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DEVELOPING VISUAL THINKING THROUGH VISUAL COMMUNICATION IN  
ART EDUCATION: IMPLICATIONS FOR ART EDUCATION IN BRAZIL

INTRODUCTION

Western society is becoming insensitive to the natural world around it, a situation which appears to be aggravated by the increasing use of visual communication media. The very excess of visual communication through mass media and the unilateral development in the education system of scientific or verbal thought at the expense of perception may be among the causes. Man has to get back in touch with nature and the senses.

Visual perception is the most important element in the link between man and the external world. Today, it has taken on a new significance and is considered to be directly associated with thought.

Perhaps visual thinking is a way to re-establish man's relation with the external world. It seems logical to take advantage of the increasing use of visual communication for this purpose, for, by comprehending and criticising the world around him via the communication media, man can begin to develop his capacity to think visually.

Visual thinking can be enhanced most effectively through the teaching of art, for it is through an understanding of how visual communication functions in art that visual thinking may be developed in students. Since visual communication is intimately related to visual thinking, it is impossible to communicate visually without thinking visually. In addition, learning visual language will help students to look critically at mass communication.

The purpose of this paper is to demonstrate the importance of visual thinking and to propose that it be taught through visual communication.

The meaning of the terms visual thinking and visual communication must be established, for a clearer understanding of this paper. The terms will be used here with the following meanings:

Visual thinking happens when an individual visually perceives the inherent qualities in visual objects and in this way forms visual concepts. Such concepts are used in complex operations of thought where the vehicle used is sensory imagery.

Visual communication is the process by which a visual message is received and transmitted. The message can be aesthetic or not, and can transmit information and/or emotions. For this process to occur, the message must be organized in such a way that it is visually comprehensible to the receiver.

This paper will examine the relation between the teaching of visual communication in schools and the development of visual thinking in the pupils; the results of this study will be a series of proposals for a course in visual education which can develop visual thinking.

The paper comprises three parts. The first part is a study of visual thinking to determine its meaning, its importance and the mechanisms involved in this process. The second part will study the relation between visual thinking and visual communication, and the possibility of developing visual thinking through the teaching of visual communication. The third part will relate the preceding concepts to the situation in Brazil.

A review of literature is presented which shows how different psychologists envisage the mechanisms of visual perception, and reveals the origins of the concept of visual thinking, as well as demonstrates the influence of various psychological theories on art education.

Visual thinking as a process is discussed, and following this, a review is made of the major existing programs that apply the principle of the link between visual communication and visual thinking; theoretical opinions on this subject are discussed.

The author's proposals are based on the above-mentioned research work, and are designed to fit the present educational and cultural situation in Brazil; for this purpose, local conditions are described and analysed.

The author hopes that her paper will be able to contribute in some way towards the development of the pupil as a human being.

## CHAPTER I.

### THE DEVELOPMENT OF THE IDEA OF VISUAL THINKING, STARTING FROM VISUAL PERCEPTION

In this chapter we will analyse the main influences which contributed to the idea of visual thinking. This idea is a consequence of the importance given to visual perception by certain psychologists who considered it more than a simple mechanism for capturing information.

Some psychological theories about visual perception will be studied to determine their influence in education and their relation to the idea of visual thinking. In addition to these theories, the importance of visual perception in developmental theories will be examined. This will be followed by determination of the presence and influence of these theories in art education, and whether or not visual thinking is considered by art educators.

An analysis of the opinions of several authors on the process of visual thinking will be made to confirm their ideas about its relation to visual perception as an active mental process, as well as its relation to cognition and art. These authors' opinions about the presence of visual thinking in children's drawings and the process of the learning of visual thinking will also be studied.

Based on these analyses of the idea of visual thinking, its origins and development, and its process and influence in education, this author will analyse in more detail the definition of the term "visual thinking" in this paper.



### Origins

The idea of visual thinking came out of psychology's long search for a better understanding of the mechanisms which control visual perception. In the last century and even in the present one, many psychologists such as Piaget and Bruner considered visual perception as a mere furnisher of raw material for thought.

