The use of pictures in literacy materials

An investigation into the processing of visual information in preliterate societies

by Dan Davis

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1. Introduction

This paper is presented with two concepts in mind, which, though well-documented, have been largely neglected in literacy programs: first, that all human beings tend to process information in a very specific way; and second, that those individuals whom we label “artistically talented” have learned to process at least some of that information differently. This second concept requires a definition of talent as an ability which is accessible to everyone, but which is utilized by only a few. The specific reasons for such a definition will be explained in Section One; suffice it to say here that talent as we know it involves a cognitive shift that is only now beginning to be understood.

These two concepts raise some important questions for the literacy worker. How are symbols processed by the brain? How are pictures processed? Does pictorial information aid or hinder the processing of orthographic symbols, or neither? If illustrations are helpful in written materials, how and when should they be used? Such questions involve many factors which are beyond the scope of this paper. Anthropological studies have made it clear that every society is different, and those differences are (1991). Notes on Literacy, 17(4).
evident in cognitive processes as well as externally observable behavior (Plog and Bates 1980:15–19). But in this paper I will attempt to accomplish one purpose: to show that pictorial information processing by the brain is far more alien to traditional teaching methods than is currently acknowledged in literacy methodology. In so doing, I will suggest some ways in which literacy workers can increase the effectiveness of reading materials by designing them to more accurately “fit” the cognitive “slot” into which they are being driven. The concepts involved are well documented; the suggestions are my own, based on those concepts.

Section One of the paper explores what we know about how the brain processes sensory and intuitive information, and more specifically, how visual information is processed. Section Two discusses the art of indigenous societies: how it operates in the absence of written communication, and what effect the introduction of written communication might have on aesthetic perception. Section Three gives an overview of current attitudes toward the use of art in literacy programs. Section Four attempts to reconcile those attitudes with the material already covered, offering suggestions as to how understanding of visual information processing can be implemented within the literacy program.

2. Mental processing

[Topics: brain function, information processing theories]

The question of how the brain processes information is certainly not a new one. For centuries, man has known that his brain consists of two equal halves, or hemispheres, but it was assumed that the two halves operated as mirror images, so that a processing center on the left side would be duplicated in the same area on the right. But in the early nineteenth century, physicians treating brain-injured patients began to realize that the structure of the brain was not quite so simple. Finally, in 1861, a French physician named Paul Broca demonstrated a definite connection between injuries to the left side of the brain and loss of language ability (Gardner 1982:300). He noted that injuries to corresponding areas on the right side of the brain seemed to cause no such loss. Many studies were consequently made over the years, but no significant discoveries were made beyond Broca’s demonstration that linguistic ability resided in the left brain (1982:301). Scientists and psychologists were content to say that the right brain “was less advanced, less evolved than the other half—a mute twin with lower-level capabilities” (Edwards 1979:28).

2.1. Sperry’s commissurotomy studies

In the late 1960s, a series of psychological studies was carried out by Roger W. Sperry and his associates on epileptics who, because of the severity of their seizures, were treated surgically. The procedure, called a commissurotomy, involved severing the corpus callosum, a thick bundle of nerve fibers connecting the left and right hemispheres of the brain (Edwards 1979:29). By severing this and two other commissures, or junctions, the patients experienced relief from their debilitating seizures. Moreover, they seemed to have suffered no ill effects from the radical surgery. It seemed that both halves of the brain continued to function independently of each other. Sperry and his associates conducted a series of experiments on these patients to determine the extent and manner of impairment they had sustained, if any. (For an interesting summary of their findings, see Betty Edwards’ Drawing on the right side of the brain, 29–32.)
These became known as the *split-brain studies*, and have held considerable sway in educational and psychological circles since the findings were published, though in some cases the results have been oversimplified or misapplied (Gardner 1982:283–285). Basically, the studies showed that the two halves of the brain process information in two totally different ways. Sperry and his associate, Jerre Levy, summarized the differences in their initial report (Sperry 1968).

The data indicate that the mute, minor [right] hemisphere is specialized for Gestalt perception, being primarily a synthesist in dealing with information input. The speaking, major [left] hemisphere, in contrast, seems to operate in a more logical, analytic, computer-like fashion. Its language is inadequate for the rapid, complex syntheses achieved by the minor hemisphere.

