HIV/AIDS, LITERACY AND HEALTH COMMUNICATION

A study on the comprehension of visual symbolism in educational documents produced for people with limited reading skills

1 INTRODUCTION

This article reports on a qualitative research project undertaken among urban speakers of African languages with limited reading skills. The purpose of the research was to test low-literacy South Africans' comprehension of potentially problematic visual symbols featured in public awareness documents about HIV/AIDS. In the next section (2), the intricate relationship between HIV/AIDS, literacy, and health communication is expounded. Section 3 provides an overview of the problems frequently mentioned in the literature in connection with how visually and verbally low-skilled people interpret pictures. Thereafter, in section 4, the focus of the research project is described and justified. An adapted version of Hoffmann’s (2000) semiotic typology, which serves as a framework for the analysis, is discussed briefly in section 5. Section 6 outlines the research methodology followed by a discussion of the findings in section 7, an interpretation of the results in section 8, and concluding remarks in section 9.

2 THE PROBLEM: HIV/AIDS, LITERACY AND HEALTH COMMUNICATION

Effective communication is the backbone of health promotion and disease prevention. People need to understand health messages in order to be able to apply it to their own behaviour. According to Pimm and Roos (1994:86), most health information in the United States of America is written for a reading level beyond tenth grade comprehension, and 30 to 50 percent of the target audience cannot read at this level. The South African situation is more unfavorable, even the most basic instructional materials regarding health issues (including HIV and AIDS) display a readability level of just below 60, which is equivalent to Grade 9 (Carneiro & Smymon 2003), and more than 70 percent of the South African population has only marginal reading skills; 30 percent is functionally illiterate and the other 40 percent has limited skills (Carneiro in press; Project Literacy 2004).

The most important socioeconomic correlate of good health in adult populations is probably the number of years at school that have been completed (Grosse & Auffrey, 1999:23). The poorly educated adults, those with the lowest literacy levels, suffer the highest rates of morbidity and mortality from chronic diseases and conditions (Rudd, Muirhead & Colton 1995; Pimpton & Roos 1994; NVLUG 1998). The fact that people cannot understand the information necessary to change harmful behaviours and improve their health would seem to be an important factor in this equation.

Thus, given a situation in which almost two-thirds of the population read with health and literacy are correlated, and health promotion materials are too difficult to understand, one may ask what strategies can be used to convey important health information. The answer has often been sought in the use of visual media. In health campaigns across the world, pictures are used wherever the written word fails to communicate effectively – usually to supplement or extend oral messages (Doak, Doak and Root 1996:91–92) provide the following rationale for using visuals in communication with poor readers:

Visuals are especially important for health education reasons, since complex concepts can be understood more easily through visual presentation.

People’s meanings are easily stimulated through the visual sense, and this increases the speed with which they respond to messages.

According to these authors, research on the use of visuals in materials produced for audiences in developing countries supports the value of incorporating visuals in health education materials (Doak et al. 1996:92). An uncritical acceptance of this statement is, however, problematic. It cannot be taken for granted that people who cannot read are able to interpret visual communication and that they can learn from pictures what they cannot learn from words (Hoffmann 2000:4) echoes this scepticism when he contends:

Although they may have had some exposure to pictures, they may not be associating with symbols in the way that is intended.
Communicators working in the field of health education are seldom aware of the problems visually low-skilled viewers experience (Cude & Glass 1986:159; Hoffmann 2000:2). The following section provides an overview of the problems generally mentioned in the literature regarding pictorial communication with low-literates.

3 COMPREHENSION OF PICTURE BY LOW-LITERATE AUDIENCES: FREQUENTLY MENTIONED PROBLEMS

During the 1970s, confidence in the effectiveness of pictures was shaken with the publication and dissemination of the results of picture comprehension tests administered to illiterates (Fuglesang 1975). However, very little empirical work on pictorial processing by low-literates has been done since (Hoffmann 2000:136), and almost all the studies that have been undertaken lack a purposeful theoretical orientation. Moreover, it is clear that the researchers find it difficult to orient themselves in the wealth of detail, and the often contradictory findings.

Despite the lack of systematic research, the following difficulties that low-literate viewers experience with picture comprehension recur in the literature on the effectiveness of visuals in developing countries.

3.1 Unnecessary background detail

In contrast with skilled readers, who systematically scan a visual to find the central meaning and quickly identify principal features, low-literates’ eyes tend to wander about the page without finding the central focus (Dook et al 1996:9; Linney 1995:23). Too much detail, too many figures or objects on a busy background for example (Dook et al 1996:102), may cause the unskilled viewer to miss the central focus of the visual or to focus on the wrong detail (Auburn & Asburn 1983:13; Dook et al 1996:9; PATH 2002:2), thereby missing the main points that are being communicated. However, despite the emphasis in the literature on keeping visuals simple (NCT 1994), pages cluttered with too many graphic devices are still frequently found.

3.2 Divergent knowledge systems and cultural backgrounds

Trope-Ramer and Afi (1989:613) emphasize the fact that health behaviour is largely patterned by culture. Socio-cultural and demographic variables (including ethnic group, gender, dress, rural customs, and physical environment) may influence the acceptability of a message, decrease motivation to read (Tomaselli & Tomaselli 1984; Dook et al 1996:99), and hinder comprehension if the visual fails to evoke a schema against which to interpret the new information.

