the focus away from determining what types of pictures 'illiterate' people couldn't understand, towards a more balanced understanding of which information can and cannot be reliably communicated visually, and how. Illustrated educational materials should continue to be used to support and enhance education and communications in such contexts, but they should not be seen as convenient substitutes for face-to-face discussion and comprehensive community education on important public health issues.

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Katherine Arbuckle
School of Education
University of KwaZulu-Natal

arbucklek@ukzn.ac.za