Specifically, the left hemisphere analyzes, counts, keeps track of time, verbalizes, stores and processes symbols, and utilizes logic to solve problems. The right hemisphere establishes context, utilizes intuition to solve problems, imagines, works outside of a concept of time, perceives relationships, categorizes, works holistically, and interprets spatially. (For a specific comparison of the characteristics of the two, see the chart, *Notes on Literacy* 62:19.)

2.2. Information processing, language, and art

How is language processed according to this left/right hemisphere model? Broca established over a hundred years ago that the left hemisphere controls language ability in the great majority of individuals Sperry’s experiments confirmed this, as well as bringing to light the functions of the right hemisphere. Given the analytical and symbological characteristics of the left hemisphere, it appears that when visual or auditory information is input, the left hemisphere matches that combination of sounds or visual symbols to preestablished meanings. It acts as a “translator,” changing visual and auditory components to semantic components and stringing them together in a linear sequence. This operation is reversed in speaking or writing.

But the operation described above is not all that is involved in language processing. The left hemisphere processes the semantic components, and understands them linearly, concretely. It can draw conclusions based on available facts, and can suggest solutions to problems. What it cannot do is interpret metaphorically, nor can it extract topic, theme, or moral. In short, it cannot provide a context for the information it handles (Jakobson 1980:28).

This situation is clearly shown in studies led by Howard Gardner at Harvard University. He and his associates have studied the linguistic behavior of patients who have suffered injuries to the right hemisphere, with some amazing results (Gardner 1982:313–315). The patients’ vocabularies were found to be extensive, their use of grammatical constructions completely normal. When told a story, they could retell the essential facts, even recite entire sentences verbatim. But they could not accept the story as a functional unit. They did not understand main ideas. They completely missed jokes and morals in even the simplest stories. According to Gardner:

they lack a ‘plausibility metric’: they seem unable to decide, given a specific event, whether or not it fits into an overall narrative structure. Hence they may either challenge items that are perfectly appropriate or, on the other hand, go to extraordinary lengths to justify elements that really do not fit into a given context …. They are unable to figure out the underlying architecture or composition of a story …. Instead, each part stands alone, a single brick unrelated to any other or to the entire edifice.”

Only a combination of left and right hemisphere processing, then, allows us to use language effectively. The left hemisphere interprets symbols and establishes literal meaning, and the right hemisphere establishes context and significance, relating the information to previous experience.

In art, much the same process takes place for the majority of individuals. The left hemisphere, already adept at processing symbols because of lifetime practice in language acquisition, converts raw visual information into symbols. These symbols are used, beginning in early childhood, to represent objects in the real world. For example, in the United States, children learn early on to develop a symbol for the human eye, which usually looks something like this:

![Eye](image)

Whenever they draw an eye, then, animal or human, from the front or from the side, the left brain matches the object with the symbol, and, in effect, says “here it is, eye,” and the child draws it. These symbols are amazingly persistent, and, in fact most people continue to use them throughout their adult lives, with little or no modification (Edwards 1979:62–64). This reliance on symbols in drawing is by no means confined to America, or even to developed countries. Jo Machin has “published” some interesting examples of artwork from South America (Machin 1981:7, 9) which show this tendency beautifully.

Here the definition of “talent” offered in the introduction comes into focus: an ability which is accessible to all, but which is utilized by only a few. The right hemisphere, which perceives spatially and holistically, is capable of mentally and physically reproducing objects in the real world in minute detail. It is the “mind’s eye” of traditional thought. It bypasses symbols entirely and processes visual information exactly as it occurs in the real world. Unfortunately, since the left hemisphere is used more frequently by most people, it intercepts visual information before the right brain can process it, and inserts the appropriate symbol from its “library” (1979:76–79).
Figure 1

Thus, unless an individual “learns” how to “bypass” the left hemisphere and input information directly into the right, he or she is not able to output anything more than a crude, often childlike symbol for any object (Figure 1). Those people whom we call “artists” have either stumbled on how to do this during their youth or have trained themselves, usually unconsciously, to do it. Betty Edwards relates the reality of this “shift” from an artist’s perspective (1979 vi, vii):

I have always done a lot of demonstration drawing in my classes, and it was my wish during the demonstrations to explain to students what I was doing—what I was looking at, why I was drawing things in certain ways. I often found, however, that I would hear my voice stop and I would think about getting back to the sentence, but finding the words again would seem a terrible chore—and I didn’t really want to anyhow. But, pulling myself back at last, I would resume talking—and then find that I had lost contact with the drawing, which suddenly seemed confusing and difficult. Thus, I picked up a new bit of information: I could either talk or draw, but I couldn’t do both at once.