If the mental schema or knowledge system underlying the picture is not compatible with the indigenous knowledge system of the recipient, comprehension may suffer (Cornwall 1992) referred to the ineffectiveness of standard Western pictures and diagrams of reproductive activity in Zimbabwe. Ineffectiveness seemed to stem from the fact that these visuals illustrated the Western medical model of reproductive anatomy, and did not reflect the folk models of the indigenous peoples. Bradley (1995:11) furthermore postulates that the representation of quantities is problematic. She claims that pie charts are not universally understood, especially in countries where pies are not part of the cuisine. Although similar circular forms can be found in the cooking of most countries, for example chopstix in India, they are not skied into portions for distribution but torn by an individual to accompany less solid food.

3.3 Representation of perspective

PATH (2002:2) emphasizes that low-skilled viewers experience problems comprehending the pictorial conventions of depth perspective. If viewers experience problems with linear perspective (e.g., the lines of a road converging towards the horizon), depth perception on the basis of the relative size of objects (e.g., similar objects decreasing in size as they recede towards the horizon), and occlusion (superposition and overlapping of objects), the message may be misunderstood. Misunderstanding may arise from the fact that objects are not recognised, relationships between objects are not comprehended, or the fact that the picture does not reflect real-life experience (which may have an impact on believability).

The research by Holmes in Kenya and Hudson in South Africa is quoted by Linney (1995:23 - 24) to support this assumption. Hudson’s respondents were, for instance, unable to interpret the size of an object as an indication of its distance from the audience (reference point). Bradley’s (1995:74) conclusion on the basis of evidence such as this is that there are both graphic and environmental conventions that need to be learnt before ‘learners’ pictures can be understood without someone having to explain them.

The extent to which aspects of depth perception cause comprehension problems for low-literate people in general (in other words, not only people who have been isolated in rural villages and have had almost no exposure to visual materials) has not received research attention recently. It is thus debatable whether this aspect of pictures should indeed be a matter of concern for materials developer’s. Mesars (1994:3) is convinced that in the case of depth perception it would be hard to argue that the informational cues typically used by more experienced viewers constitute an arbitrary, exclusively pictorial set of conventions.

3.4 Pictorial symbols

Vocabulary of mass media symbols

It has repeatedly been claimed in the literature that people who are unused to reading pictures interpret visual symbols literally and find it difficult to understand visual renditions of abstract ideas. One of the reasons given is that low-literate people often lack a visual vocabulary of symbols that literate people may have acquired through growing up with comic books, magazines and greeting cards (Linney 1995:24). According to PATH (2002:2), people may not know that a heart indicates
love, for instance, and an eight-sided red sign indicates a need to stop. Pictorial symbols such as crosses, ticks and arrows also seem to pose problems for the pictorially inexperienced. Some of these symbols may be misunderstood if they have different meanings for different cultural groups (Mathiak and Pfeiffer 2002:2), or because they are ambiguous. Knox and Van Leeuwen (1996:61-70) mention the various functions of arrows in pictures, namely to indicate movement, influence/impact or direction; and to select a source (pointing out a specific detail). The literature on pictorial aids for low-literacy audiences is not unanimous regarding the success of using arrows to focus readers’ attention on specific detail. Colle and Glass (1986:161) warn against the use of arrows to point out a specific part of a picture since ‘it may be that the arrow is perceived as part of the subject matter in the picture’. Dookh et al. (1996:10:106), on the other hand, advise the materials designer to use cues (such as arrows, a splash of colour, underlining, circling and magnification) to direct the eyes to important points.

**Cartoon style pictorial conventions**

According to Colle and Glass (1986:161), ‘[t]he intended message may not be interpreted if the viewer is unaccustomed to the cartoon style or finds it inappropriate for serious subject matter’. Dookh et al. (1996:95) warn explicitly against the use of “child-like imagery to try to simplify complex concepts’. Firstly, the inappropriateness of the style may cause readers to discard the entire message because they think it is meant for children, and secondly, the use of many symbols may make the meaning of the messages too obvious for the readers who will probably interpret the information literally. Pimplon and Root (1994:86) mention ‘cartooning body parts’ as one of the six main problems frequently encountered in typical health materials.

Under the rubric ‘comic devices’, Colle and Glass (1986:61) mention thought balloons and animated characters as problematic for low-literate users. Whereas the visually literate understand the difference between a cartoon speech balloon and a thought balloon (Mathiak 2002:2), namely that the one represents speech and the other cognition, the visually inexperienced may not.

Another convention derived from the comic style that may cause misunderstanding, owing partially to its ambiguity and partially to unfamiliarity, is the use of lines for purposes such as:

- Indicating a person seeing an object. Visually inexperienced readers will easily interpret a dotted line from a woman’s eyes to an apple on a table as ‘a woman seeing an apple’, while the low-literate individual might see a stick coming from the apple that makes a woman in the eye (Mathiak 2002:2).
- Indicating movement. Lines or a blur often accentuate movement. If lines are not interpreted as a device depicting motion, they may be perceived as part of the person or object, thus hindering object recognition (Colle and Glass 1986).
- Indicating the emission of, for example, sound, steam, heat, etc. Hoffman (2000:142) quotes the example of a coughing boy where low-literate readers interpreted the lines that symbolise the forcing of air out of the lungs and mouth with a harsh sound to be a swarm of gnats.