It was only in recent times that psychology began to study perception as a higher category in the mental process. Psychological investigation does not occur in a vacuum; it relates to other disciplines. The relation between psychology and philosophy is particularly significant, and the origins of visual thinking are to be found in philosophy, in a current of thought which emphasized the influence of the external world upon man.

In analysing philosophical thought which deals with the relation between man and the external world, Arnheim (1962), the Gestalt psychologist who developed the most important work in visual thinking, differentiates two opposing currents which he calls the extroverted and introverted theories. According to him, the extroverted theory maintains that man undergoes the influence of the external world and that his memory and thoughts derive from his perception of the external world. The introverted theory, on the other hand, considers the external world to be amorphous and gives great importance to the mind; sensory perception is a minor factor, and what matters is the individual's past experience. Thus, in Arnheim's analysis, the followers of the introverted theory give greater value to the abstract operations of the mind than to perception. The followers of the extroverted theory bring out the importance of the image of the external world and of perception as an organizer of structures.

Arnheim's treatment of this subject plays an essential part in the development of this paper. He clarifies the philosophical controversy between those who valorize the mind or purely intellectual thought and those who valorize the influence of the external world and the link between the image and thought in perception.

Following Arnheim's observation of the division into extroverted and introverted theories, it can be seen that the controversy is still very much alive in psychology, particularly among those psychologists studying visual perception.

For those psychologists of visual perception who espouse the introverted theory, perception is considered merely a shaper of raw material, and abstract concepts are formed in a higher mental operation where perception has no place. The strongest argument for this point of view says that it is only possible to perceive the particular or the individual through perception, and that to arrive at more general concepts, a more complex abstract thought is necessary.

Gombrich (1977), a defender of the introverted theory, says in his book, Art and Illusion, that the recognition of images is linked to previous knowledge, and in his article, "The Visual Image" (1972), he affirms that "what a picture means to the viewer is strongly dependent on his past experience and knowledge" (p. 84).

Gombrich (1977) considers perception to be a "hypothesis" to be or not to be confirmed. Because of this, he states that "there is no rigid distinction ... between perception and illusion" (p. 24).

Among visual perception psychologists who can be classified as followers of the extroverted theory, Gibson (1950) has produced one of the classic studies of the perception of the visual world. He makes a

distinction between the visual field and the visual world. According to him, the visual field is the way we see the external world as if we were looking at a picture in perspective; it has boundaries. But the visual world is our perception of the daily external world; this has no boundaries because it is perceived with movements of the eyes and the head. It is stable because it is subject to the phenomenon of constancies and has depth.

Gibson feels that theories of vision were generally theories on the visual fields and not the visual world. For him the study of the perception of space, and therefore of the visual world, is basic. He considers the external world to be the most important element in perception, supplanting the past experiences of the observer.

In his psychological theory of perception, Gibson (1950) advances the idea that "the correspondence of the visual field to the total retinal image is an anatomical point-to-point correspondence" (p. 76). The perception of depth occurs through a "gradient of texture" in the visual field which corresponds to distance in the visual world.

In another study, Gibson (1966) considers perception to be an active interrelation between the organism and the environment, serving to obtain information. Vision is more than the simple using of the eyes. It is a form of perception which functions within a gravitational field. Gibson emphasizes perception's exploratory nature (pick-up of information) and performing aspect (expression of the organism's relation to the environment). Gibson declares that the environment is structured geometrically by the light which reflects in different ways, according to each surface's incline, the chemical composition of substances which determine their reflectivity and the existence of projected shadows.