So drawing (and most other art forms) is processed through the right hemisphere, while verbal and written communication goes through the left predominantly, while accessing the right hemisphere for context, topic, impact, and so forth.

Turning now specifically to written communication, some interesting facts surface. Language orthographies began in the mind of man as symbols, simple pictures which represented verbal language units or concepts. Hieroglyphs gradually became ideograms, and in most written languages of the world, those ideograms became associated with language sounds rather than semantic units (Chinese is one of several notable exceptions). But from beginning to end they were left-hemisphere symbols, not drawings.

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An interesting example of what might well have been written communication in the making is the graphic representational systems of certain Australian Aboriginal groups like the Walbiri or the Pintupi (Figure 2). These systems use very economical symbols to represent objects in the real world. Though Lesley Hansen (Hansen 1983:8) and Nancy Munn (1971:336) refer to these systems as “art,” they are in fact closer to written language, since their sole purpose is to communicate. In her article about Pintupi art forms, Hansen herself gives strong evidence to support this conclusion: “… European art is a meaningless jungle to the Pintupi. Line drawings of the very familiar were completely incomprehensible” (1983:8). “However”, she continues, “we have found that visual discrimination based on letter shapes has given no difficulty whatever” (1983:9). In short, the Pintupi had no trouble learning to work with symbols they had never seen before, but had great difficulty deciphering pictures they had never seen before. Hansen goes on to conclude that using pictures in the Pintupi literacy program would be confusing at best. (She did use them, however, because of pressure by a small group of educated Pintupi).

So why couldn’t the Pintupi decipher pictures? Their minds were locked into use of the left hemisphere to decode visual representations. Detailed drawings, or even simple outline sketches, were meaningless to them because they were not part of their cognitive processing system.

The Western world has developed a singularly interesting mutation which we call the “illustration.” Illustration is kept carefully separate from the “fine arts,” as evidenced by the fact that we call the people who draw illustrations “illustrators” and not “artists.” An illustration is an attempt to emphasize the key points, topics of a story, or any other written work by offering a visual representation of that point or topic. So then, it is an extension of the written word. But a drawing produced by the right brain cannot, as is discussed above, be processed by the left unless it corresponds with a symbol or group of symbols in the left hemisphere’s “library.” It must be processed by the right hemisphere. A cognitive shift is therefore necessary to scan from written material to illustration; to a lesser extent the same cognitive shift that occurs when an artist draws. We, in the Western world, have learned how to do this, at least when we are reading illustrated material, but what happens when similar materials are introduced in a preliterate group whose language has just been given a written form? Their minds must simultaneously grasp and compile strange new symbols, learn to establish contextual and topical relationships, and attempt to make an unconscious cognitive shift between orthographical symbols and illustrations. All over the world, language groups are being asked to do just that. They may succeed; it is certainly not an impossible task. A young child when thrown into a lake stands a good chance of learning how to swim; an adult in the same situation is more likely to drown.

3. The art of indigenous societies

Few societies exist that have no method of artistic expression. For most primitive societies, art functions concurrently with either religious ceremony or traditional, utilitarian handcraft. Warner Muensterberger (1971:4–10) lists three general elements of artistic creativity in primitive societies:

1. The inclination to personify things and ideas

2. The tendency for art objects to produce an exhibitionistic attitude, in which the owner or creator of a work of art gains considerable prestige

(Hansen 1983). Notes on Literacy, 17(4).
3. Similarity of style within a certain geographical area

These are very general characteristics, but they emphasize one important fact quite clearly. For the majority of the world’s societies, art for its own sake, for the pleasure of creating alone, does not exist. This is not to say that a Maori sculptor, for example, does not enjoy producing the intricate carvings for which his people are famous; to suggest such would be ridiculous. The point is that for that Maori sculptor, as well as for most artisans in primitive societies, the production of a work of art is intrinsically tied to ceremony or strict tradition. Art is created for a specific purpose not related to aesthetics.