3.5 Picture sequences

Visually unskilled persons generally experience difficulty understanding groups and sequences of pictures (Lemey 1995:23-25). In the case of single picture frames composed of different subject-sequences, low-literates can usually identify the parts, but may not be able to put them together and interpret the situation as a whole (Hasland 1994).

Picture sequences are challenging in various ways. Inexperienced viewers do not necessarily look at a series of pictures from left to right. Moreover, they tend to decode pictures in a series one by one, because they do not assume that there is any connection between them. Visually low-skilled people find it particularly difficult to comprehend cause and effect, and the passage of time in a series of pictures, even though these relations are fundamental for making sense of events in everyday life (at least from a Western perspective—AC) (Colle & Glass 1986:61; Hoffmann 2000:142). The explanation provided by Hoffmann (2000:134) is that non-literate persons do not have very precise and accurate notions of cause-effect chains and of their length. The explanation he gives seems to be in tandem with his definition of the Africans’ worldview namely that ‘their conceptions are determined more strongly by ungeneralised notions of general complexity, a more cosmic world view in which all elements are linked causally, whereby specific cause-effect pathways cannot be traced exactly’.

3.6 Pictures featuring unseen objects

Objects are described as ‘unseen’ when they are obscured, internal, or invisible. Colle and Glass (1986:61) refer to examples such as the internal organs of a human being, the internal parts or working of an object, or subject matter that is not directly observable. Such entities can be portrayed artistically or photographically with close-up or a magnifying lens. A case in point is a magnified image of the HIV virus. Enhancing or increasing the dimensions of an object may cause problems for low-literate viewers. The enlarged object may, for instance, not be identifiable or believable because it is out of proportion with what the viewer has experienced. Dudley and Haskel (1993:37) quote the classic example of a health worker in Africa who showed a picture of an enlarged fly to explain how flies are a threat to health. The people walked out after the presentation with smiles of relief, saying ‘We don’t have a problem, because our flies are just very small.’
4 Research Focus

The research project detailed in this article concentrates on pictorial symbols as this category easily serves as an umbrella for including a large number of image types that have proven to be problematic for low-literacy and visually inexperienced audiences (Cole & Glass 1986; Duda et al. 1996; Hoffmann 2000; Linney 1995; Raths 2002). The decision was strengthened by evidence from exploratory interviews by doctoral Researcher Gillian Brink with ABET students employed by the South African National Defence Force at the Waterkloof Airbase in Pretoria, for the purpose of categorisation and description. Hoffmann's (2000) semantic classification of still pictures was chosen because it provided the researcher with a useful descriptive framework within which pictorial language could be treated both as a sign system and as a communicative vehicle equal to verbal language in various respects.

5 Types of Still Pictures: A Semantic Perspective

Hoffmann (2000:62) departed from the Peircean tripartite distinction between symbols, icons, and indexes. Here, in the case of iconic symbols there is an arbitrary relationship between the sign and its meaning (e.g. words in a language). Iconic signs are direct representations of real-world concepts (e.g. drawings, paintings or photographs); and index signs are objects that call up the meanings of their sources (e.g. smoke as a sign of fire).

Hoffmann (2000:83) divides visual 2-dimensional still images into three basic categories, namely iconic, symbolic-analogical and symbolic-abstract. Symbolic and indexical images, which form part of the Peircean triad, are excluded by Hoffmann on the premise that symbolic is a characterist of 'any type of visual that is linked to a generally accepted convention for representation', and indexical images 'create the minimum of interpretation difficulties' (Hoffmann 2000:62:43). In this article, iconic pictures will only be discussed to define the category symbolic-analogical, and symbolic-abstract will be used as a superordinate label under which symbolic-analogical and symbolic-abstract pictures are subsumed. Indexical pictures will be treated in a separate category because certain types of indexical pictures have been found to be problematic for visually inexperienced readers.

5.1 Iconic Pictures

Iconic representations are normally used for depicting the external shape of concrete objects such as people, animals, plants, houses, food, and utensils. If viewers are familiar with an object, and the visual style does not introduce visual noise, this type of still picture should not cause problems of comprehension (cf. Spain 1987:89; l2: Hoffmann 2000:136). Apparently, low-literacy users only have problems recognizing unknown objects, and well-known objects depicted in a way that contradicts their experience (Hoffmann 2000:140).

With reference to unknown objects, Hoffmann refers to a picture of a tortoise identified by Kenyans in rural areas of the country partly as a snake (because of its head), and partly as an elephant (because of its feet). In conversation with a portrait that clothes with viewers' experience, Shaw (1949) mentions the example of a goat that was new recognized because it was depicted with an ear hanging down, while the people to whom the picture was presented knew that goats' ear points horizontally or upwards.

Hoffmann's claim that iconic still pictures are non-problematic in general, is consistent with the view of Paul Mosier, one of the leading scholars in visual studies. According to Mosier (1994:10), previous experience is not a prerequisite for the interpretation of outline drawings, black-and-white photographs, sketches, or stick figures – to name only four kinds of pictures. Mosier's (1994:13) contends that the following general process of how the brain translates the retinal image into a mental representation of identifiable objects in three-dimensional space is universally valid (also for the visually inexperienced).

1. Visual information is transmitted from the retina to the brain via a two-dimensional array of light and colour values in order to detect the outlines of objects and the edges of surfaces. This results in a mental representation that can be thought of as corresponding to an outline drawing.

2. Assigning depth to the various parts of the outline by calculating distances between the viewer and each part of the scene.