In a later work, Gibson (1971) comes to reject in part the point-to-point theory, saying that it can only be applied to painting or photography, but not to a line drawing or a caricature. "There is no point-to-point correspondence of brightness or colour between the optic array from a line drawing and the optic array from the object represented" (p. 77). To explain the cases of line drawings and caricatures, Gibson presents a new theory by which "a picture is a surface so treated that a delimited optic array to a point of observation is made available which contains the same kind of information that is found in the ambient optic arrays of an ordinary environment" (p. 84). Thus, it is the information which is important, and not the stimulus which can be different but can provoke the same information. Gibson continues, saying: "information consists of invariants" (p. 85), that is, information comes to perception from the visual world and not the visual field, and because of this its basis is not the form sensations, but "the formless and timeless invariants that specify the distinctive features of the object" (p. 85). Gibson calls these invariants "formless" and "timeless", because, for him, their basis is not found in sensations of the form nor in the remembered time sequence of the object's forms.

He explains that "picturing is a means of communication and a way of storing, accumulating and transmitting knowledge to successive generations of men" (pp. 92-93).

Gibson (1971) adds that we think in terms of visual information; in other words, by visual thinking. He makes a comparison between verbal and visual thinking:

Not only do we perceive in terms of visual information, we also can think in those terms. Making and looking at pictures help us to fix these terms. We also can think in terms of verbal information, as is obvious, and words enable us to fix, classify, and consolidate our ideas. But the difference is that visual thinking is freer and less stereotyped than verbal thinking; there is no vocabulary of "picturing" as there is of "saying". As every artist knows, there are thoughts that can be visualized without being verbalized. (p. 93)

It is interesting to note that Gibson and Arnheim reach the same concept of visual thinking by way of different theories of visual perception; for Gibson, visual perception is a furnisher of information, whereas for Arnheim (1979), it consists of the "grasping of structural features" (p. 122).

Gibson's "invariants" refer only to the constancies of shape which are characteristics of the way we perceive objects, while Arnheim's "structural features" refer to the perception of the generic qualities of the object, that is, the perception of its structure.

Arnheim (1979) comments on Gibson's ideas of "information" and "invariants" calling them "undefined and vague concepts" (p. 121). Arnheim does not contradict the idea of constancies (the basis for Gibson's idea of invariants) but says it is necessary to explain the phenomenon, not only to point at it. Arnheim goes on to say that in the phenomenon of constancy, a transformation occurs only when the visual concept of things is structurally simpler than the particular object perceived in perspective.

Kennedy (1974), influenced by Gibson's theory in his study of picture perception, focuses on the information transmitted, although he considers that it is frequently aesthetic or expressive, because

"meaning and style can never be completely isolated from one another; to say where style leaves off and subject matter begins is difficult, maybe even impossible" (p. 3).

Kennedy agrees in part with Gibson's theory of invariants, but thinks that Gibson's definition of perception of pictures is very general. He considers the recognition of drawn objects is independent of learning; this can be seen in children and primitive groups of people. Only the interpretation of the picture's meaning is influenced by culture. A person looking at a picture is making a choice of what is relevant to him in the picture. Kennedy acknowledges that culture may also play a role in this choice.

Kennedy says that perception of the external world needs light which determines the discontinuities in the visual world which, in turn, permit us to perceive the environment. He explains that line drawings can represent objects or the environment through drawing discontinuities, or "abrupt change", these being "the basic features of the environment" (p. 132). Thus, discontinuities of the surface, pigmentation, illumination and texture are represented by the line.

Another of his conclusions in his review of pictorial perception theories is that outline pictures are symbols which require less training than any code or language, do not require as much elaboration, as much time to grasp their meaning, nor do they require any translation to be able to be universally understood. Moreover, they are comprehensible forms of communication through vision as well as touch, as has been shown by experiments with blind people.

The extroverted theory is echoed in Gestalt theory, which considers perception to be an integral part of the mental process. According to

Gestalt theory, we perceive the external world through structures where the whole is more important than the parts. It is this aspect of Gestalt theory which gave rise to the visual thinking concept; it will be examined in more detail later in this paper.