Because of this ceremonial and utilitarian emphasis, the art of many primitive societies is basically left-hemisphere symbology. Its creativity lies basically in minute changes made by individual artists which, over the course of time, become part of the symbology. Since any creativity must come from the right hemisphere, it is obviously used, but it is not primary, since many, if not all, of the basic design motifs are standard, passed down from one generation to the next (see Chipp 1971:146–170).

3.1. Art and the introduction of written communication

In a few preliterate societies, this symbol-based art is a form of communication. The Australian Aboriginal groups discussed above have developed a system which, over the course of time, might have evolved into a unique written language, had colonization not interrupted the process. Thus it is no surprise that the Pintupi were able to learn to work with letter shapes fairly quickly (Hansen 1983:9)

It has already been pointed out that the introduction of written communication involves many mental adjustments on the part of the peoples involved (1983:9). Here the Pintupi are an exception, in that they had already learned to categorize and transfer meaning to visual symbols. In most cases, however, when a language is spoken but not written, it is processed by the brain in streams rather than “chunks”; the categorization is based on auditory input rather than visual input, so the brain attaches certain meanings to certain streams of sounds, rather than to groups of symbols (Jakobson 1980:11–18).

Symbolic art may communicate, but it does so separately from the spoken language, hence it is not cognitively a part of the language processing system. It operates through left hemisphere visual cues which trigger right hemisphere concepts and ideas. When a representational system, or orthography, is introduced, the brain apparently must reorganize itself in order to learn to “read” it. It must search for sound streams and their corresponding meanings and break those streams down to match the dictates of the orthography. If the orthography is well designed, this process is simpler, but still by no means simple. In most cases those learning to read will be adults whose cognitive processing systems have been operating in the same way for many years. Altering those systems after so long might prove to be quite a struggle.

3.2. The introduction of illustrations

Along with this struggle comes another: reading materials often utilize illustrations to emphasize key words or ideas. With no experience in decoding realistic representations or pictures that “illuminate”

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words or topics, the new reader or preliterate has never made the kind of cognitive shift that is necessary to connect the picture to its meaning or to its larger context as an element on the page of the book.

The question of whether or not this problem can, or should, be avoided is a complex one, involving psycholinguistic concepts and consideration of individual learning styles. Though many literacy workers have very carefully taken into account many cultural and psychological factors in implementing their programs, use of illustrations in some of those same programs has been rather indiscriminate. This problem will now be examined in hopes of pinpointing specific areas of difficulty and offering possible solutions.

4. The current situation

As far back as 1960, communications specialists were realizing that printed words and illustrations were strange bedfellows; Stuart Cooney even went so far as to say “I found myself wondering whether words and pictures do indeed belong together at all, and if they do, what might be some of the conditions of their compatibility” (Cooney 1960:63). Interestingly, he goes on to conclude that they do belong together only when “the total message is central, rather than that the printed word is central, aided by illustrations” (1960:64).

This concept, though it predates Sperry’s left/right hemisphere studies, reinforces some of their implications for literacy programs. Illustrations, rather than being secondary aids in printed materials, must actually be an integral part of the message design.

Cooney’s insight is not reflected in Sarah Gudschinsky’s comments on the use of illustrations. Her writings (1973) hold to the traditional attitude towards pictures as “aids.” She lists six purposes of pictures in primers (1973:102–103).

First, she says that they “keep the page from being crowded …. If a page is solid text, it is harder on the eyes and harder psychologically to read than if it is broken up.” This reasoning, given understanding of left/right hemisphere functions, is flawed, since it is “harder psychologically” to scan from words to pictures than to read even a crowded page of text, since no cognitive shift would be involved in the latter. A better way to avoid the confusion of a crowded page would be to leave white space; the idea that a picture improves the page layout, and hence the readability, is a purely Western one.