3. Identification of the object by means of the outlines and matching them against a 'dictionary of object structures' in the brain's memory.

For Mosier's (1994:13) these principles suggest that our ability to perceive and comprehend such incomplete images as sketches and stick figures may be an extension of an everyday, realistic perceptual skill rather than something we have to train with specific reference to recreational conventions. Therefore, sketches and other incomparable images also do not greatly curtail the ability of inexperienced viewers to identify objects in pictures, and many pictorial conventions that may at first glance seem unrealistic, appear to be interpretable on the basis of any viewer's real-world visual skills.

In the light of this evidence from researchers working in both the developed and developing world, it was decided not to include purely iconic pictures in the framework of problematic picture types. However, aspects of iconicity will be invoked when describing the problematic picture types and in the analysis of responses.

5.2 Pictures with Symbolic Elements

Following Grasik (1985), Hoffmann (2000:8) distinguishes two types of pictures with a partially or completely symbolic content, namely symbolic-analogical and symbolic-abstract. These types of pictures are not pictorial reproductions of visual entities in the real world. Some kind of cognitive transformation, based on academic or cultural knowledge, is
needed to connect them to their intended meanings.

**Symbolic-anaological pictures**

Symbolic-anaological pictures constitute a hybrid category between symbolic and iconic. These signs mostly work symbolically, meaning that their use is fixed by convention, yet there is a vestige of iconicity in the representation, since some structural or functional resemblance to the object represented is preserved. This category contains all the various types of diagrams that people use to convey abstract concepts, such as diagrams, relationships or processes, as well as postures and pictorial metaphors that instantiate processes and complex concepts. Examples include, for instance, a schematic representation of a stock to represent time in general, a smiley face to represent happiness or friendship, and a schematic representation of the heart to represent love or cardiovascular health. In these cases, visualization is used as a means to promote better recognition and more intuitive and instantaneous comprehension (Hoffmann 2000:85).

**Symbolic-abstract pictures**

Symbolic-abstract representations are images that are fixed purely by convention. Hoffmann (2000:85) characterizes them by saying that with these images 'there is a constant tendency to cross the line into the field of written representation'. Figures, formulae, tables, mathematical symbols (e.g., the conventionalised symbols for equation, addition, subtraction, multiplication, and division), and logical notation (e.g., an arrow to signify entailment) are examples of signs that are closer to written signs than pictorial signs.

Despite the fact that signs and logos may have originally been iconic or symbolically anaological, Hoffmann categorises them as symbolic-abstract once they have become the standard symbols for companies (e.g., the Metrodore star), products (the international wool mark), or organisations (e.g., the five Olympic rings, the International Red Cross).

Speech balloons and thought balloons are not accommodated in Hoffmann's semantic typology yet one could assume that they belong to the category 'symbolic-abstract', since there is no direct resemblance between form and meaning, and since their meanings are only fixed by convention.

Graphemes with fixed, conventional meanings that present unseen or non-concrete objects (e.g., lines to indicate movement, sound, light or heat, blurring to indicate movement, a white spot to indicate light reflection) are not mentioned explicitly by Hoffmann. These parts of text pictures are difficult to categorise. They seem to be positioned on a continuum, somewhere between symbolic-anaological and symbolic-abstract, depending on the connection between visual representation and conceptual representation. I would argue that the line between a person’s eye and an object indicating ‘seeing and recognising’ is symbolic-abstract, whereas a white spot on an object indicating light reflection is symbolic-anaological. A clear distinction is, however, not crucial for the current research.

**5.3 Indexical pictures**

Indexical pictures display a sign-source relationship between the visual representation and the concept referred to. In the real world, a face is an index of sex; in pictures a facial expression, a gesture, or a posture may be used as an index of a particular emotion; an emaciated body could instantiate a person with AIDS, and a well could indicate a water source. The extent to which indexical pictures present interpretation problems for low-literate readers may depend on universal characteristics of embodiment, cultural conventions, and familiarity with the context.

**6 RESEARCH METHODOLOGY**

**6.1 Research design**

As stated in the introduction of this article, the purpose of this research was to learn more about whether and how low-literate South Africans understand aspects of visual symbolism in public awareness documents about HIV/AIDS.

The research design is therefore essentially qualitative and descriptive.

**6.2 Respondents**

Thirty-five low-literate speakers of eight African languages, between the ages of 22 and 55 years, were interviewed individually by the researcher. An incentive of R30 per respondent was offered.

The literacy levels of the respondents were determined on the basis of self-reports regarding years of formal schooling, live of the initial 35 records could not be used, since the literacy levels of the respondents were above Grade 8. Eight years of schooling was set as the upper limit, because it is regulated by law that learners who have passed Grade 9 may leave school and start vocational training. A supporting justification was that persons with less than nine years of schooling are regarded (in terms of the categories defined by Project Literacy 2004) as only marginally literate.

The sampling method was both convenient and purposeful, as the researcher relied on personal acquaintances to identify and recruit respondents who satisfied the literacy requirements. Fourteen respondents were interviewed at the house of Ms Eile MaMutho at Phumula in KwaMhlong. Ten respondents were recruited by Ms Jetma Setumo, a domestic worker, in the Constantia Park suburb of Pretoria and were interviewed at the researcher’s house. Eleven respondents (domestic workers and gardeners) were recruited via the network of a faith-based therapy centre in Waterkloof Glen (Pretoria), and interviewed in the homes of their employers. The gender imbalance (25 females and 5 males) is due to the sampling method, and the fact that males were hesitant to participate in individual interviews conducted by a female researcher on a semi-taboo topic.