Another aspect of Gestalt theory which has a growing influence are the principles of organization which act in visual perception. Gestalt theory explains that there are forces in the visual field which make the forms organize in structures. Things do not exist as single entities but rather as interacting factors within the whole. The principles of organization are grouping by similarity, which refers to the tendency of grouping similar in shape, size, colour or texture; grouping by proximity, which refers to the tendency of grouping according to the relative placement of forms; closure, the tendency to complete a form which is incomplete; and good continuation, which is defined as that arrangement of line separation or figure and ground that produces the fewest interruptions or stopping points for the eye.

Arnheim (1974), the Gestalt psychologist, believes that visual perception first apprehends an object by its generic quality, its "overall structural features" (p. 45). He explains that a triangle, for example, is first seen in its triangular quality, and only afterwards in its individual details. Therefore, the perception of this structure is not posterior intellectual abstraction, but rather "primary data of perception" (p. 45).

Arnheim theorizes that:

Perceiving consists in the formation of "perceptual concepts"...[because] vision deals with the raw material of experience by creating a corresponding pattern of general forms, which are applicable not only to the individual case at hand but to an indeterminate number of other, similar cases as well. (p.46)

Arnheim says that the aspect of generality of a percept gives it the character of a concept, or that "the concept and the percept are united" (Peterson, 1972, p. 58).

Arnheim points out that the use of the word "concept" does not mean that he considers perception to be an intellectual operation, as visual perception is an operation which occurs within vision, but he does feel that the same mechanisms which operate on the intellectual level operate on the level of perception.

In another study, Arnheim (1964) affirms that "it is these perceived generalities that make visual thinking possible" (p. 52). Arnheim (1974) attempts to explain this phenomenon by suggesting that the brain may possess "a specific pattern of general sensory categories" (p. 45) which are stimulated by the form of an object. He does not consider visual perception as merely furnishing material for thinking, or functioning as a passive receiver of images. For him, visual perception is active rather than passive, as it includes complex operations considered by other authors to be the prerogatives of thought. Arnheim believes that the human mind treats cognitive material in the same way at any level: whether a person looks at the world or whether he closes his eyes and thinks. The same operations would occur in both cases, operations such as "active exploration, selection, grasping of essentials, simplification, abstraction, analysis and synthesis, completion, correction, comparison, problem solving, as well as combining, separating, putting in context" (p. 13). For Arnheim, there is unity between perception and thought.

There are still many points of controversy in the study of visual perception. Gombrich emphasizes the importance of past experience and



knowledge for visual perception, while Arnheim and Gibson both give importance to the external world. Gibson and Kennedy emphasize the importance of light for visual perception. Gibson considers perception to be a way of obtaining information, whereas Arnheim places it on a much higher level, which is his concept of visual thinking.

This idea had its origin in the Gestalt theory, which studied the visual perceptual phenomenon and considered it of great importance, relating it to mental operations.

These theories of Gestalt will be developed in greater depth later in this paper, because of its important role in the formation of the idea of visual thinking.

#### Visual Perception In Developmental Psychology

##### And In Art Education

In the preceding section, the two main currents of thought about the relation between man and the external world, and the importance given to perception by these two opposing currents were studied. The effects of these ideas in psychologists' opinions about visual perception were also analysed.

In this section, developmental psychology will be studied because of its great influence in education. Some psychologists were chosen for examination because of their importance in their theories on visual perception.

The influence of the developmental and visual perception theories on art education will also be analysed.

### The Importance Of Visual Perception For Developmental Psychology

Visual perception had an important role in studies of the developmental psychologists, but their opinions of the importance of visual perception differ quite widely. As the results of their studies are directly reflected in education, it is necessary to analyse some of these authors for a better understanding of the present education system.

Among the psychologists who have studied children's mental growth, Piaget has been the most influential for education today. Piaget (1969), through his studies on perceptual development in the child, arrived at the conclusion that "generally speaking it is ... impossible to maintain that the concepts of intelligent thought are simply derived from the perceptions through abstraction and generalization" (p. 49). He is of the opinion that "perceptual activities develop with age until they are able to obey the directives of the intelligence" (p. 43). Thus, Piaget seems to be an advocate of the introverted theory.