Second, she holds that illustrations will “make the primer cultural,” adding that this point is only valid “if the pictures are indeed a reflection of the culture.” This is an extremely important point, one that she mentions only in passing. For pictures to be a true reflection of a culture, they must be developed by the people of that culture, as an expression of the values of that culture, as well as a reflection of the cognitive processing systems of the people. If the people have no desire to do this, or if the literacy worker has no desire to put forth the effort necessary to ensure this, then it might be more prudent to leave out pictures entirely. This is not ideal, but it is certainly preferable to using traced pictures from clip art books, which Murphy and Scheffler (Murphy and Scheffler 1983:13) discuss as a common practice in writer’s workshops. (Murphy and Scheffler comment that “very few groups” prefer no pictures over tracings. This is an interesting comment; it would be even more interesting to find out how this preference was determined.)

Third, Gudschinsky says that pictures “give pleasure.” This may be very true, if the pictures are easily decodable. There is a great danger in assuming that an illustration is being decoded accurately when in reality it is not. The material presented in this paper indicates that a person must be taught how to “read” pictures just as he must be taught to read words. The reader must be trained to make the cognitive shift from illustration to text and back to illustration, and so forth. This training is certainly not difficult, but if not taken into consideration, in many cases the teaching process will be impeded.

The fourth purpose Gudschinsky lists is “to stimulate oral and written expression.” This is certainly valid, but again only after the student has learned to decode the picture properly, and only if that decoding is a part of his cognitive processing system.

Fifth, Gudschinsky says that pictures help “to tell the story.” This is much like the old “one picture is worth a thousand words” idea. But one picture is worth nothing, if the people who see it attach no significance to realistic representations. If they are not able to match that right hemisphere input with a left hemisphere symbol or set of symbols, or if the picture does not act as a cue to trigger the memory of a corresponding object in the real world, then it is useless.

Finally, she says that the most important purpose of a picture is to help the student “to remember the keyword.” In order for this to be true, the picture must become a symbol in the left hemisphere’s library of symbols. If it is at all a detailed illustration, the left hemisphere will reject it as symbol. If pictures are to be used as mnemonic devices, then, they must be simple enough to be remembered as symbols, yet unambiguous enough to have only one semantic correlate.

Another prevalent attitude in literacy circles is that, within a people group, there will exist artistically “talented” individuals amongst a sea of “untalented” individuals. Margaret Wendell, while discussing the training of indigenous artists, displays this attitude (Wendell 1982:120):

Jo Machin (SIL artist in Mexico) has taught art classes in several workshops, helping the trainees to develop their abilities to their own satisfaction. As experienced as Machin is, she states that at times it is quite difficult to decide whether the picture which the trainee struggles to produce is representative of a true cultural art form, or if it is merely the work of an unskilled trainee who really has no artistic talent (1982:120).

Again, I refer back to the definition of talent as an ability which is accessible to everyone, but which is utilized by only a few. Anyone can learn to draw if he knows how to make the left-right cognitive shift. Literacy workers and translators who find artists in their language groups have found people who have learned to make that shift. Literacy workers and translators who do not find any artists among the people they are working with can train artists. By training I do not mean setting up art classes; I am referring to teaching people to make the perceptual shift which would enable them to draw on their own, as part of their own cognitive systems.

There is one catch: desire is the key. There is mention above that if there is no desire among the people to use pictures or learn how to draw them, or if the literacy worker has no desire to spend the time and effort necessary to develop perceptual acuity, then it is best to leave out pictures completely. They will be
foreign elements. Showing people the value of artistic expression is every bit as difficult as showing them the value of written expression, but if pictures are to be used as effectively as they can be, then it must be done.

5. Suggestions

Detailed suggestions in the form of a plan for implementation of art in a literacy program are far beyond the scope of this paper; however, some guidelines that might prove valuable follow:

1. Murphy and Scheffler (1983:9) suggest three stages of difficulty in illustration, paralleling Wendell and Herzog’s “Stages of literature”:

   Stage 1  Illustrations which deal with subjects known through experience to both the illustrator and the people
   Stage 2  Illustrations which deal with subjects known by experience to the illustrator, but unknown to the target group
   Stage 3  Illustrations which deal with subjects indirectly learned by the illustrator through books, magazines, and discussions and are unknown to the target group

These stages are a valuable tool in assessing the level of difficulty of subject matter in illustrations, but this paper has attempted to show that effectiveness of illustrations is tied more to the level of perceptual difficulty than to the familiarity of subject matter.