The following matrix summarises the socio-demographic profile of the respondents:
6.3 Materials

The materials for the project consisted of a compilation of fourteen activities from various public information documents on HIV/AIDS that were collected from educational and public health care facilities (clinics, hospitals, schools) in and around Pecoria during the period 1999-2004. The pictures were scanned and arranged in a narrative sequence that could be characterized as the story of AIDS. Pictures regarding the following topics were included: talking about sex and pregnancy; talking about sex and protection against HIV/AIDS; postponing sexual debut; HIV/AIDS and pregnancy; negotiating condom use; HIVtesting, HIV testing and counseling, regular exercise, getting rest; healthy and unhealthy food choices (health); prohibition of smoking and alcohol use; and taking antiretroviral medicines according to schedule.

The choice of a narrative sequence was based on the rationale that pictures are very seldom used in and interpreted as stand-alone, that is as a written explanatory text or verbal instruction. It was further argued that a chronological narrative would coincide with the most basic illness narrative which, according to Hawkins (1999), is composed of the time before the onset of the illness, the onset of the illness, and the resolution of the crisis.

The selection of pictures from different documents resulted in a sufficiently heterogeneous instrument, representing the following visual styles: black and white semi-realistic line drawings; coloured, cartoon-style line drawings; semi-realistic line drawings with background detail; silhouettes; coloured, semi-realistic line drawings without background detail; shaded colour drawings without background detail; and shaded colour drawing with background detail.

6.4 Structure of the interviews

The researcher started each interview by introducing herself, asking the name of the respondent, and establishing the preferred language for the interview. In cases where the respondent was not conversant with English or Afrikaans, an interpreter was used. Different interpreters were used in KwaMhlanga and in Pecoria.

After the introduction each respondent was briefed regarding the purpose of the research, namely to assist the researcher in finding out whether the pictures were ‘good’ or ‘bad’. Interviewees were informed that their responses would be tape-recorded anonymously, that their participation was voluntary, and that they were entitled to withdraw their participation at any stage during the research process. Respondents were asked verbally for their consent to use the data and to proceed with the interview. Only one respondent preferred not to participate, and the interview was subsequently terminated.

After obtaining informed consent, the socio-demographic details of the respondents were noted, including age, occupation, years of formal schooling, mother tongue, and gender. To ensure that all the respondents had sufficient factual knowledge to interpret the pictures, it was decided to first engage in a semi-structured conversation about the topics dealt with in the picture story, following the same chronology. During this pre-interview conversation, the researcher asked questions, confirmed correct answers, and provided correct information where the respondent did not know the answer or held erroneous beliefs. Respondents were invited to ask questions, and to comment on any of the issues raised.

The subsequent interviews were semi-structured, but respondents were invited to make additional comments that could assist the researcher in establishing the quality and the acceptability of the pictures. Respondents were prompted to comment on particular aspects of the visual if they felt not referred to these issues in the initial response.

6.5 Data-analysis

After each interview, the responses were typed on a data sheet, and after all the interviews had been conducted, the answers were transferred to templates for each question. Codes were assigned to select categories of answers to facilitate a measure of generalization.

7 DISCUSSION OF FINDINGS

7.1 Pictures 1-3

The black and white line drawings were selected for two reasons. Firstly, to find out whether visually unskilled readers would interpret the thought and speech balloons correctly; and secondly to establish whether they would be able to handle pictorial complexity (e.g., to relate and make sense of picture elements referring to concrete objects and processes of thoughts and speech).
More than three quarters of the respondents (respectively 24, 20 and 24 out of the 30 respondents) correctly identified the characters in the main group of these line drawings and 84.4 per cent (22, 26 and 28) identified the objects in the thought balloons/speech balloon correctly (where ‘correctly’ means in a purely iconic way). The majority seemed to have no difficulty in recognising iconic line drawings of objects with which they were familiar. Only three respondents did not identify the condom in picture 2, and three identified the condom incorrectly; two thought that it was a pipe and one identified it as a flag.

However, a significant number of respondents had some difficulty in grasping the compositional meanings of these pictures, where compositionality is either present in a particular picture unit, such as a speech/balloon, or held between a main picture and the contents of the thought/speech balloon. Owing to the relative simplicity of picture 2, it was not surprising that two thirds (19) of the respondents correctly related the condom in the speech balloon to the main picture. Moreover, 20 respondents identified the main message as a father talking to his son about safe sex. Although verbs of instruction occurred frequently in the responses to picture 2, namely teach (13), tell (7), instruct (1), ask (10); say (2) only one respondent labelled the speech balloon as such, when prompted.

In picture 1, only four respondents were able to construct a compositional meaning for the picture in the thought balloon (e.g., ‘If a man and a woman have intercourse, they can have a baby’). None of the respondents mentioned anything about the girl’s learning, knowing, thinking about or being taught these facts. Moreover, only one respondent was able to assign the correct meaning to the abstract symbols ‘=’ and ‘%’ when prompted. Four respondents replied that the symbols indicated a clinic or a hospital.