Piaget (1969) distinguishes conceptual intelligence from sensory-motor; for him the mental development of the child passes through five stages, each of which depends on its predecessors. In the first stage, from birth to two years old, the child develops a sensory-motor intelligence. In the second stage, from two to four years old, pre-conceptual thought is developed, where the notion of objects and sometimes the concept of a class of objects appears. In the third stage, from four to seven years old, intuitive thought is developed; there is an increase of the internalization of actions in thought. However, the notion of reversibility is not attained. The fourth stage, from seven to eleven years old, is the stage of concrete operations. The last stage, that of formal operations, is reached at the beginning

of adolescence, between eleven and fifteen years old. This is the stage of abstract thought, where concrete material, thus perception, is no longer necessary.

Among the many psychologists who have followed the theories of Piaget, Jerome Bruner has been a major influence in the field of education. Bruner (1967) proposes three stages of mental growth which, like those of Piaget, are in linear order, the latter two stages growing out of the preceding stage. He calls them "enactive, ikonic, and symbolic" (p. 1), which correspond to the motor, image, and language stages. All of these processes persist into adulthood.

Piaget denies the collaboration of perception in formal thinking, considering it a furnisher of raw material. Bruner, although he places the language stage as the culminating point of mental development, does give greater importance to perception (the ikonic stage) in that all three stages are still operative in adulthood.

It is this classification of perception in Piaget's scheme of mental development that still has influence in our present-day education system, and it is against this conception of perception as inferior that the exponents of visual thinking are rebelling.

Gardner (1973), a developmental psychologist who discusses art education, developed a theory of human growth in which he refused the tenets of Piaget's theory of the development of logical thought, or of Freud's personality theory. For him, logical thought is not achieved by the great majority of people, who, although they do not reason scientifically, are still capable of complex intellectual activities. Gardner considers Piaget's theory inadequate because it does not include the

integration of the cognitive and the affective processes, and therefore does not include personality and emotional development.

According to Gardner, Freud is a psychologist who, contrary to Piaget, does bring out the affective aspects of personality in his study of human development. Neither one, however, goes into any depth about imaginative creativity. Because of that, Gardner's study of human development changes these goals to the goal of "participation in the artistic process—the capacity to be a creator, performer, critic, or audience member in an art form" (p. vi). With this in mind, Gardner developed a study of how the child develops, and of the process in itself.

Searching for developmental stages, Gardner arrived at, in his words, "an unexpected conclusion: the child of seven or eight has, in most respects, become a participant in the artistic process and he need not pass through any further qualitative reorganization" (p. vii). This means that "while development continues far beyond these years, indeed throughout life, the development is a deepening process involving the same principles, rather than a total reorganization of systems" (p. 305).

According to Gardner (1973), the organism possesses three systems: making, perceiving, and feeling, and development is the process in which the three systems evolve and interact. He sees little evidence that an artist must be a formal operator, and therefore considers artistic development in the child to occur in two stages:

I have viewed artistic development as encompassing only two broad stages: a sensorimotor period in which the principles of the making, feeling and perceiving systems are first manifested; and a symbolic stage in which the three systems recapitulate their development on the symbolic level and in which the child becomes well versed with various symbol systems, preeminently natural language. ...

The development characteristic of the symbolic stage never ends; one can increase one's mastery of a symbol system indefinitely, and this trend epitomizes the accomplished artist. (p. 307)

Gardner (1974) thinks that the child of seven has already achieved "an initial handle on the major symbolic media of his culture" (p. 7). After age eight the child develops skills and more experience, but also, with the approach of adolescence, "for reasons not entirely understood" (1973, p. 258), the child undergoes an artistic regression, perhaps the adolescent becomes more self-conscious and therefore inhibited, or perhaps because "the emphasis in our culture on abstract thinking and on rigorous logical reasoning causes a decline in sensitivity to aesthetic properties, though it is also possible that such a decline antedates (or even causes) a shift to more abstract modes of expression and communication" (1973, p. 259).