In view of this, I would like to suggest four levels of perceptual difficulty:

   Stage 1  Illustrations which are simple, easy to encode as symbols, drawn by an indigenous artist according to the dictates of his cognitive processing system
   Stage 2  Illustrations which are realistic, difficult to encode as symbols, drawn by an indigenous artist according to Western stylistic influences
   Stage 3  Illustrations which are simple, easy to encode as symbols, drawn by an artist from outside the culture, according to Western stylistic influences
   Stage 4  Illustrations which are realistic, difficult to encode as symbols, drawn by an artist from outside the culture, according to Western stylistic influences

Every literacy worker needs to be aware of these levels, and should at the very least do everything within his/her power to avoid levels three and four. Using those two levels is roughly the cultural equivalent of adorning a first grade American spelling book with Sung Dynasty Chinese watercolors.

4. Gudschinsky says, “It requires special training both to see and to draw” (Gudschinsky 1973:107). She is half right. If a person learns to truly see, he will be able to draw (given he knows how to hold a pencil). Literacy workers must train people to see if they want truly effective Level One illustrations.
Here, I can only recommend reading Betty Edwards’ book (see page 4); there is hardly space here to elaborate. There are questions, however, that can be used as starting points: 1) Are potential, willing artists able to describe an object in detail after examining it carefully for five minutes, then closing their eyes and remembering it? 2) Are they able to trace with their finger an intricate outline of an object while looking at the object, and not their finger? These two skills are practicable, learnable, and are the basic characteristics of the right hemisphere shift. They are essential to drawing, and, once they are learned, all that remains is practice.

5. Practice presupposes motivation. Why should anyone learn to draw, anyway? What good is it? The literacy worker should establish a practical value for artistic ability compatible with motivational values that have been established for the literacy program itself.

6. All examples of Western illustrations in the literacy workers’ possession should be hidden or thrown away. Our insistence that materials we publish should “look good” might very easily take precedence over what the people want. This will be especially easy for people who are artistically active themselves. Even if the people are already familiar with art forms and illustration from outside their culture, it should be downplayed. Anything they do on their own is more valuable than anything that can be brought in from the outside.

6. Conclusion

Anyone who does literacy work has many factors to consider. So many, in fact, that some considerations are likely to fall by the wayside. The use of pictorial material in the literacy program is not one of the things that should meet this fate. Art is a powerful tool, at least as powerful as the printed word; it should not be a careless afterthought on the order of “well, this might look nice on this page.” Too many literacy materials have been produced with pictures traced out of a clip art book or drawn by an expatriate artist. If literacy work really does aim to help a people to be more culturally, nationally, and spiritually aware, then it should give them every opportunity to be who they really can be culturally, spiritually, and yes, even artistically.

Figure 2

The Pintupi people of Central Australia have a highly symbolic (or some prefer to call it representational) art form. A circle, for example, may represent any roundish object, that is, a hole, a tree, a fire, a nest, and so forth. If a Pintupi wished to illustrate a goanna on a nest of eggs, it would look something like this:

Or a fire at which two men are standing and one sitting like this:

Walbiri

Tree  Human  Yam  Hill

wagilbiri  dead man  small tam  conical
           (unjunu)    (wabadi)    hill

* slightly simplified from the original

Discontinuous Meaning Ranges.... Walbiri

circular path  straight path  winding path  cave  "actor", (sitting, standing)

waterhole  straight tail  winding tail  (arched) line  human
           (e.g. kangaroo)  (e.g. possum)  of toes

fire  spear  snake  etc.  kangaroo
      (e.g. wabadi)  (e.g. trunk)  etc.  (ancestor)

yam (e.g.  backbone  etc.
wabadi)  etc.

eetc.

Walbiri

snake  tree  human  hill

Figure 1a. Elementary Visual Categories

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