Picture 3 proved to be more challenging. This could have been due to the complexity of the thought balloon and the ideosyntactical nature of the picture, where the clothes on the floor are ideosyntactical representations of sex. The responses were as follows:

- Eight respondents interpreted the bed completely erroneously (i.e. as ’a bed’).
- Seventeen related it to having sex.
- Eleven realised that the intercourse was in some way inappropriate. However, only five gave the correct interpretation, namely that they are too young to have sex. Other answers included: ‘they will sexually abuse without a condom’, ‘they will get AIDS if they have sex’, ‘they did not talk about sex’.
- Only nine identified the cross as a symbol of prohibition.

In both pictures 1 and 3 only one respondent (the same person), used the word think in her responses, which suggested that she might know the shape of a thought balloon. However, when prompted, she could not label the shape.

7.2 Pictures 4 and 5

These coloured arrow pictures were included to elicit responses on certain symbolic-ideographic elements, namely the hearts and the moon: Recognition of the couple as a boyfriend and girlfriend in picture 4 and a husband and wife in picture 5, were not problematic for any of the 30 respondents. However, as in the previous three pictures, the speech balloon and the thought balloon presented problems—the latter more so than the former. Although none of the respondents explicitly referred to the elliptical shape in picture 4 as a speech balloon, nine of them used a verb of speaking to describe the relation between the main picture and the picture in the speech balloon. However, only five attributed the speech to the girl; two respondents that the girl was asking the boy something and two answered that she was saying something to the boy. The other five identified by directional communication by making use of the pronoun they and the verbs discuss (1), say (1) and ask (4). None of the respondents identified the thought balloon in picture 5 positively, although two used the verb think in their description of what the characters were doing.

The most problematic aspects of the two pictures proved to be the interpretation of the person metaphors the hearts in picture 4 and the moon in picture 5. Only 10 respondents recognised the hearts around the boy’s head correctly. However, out of these 10, four respondents interpreted the meaning as thinking deeply or having trouble. Ten respondents indicated that they did not know what the red objects meant, and the other two gave erroneous interpretations, including ‘the condom of the woman’ (2); ‘spis’ (1); ‘ask’ (1); ‘screaming’ (1) and ‘signs of happiness’.

In picture 5, 18 respondents (60 per cent) noticed that the
woman was pregnant. However, only nine respondents (20 percent) recognised the red mark in the thought balloon as a representation of disease ("HIV", "AIDS", "bacterium", "virus" or "AIDS virus"). Eleven respondents indicated that they did not know, and six responded that it was the baby in the mother’s "stomach". None of the respondents was able to appropriately relate the consent of the thought balloon to the main picture, that is, a mother who is pregnant, and who is worried by the thought that she might be HIV positive.

Although few respondents focused on totally irrelevant detail, it was nonetheless a matter of concern that one respondent identified all the cartoon characters in pictures 4 and 5 as having AIDS. When asked to explain her answer, she responded "Just look at how thick their necks are!"

7.3 Pictures 6a and 6b

Pictures 6a and 6b were placed adjacent to each other in the test material, and after responding to 6a, respondents were asked to explain the message in 6b in relation to 6a.

In 6a the syrup (labelled by the majority as an "injection") was identified by 86.6 percent of the respondents (26). However, only a third of them (11) realised the picture as a whole in an idiosyncratic way to the HIV test. From the remaining 19, who neither recognised the test tube with blood, nor related the picture to the HIV test, nine did not recognise the test tube with blood at all. The other responses included "pills" (4), "a man's thing" (2), "vacine" (1), "the things you put on your lips" (1), "a condom" (1).

In general, respondents did not experience any problem in recognising the main participants in picture 6a as being an adult male and an adult female (96.6 percent). Twenty-one (80.7 percent) attributed emotional distress (pain, sadness, crying, worry) to the male person, and 10 saw the woman as someone providing emotional support, but only seven identified her as a health worker (doctor, nurse or counsellor).

A surprising 27 respondents (90 percent) interpreted the main message as having something to do with the outcome of the HIV test.

7.4 Pictures 7a and 7b

Picture 7a was selected to test low-literate readers' interpretation of lines as representations of movement, as well as to find out whether they would relax playing soccer to regular exercises for those who are HIV positive. Picture 7b was included to establish whether they would understand the picture of the woman reciting in the chair and reading a book as an instruction that seropositive people should relax on a regular basis.

Twelve respondents interpreted picture 7a as a purely literal scene, as a man playing with a ball or a man playing soccer. Fourteen respondents provided an answer at a further level of abstraction, and said that the man was exercising. However, only four interpreted the message of the picture as an instruction to exercise regularly if one is HIV positive. A third of the respondents (10) interpreted the picture as representing a completely healthy individual, smoking their
interpretation to the fact that he looked healthy.

In order to establish to what extent low-literate people understood pictorial conventions that depict unspoken concepts, such as movement, they were prompted about the meaning of the curvy line stretching from a location at the back of the man’s leg to the foot that kicks the ball. Only five respondents interpreted the meaning of the line as showing movement of an object (the foot and/or the ball) from one spatial location to another. Two respondents said that they thought it represented the dust generated by the kicking. Other responses included “I don’t know” (8) as well as associations with power, strength, and health (6).

The interpretation of 7b was comparable to that of twelve respondents (40 percent) interpreted the picture in a purely iconic way, namely as a woman sitting on a couch, reading a book. Sixteen respondents abstracted away from the purely literal, and described the action as ‘studying’ or ‘learning about HIV’. Only two respondents related reading to relaxing, and not one person came up with an interpretation related to the necessity of relaxation for people who are HIV positive.