For Gardner, the fact that the artist develops the symbolic more than the logical side does not mean that he is less developed, but rather that he is using "different processes of thought with their own evolution" (p. 9). This theory concurs with the idea that some cultures where logical thought is not particularly developed produce highly sophisticated art works.

Gardner's reflections are obviously closely related to the visual thinking concept.

The author of this paper agrees with Gardner in his attempts to integrate the cognitive and affective processes in his study of children's development, but feels that his idea that formal thought is not necessary in the artistic process still lacks confirmation by other studies.

There is an obvious evolution to be seen in the opinions on perception of these three authors. Piaget considers perception as a furnisher of raw material for thought, and thinking. For him, the more complex and abstract the thinking, the further away it is from the senses, and therefore from perception. The adult stages of thinking are no longer related to perception. One sees some evolution with Bruner who attributes greater importance to the role of perception. He sees the language stage as the most complex one, but contrary to Piaget, he believes that forms of thinking through images continue into adulthood. Gardner denies that only formal operations should be considered the highest level of mental development. For him, artistry is on the same level, differing only in that it is another kind of thinking.

#### The Development And Importance Of Visual Perception According To Art Educators

Art educators have been influenced by the different positions of developmental psychologists and also by the opposing theories of visual perception. The opinions of some art educators about visual perception and its importance in children's development will be studied. In addition the question of whether the concept of visual thinking appears in the ideas of art educators, even without being clearly defined, will be analysed.

The main directions of art education in our century. It is important to analyse how twentieth century art educators saw these developmental psychology theories, and how these theories influenced them.

For this purpose, we will use Efland's (1979) classification, in which he explains the four main directions that art education has taken in this century, establishing a relation between these and aesthetics and psychological theory. He believes that art education was influenced by aesthetics just as much as it was by psychology. According to him, the four directions from aesthetics and psychology which influenced art education are: the mimetic-behavioural, the pragmatic-cognitive, the expressive-psychoanalytic, and the objective-Gestalt.

Although this classification may at times seem forced, it does give quite a clear idea of the possible influences on art education in the present century, and Efland admits that some art educators do not fit into any classification.

During the last century, art education was based on the behaviourist principle that learning occurs through imitation. Thus, copying was considered the best means of teaching art. A reaction against this idea emerged with the self-expression movement. Herbert Read (1958) was a major partisan of this movement, developing his theory of "education through art", where self-expression is emphasized. Read has made a study of psychological character and of emotional development through children's drawings. He considers mental growth as a learning process in which children learn through experience, a complex process which begins with the sensory-motor stage and ends at the stage in which children are capable of controlling their actions "in relation to the ideals...[that they have] formed about the world" (Read, 1958, p. 56).

Lowenfeld (1964) also considers the child's self-expression as the most important aspect of art education. It was Lowenfeld who developed the most commonly used theory of developmental stages in art.

The pragmatic orientation is based on previous learning; thus, children draw what they know. Learning should lead children to adapt themselves to their environment. The cognitive orientation sees the use of symbols as a form of interaction with the world.

The most important consequence of this idea of adapting to the environment in art education was the integrated curriculum, in which the arts often served as integrating elements.

Another psychological current which has a forceful impact on twentieth century art education was Gestalt theory, which Efland places with objectivism in aesthetics. By its laws of perception, Gestalt influenced art education in that teaching was more geared towards the discovery of the structure, the differentiation and integration, as form expresses its inherent nature. The art teacher should encourage perceptual training for the pupil. The Gestalt psychologists who had the greatest influence in art education were Arnheim (1974) and Schaefer-Simmern (1976), who studied the development of children's art. The Bauhaus movement was a major exponent of this current of thought, and proposed a new kind of art education, linking fine arts and crafts. McFee (1964) supports the idea of the union of arts and crafts, and admits that she was influenced by Gestalt theory in the forming of her theory on education, which takes into account research in cultural anthropology, psychology and the social environment. McFee and Degge (1980) also take into consideration the pragmatic orientation of previous learning.



Visual perception in children's development. McFee and Degge, as well as other twentieth century art educators, have emphasized the importance of perception in the child's development. Piaget's concept seems to have been supplanted. This has only occurred in art education, however, and in general, education has continued to limit itself to the development of abstract thought through language and science.

In Read's (1958) opinion, perception and expression are natural gifts in the child, and art education should attempt to preserve these qualities and develop them for integral mental growth.

Read thinks that visual perception can occur with external or internal objects. Because the object is in a certain context, the act of perceiving involves discrimination and association with previously perceived objects. "The perception of objects results in the formation of patterns. He stresses the importance of images for thought, saying that "in the higher process of reasoning, where intuition and the perception of pattern or wholeness of relationships is called for, the image still plays an important part" (p. 128).

Although Lowenfeld (1964) considers the child's self-expression the most important aspect of art education, he also emphasizes the development of perceptual sensitivity. It is therefore important to note that Lowenfeld is not referring to visual perception, but perception in its broader sense, involving all of the senses. In his theory of haptic and visual types, the development of visual perception is not necessary for the haptic type. Rather, kinesthetic perception is important for the haptic type, as it is through subjective reactions that children express themselves artistically. The visual type has potential for greater visual perception, and this tendency should be encouraged by teachers.

Lowenfeld's important study on the stages of children's artistic development related to age still shows a relation to Piaget's stages.

Both Read and Lowenfeld, despite being art educators of the school of self-expression, emphasize the development of perception, and Read shows an approach to perception similar to that of Gestalt theory.

McFee (1964) emphasizes that the artistic development of children should not necessarily be linked to their chronological age, but rather to their mental growth, which is influenced by psychological and environmental factors. For her, the rigid sequence of Lowenfeld's stages does not correspond to reality. McFee says "when all factors are considered, only a very general concept of art growth as a series of developmental stages can be used" (p. 159). In her perception-delineation theory, McFee (1964) says that children perform a complex action of perception and organization of what they see, involving what they have learned in the past, how they feel, and the influence of the environment. Her theory lends great importance to children's individuality, as well as to sociological and anthropological factors which influence mental and artistic development. She subscribes to the Gestalt concept of whole-to-parts direction in perceptual growth, but takes into account the variations in the child's personality as well as the environment.

McFee's conclusions are interesting particularly because she manages to attain a kind of equilibrium among the different currents of thought in art education. Her work reveals the active presence of the art educator, using her day-to-day school experiences together with a great sensitivity to the problem.

In a more recent study, McFee and Degge (1980) explain that their psychocultural approach to perception is eclectic, but that the differ-

ent theories about perception help to understand the parts of the system, and that they are not as contradictory in this sense as it would appear at first glance. They support the Gestalt theory of organizing processes, but add:

We have seen them [the Gestalt theories on the organizing processes] as underlying and necessary but not the only factors in perception. We are also concerned with prior experience as are the constructionists' theories. People use mental images and knowledge they have learned in the past to help see things they look at in the present. (p. 345)

Contrary to the school of self-expression, which holds that the child possesses possibilities within himself that can be let out, Eisner (1973-74) believes that the child's artistic development is processed from the outside to the inside. For him, perception is a skill which can be learned. He affirms that "we are not born with 'sight', we acquire it through experience and through trial and error. To see something is to have intellectually constructed a perceptual realization" (p. 8).

Completely opposed to the idea of a child's artistic development being developed from the outside to the inside is Kellogg (1970), who completed a study with more than 10,000 art works of children from one to five years old in which she followed the evolution in the drawings and made comparisons, including those of the works of children from different cultures. The results of this monumental task are invaluable. Her analysis was restricted to line formation, and therefore she studied only crayon and pencil drawings. She discovered a very strong general evolution in the shapes in the drawings, which suggests an innate tendency, independent of the environment. Children continue to add variants to their first scribbles as they evolve. Kellogg is a strong

exponent of the school of self-expression, and for her, any adult influence in this evolution is prejudicial, as the child learns by himself through the observation of his own drawing.