7.5 Pictures 8a and 8b

Pictures 8a and 8b were selected to establish whether symbolic-abstract visual elements would be recognised if they formed part of the background of a picture, whether their meanings would be integrated compositionally, and whether these meanings would be translated into instructional messages concerning HIV and AIDS. In picture 8a a third of the respondents (10) interpreted the food items purely literally. They simply named the bread and soda. Eighteen respondents identified the foods, and recognised that they were not healthy choices. However, even when prompted, only 13 of them pointed out the red cross on which the food is superimposed, as the source of their answers. The other five replied that they 'just knew' the answer; in other words they based their answers on prior knowledge. Only two respondents related the prohibition to a healthy lifestyle for those who are HIV positive.

The responses to picture 8b were comparable. Seven respondents identified the bread, cheese, and orange only literally, and 22 (73.3 percent) indicated that the red cross in support of their answers (the colour red seemed to be a very strong indicator of danger). However, only one respondent related the non-use of alcohol to HIV or AIDS.

7.6 Pictures 9a and 9b

These pictures were included to establish whether prohibitions, indicated by the superposition of a red cross on an object, would be interpreted correctly, and connected to living with HIV/AIDS. According to the results of a pilot study conducted by Brin amongst ABET students at the Waikerie/Arabin Aboriginal Preparatory School in Pescana during July 2004, these pictures were not understood. Her respondents either did not notice the cross to the side of the picture, or could not integrate its meaning with that of the main picture (wine bottle or ash tray). Brin’s findings were contradicted, however, by the current research. Twenty-three respondents said that the use of liquor was forbidden or ‘not good’, and 22 (73.3 percent) indicated the red cross in support of their answers (the colour red seemed to be a very strong indicator of danger). However, only one respondent related the non-use of alcohol to HIV or AIDS.

The responses to picture 9b were predictable similar. Twenty-
to three respondents answered that smoking was forbidden, indicating the cross as the source of the answer; but none related the picture to HIV status.

7.7 Picture 10

Picture 10 was selected to establish whether the respondents could interpret the meaning of the clock in relation to the main picture. Two thirds of the respondents interpreted the content of the main picture in a purely iconic way: namely as a woman/boy who is drinking pills/medicine (with water). Only seven respondents referred to the pills as medicine to relieve the symptoms of AIDS (i.e., medicine that helps to boost the immune system). It may be assumed that more of them actually understood the pills to be antiretrovirals, but regarded this as shared knowledge in the interview context. This assumption is based on the fact that 20 of the respondents explicitly linked the clock to taking the medicine at the same time every day – in deference of the usage instructions that was discussed during the pre-interview briefing. Only four referred to the clock on the card purely literally in terms of the time indicated (3 pm).

Five respondents (with a mean of two years of formal schooling), were distracted by background detail (the two boys) when assigning meaning to the picture as a whole.

8 INTERPRETATION OF THE RESULTS

8.1 Symbolic–analogical pictures

The standard advice for designing educational materials to be used in development contexts is that they must be pre-tested. It is particularly important to test materials containing symbolic–analogical visuals, as they may be imbued with culture-dependent metaphorical meanings. In the case of picture 4, the researcher did not anticipate that the hearts surrounding the boy’s head would cause interpretation problems. It was taken for granted that the romantic meaning of red hearts has been popularized sufficiently by mass media such as cartoons and greeting cards. However, certain responses showed that lack of exposure to popular mass media, and the influence of language-supported cultural meanings, have caused interference. The hypothesis about the influence of language-supported cultural meanings is not too far-fetched in view of the facts that five respondents answered that the hearts mean the boy is ‘thinking deeply’ or ‘having trouble’, which could in turn be related to most African languages having an expression that contains the word heart referring to thinking. According to Sponono Mabhengu, a practitioner from the Nomabele dictionary project at the University of Pretoria (2004), the Sepedi expression is batile lile, and the isiZulu expression ukuthaweni nentshitemba, literally mean ‘to talk with the heart’, but actually mean ‘to worry’. Although the number of respondents who mentioned this meaning was relatively small, this result suggests that pictures in documents need to be controlled for language-specific and culturally embedded meanings.

Cultural meanings also seemed to play a role in the interpretation of picture 10, where only a third of the respondents recognized the red monster (as a symbol of HIV or AIDS) in the thought balloon. According to Mabhengu (2004), speakers of African languages do not have a unified way of metaphorizing AIDS. In isiNdebele, for instance, AIDS is viewed as a big, prehistoric animal, which has been lexicalized as ilweni. In Mabhengu’s opinion it would be extremely difficult to use one single metaphorical symbol that could trigger the meaning of AIDS for speakers of all the African languages.

Moreover, in picture 9b the intended meaning was at odds with the message understood by the majority of the respondents. Whereas sitting casually and reading a book symbolizes relaxation in Western cultures, people from African cultures will most probably understand it to symbolize ‘academic effort’. This is, in fact, the interpretation more than half of the respondents gave. Only two respondents related reading to relaxation. According to Mabhengu (2004), an acceptable image of a relaxing person would be someone reclining in a chair, with his/her legs crossed. However, to make sure that the message comes across unambiguously, «a search needs to be done on the bodily metaphors of relaxation among the different cultures in South Africa.»
8.2 Symbolic-abstract pictures

Thought balloons and speech balloons are one of the sym-

bolic-abstract conventions that are poorly understood by
visually impaired readers, and they should be omitted from
visual instructions for low-literacy people. In pictures 1 and
3 only one respondent used the word that in his response,
and although verbs of instruction occur 21 times in the re-
sponses to picture 2, the respondents could have arrived
at this interpretation on the basis of prior knowledge plus
the other available visual cues, such as the father’s mouth,
opened as if he is speaking. Another characteristic of the
cartoon style that seems to be poorly understood is the use
of certain conventions to depict abstract concepts, such as
movement. For instance in picture 7 only five respondents
stated that the meaning of the line is showing movement of
an object (the foot and/or the ball) from one spatial location
to another. However, none of the respondents regarded the
line as part of an object or person in the picture – a finding
that is contradictory to previous findings, namely that lines
depicting movement are interpreted as part of an object.

Symbols such as crosses and circles were noticed and inter-

preted correctly if they were highlighted by marking use of
colour, and if they were clearly visible, A red cross super-
imposed on an object was recognized by 75

per cent of the respondents as a sign of prohibition (com-
pare the responses to pictures 9a and 9b). However, if the
abstract symbol was included as part of the background
recognition dropped by about a third. Less than half of
the respondents (43 percent) recognized the cross and the
tie in pictures 8a and 8b. Although a complexity of a picture
also seems to increase the probability that an abstract-sym
bolic visual will be recognized and correctly interpreted. In picture 3,
only one of the respondents identified and correctly in-

terpreted the cross that is superimposed on the thought
balloon. The cognitive load seems to increase when abstract
symbols are combined in a kind of formula.

Mathematical symbols seem to present major problems.
Only one respondent could name the symbol “ + ” and “ = ” in
the thought balloon of picture 1, and was able to give an
acceptable interpretation of the context. A compounding
factor might have been that the symbols in the balloon are
not used in the normal mathematical sense, but in an an-
alogical way. The symbol “ + ” is used as a synonym for the
word and, meaning ‘ unh’ rather than ‘ sum’ of, and the symbol
“ = ” means ‘ the product of, ‘ rather than ‘ equal’ . Another pos-
ible reason why “ + ” was not interpreted as a mathemati-
cal symbol is that it is strongly associated with health-care
facilities in the context of HIV/AIDS.

8.3 Indexical pictures

Hoffman (1964) claims that indexical pictures cause the
minimum of interpretation difficulties, yet the results
obtained from this research project suggest otherwise. In
picture 3 only about half of the respondents related the bed
and the clothes lying on the floor to having sex. In picture 3
only a third of the respondents related the syringe and the
test tube to the HIV test. On the other hand, approximately
two thirds of the respondents deduced from the posture
of the male person in the picture that he is suffering some kind
of emotional distress as an outcome of the HIV test. Even in
picture 5, where five respondents said that the “newborn”
were angry, instead of sad, the meaning they assigned would
not cause total misunderstanding because it indicates an un-
pique emotional reaction to being pregnant and possibly
HIV positive.

The fact that certain indexical pictures were interpreted cor-

rectly, whereas others were problematic, may be ascribed to
the cognitive reality of ‘embodied meanings’, as opposed to
relationships not mediated by contextual knowledge or
human embodiment. The connection between sadness, war-

ny, and distress on the one hand, and a head buried in
a person’s hands or a distraught face, can be inferred more
readily than the relationship between a syringe and a test
tube with blood, and is a test to establish one’s HIV status,
without suggesting the action mediating between the two.

9 CONCLUDING REMARKS

In general, the findings of the project are consistent with
those of earlier research studies. The findings confirm that
people with limited reading skills experience problems
interpreting symbolic-abstract representations associated
with a cartoon style, such as speech balloons and thought
balloons. The findings confirmed that they also experience
problems interpreting representations associated with
systems of formal logic, such as plaited, minutes and equals
signs, as well as crosses and tics in cases where these con-
tribute to the overall meaning of a complex visual or con-
stitute the background of a picture. Using symbols of dis-

traction in a transferred sense compounded the problems.
As far as symbolic-analytical pictures are concerned, the find-
ings showed that ambiguity and culturally encoded meanings
interfere with interpretation if they clash with meanings as-
sociated with popular mass media. Furthermore, the find-
ings pointed out that disembodied (indiv)idual representations
that require a large amount of contextual knowledge to es-

tablish the link between visual index and real-world source
are problematic.

In addition to understanding particular symbolic aspects of
visuals, the findings provided evidence that low-literacy read-
ers have difficulty in establishing links between the elements
of complex pictures, particularly if the elements portray
both concrete entities (such as objects) and more abstract
processes, such as thought and speech. Moreover, low-liter-

acy readers tend to focus on the literal (iconic) meanings
of objects, and easily lose sight of the big picture or overall
theme. This suggests that perhaps more cues should be in-
cluded in education materials to keep the viewer focused
on the main theme, for example using an AIDS ribbon on
the clothes of a person who looks healthy but should be
interpreted as a person with HIV.
Although the outcome of this research project provided some guidelines regarding the do's and don'ts for the preparation of visuals in instructional materials on HIV/AIDS, pre-testing among members of the target audience remains the only sure way of determining the effectiveness of materials. Moore et al. (1990:307) summarise the importance of pre-testing and involving the target audience throughout the process of developing health materials as follows: Continuous pretesting and revision—from the time the staff recognises a potential need for print materials, through the development of text and illustrations and the production of the final piece— are crucial if the materials are to be as accurate as well as understood, accepted and used by the target audience.

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