Kellogg concludes that her "investigation accords with Gestalt theory, which stresses patterns and organization in perception" (p. 11). Children use visual perception to observe their own drawings, but contrary to Gestalt psychologists, she thinks that perception of the external world is unnecessary for their evolution.

From this short review of the work of different art educators, it can be seen that, with respect to visual perception theories, Gestalt theory has attained major importance in art education. This is shown in the work of McFee, McFee and Degge, Gardner, Eisner, and Kellogg. The self-expression theory has also played an important part.

Because of this influence in art education, and also because of its relation to visual thinking, the Gestalt theory will be studied more extensively in the next section.

Regarding children's development, art educators are moving further and further away from Piaget. Lowenfeld's stages are still sharply separated and defined, closely related to chronological age, which shows Piaget's influence in the sequence of developmental stages. McFee and Gardner, however, clearly reject Piaget's ideas of clearly defined stages.

Art educators, as a rule, have benefitted from the several different tendencies which have appeared in this century, taking what they consider of value from each, and not blindly following any one in particular.

Although the idea of visual thinking does not appear in the works of the art educators that have been mentioned, the tendencies which

lead up to that concept are to be found, principally among the authors who are close to Gestalt theory, who see perception as an integral part of non-verbal thinking.

### Visual Thinking As A Perceptive And Mental Process

This section will study visual thinking as a perceptive and mental process along with its relation to cognition, to art and to education.

Some theories on visual perception see it as related to mental operations. These theories led to the idea of visual thinking. The most important of these theories is the Gestalt theory, which will be studied in greater depth in this section.

The relation of visual perception to cognition will also be studied, as well as its performance as an active mental process, in order to gain a better understanding of the idea of visual thinking. The presence of visual thinking in art and in children's drawings is the subject of the last part of this section.

### The Influence Of Gestalt Theory

Gestalt theory was the major influence in the development of the idea of visual thinking starting from visual perception.

Gestalt theory grew out of a reaction against the atomist position that the world can be analysed as though it were made up of minuscule elements; i.e., the understanding of one of the cells of a body should be enough to understand the entire body. This theory, originating in the natural sciences, took hold of pre-Gestalt psychology. In Gestalt theory, the whole is more than just a sum of its parts, and not, as in atomist theory, the simple sum of the parts.

With regard to images, the atomist theory sees them as copies of sensations, by the mechanism of "associationism", sensations and images are associated by contiguity in time and space.

In defending the idea of "pure sensation", the atomists say that we perceive objects as they appear to us, that is, as deformations of perspective. It is through introspection that pure sensation is associated with previous knowledge, bringing about the phenomenon of constancy, or the perception of the object in its true form, independent of the angle of vision.

Gestalt, rejecting the atomist theory, holds that "there is no such thing as pure sensation, floating freely in the air, without perceptual conditions" (Katz, 1950, p. 13). It is the total visual stimulus pattern from the visual field which determines the phenomenon of constancy.

The Gestalt psychologists greatly emphasized the psychology of perception, particularly visual perception. Katz (1950) explains this by Gestalt's association with the physiological study of the organs of the senses. What is more difficult to explain, according to Katz, is their "exaggerated emphasis on vision" (p. 21). In fact, the laws of Gestalt theory are based on the study of visual perception and they refer directly to the forces acting in the visual field; for example, Rubin's studies of the figure-ground relationship, and Koffka's law of the pregnancy of form.

Köhler (1961) explains the Gestalt emphasis on perception in this way:

Why so much interest just in perception?  
Simply because in no other part of psychology  
are facts so readily accessible to observation.  
It was the hope of everybody that, once some

major functional principles had been revealed in this part of psychology, similar principles would prove to be relevant to other parts, such as memory, learning, thinking and motivation. (p. 4)

Köhler's wish came true, as Gestalt laws were applied to thinking. Wertheimer, in his book Productive Thinking (1945), comes close to the idea of visual thinking when he applies Gestalt theory to solving geometrical problems with what he calls "sensible thought". Here, thinking with the senses can solve problems by seeking the structural meaning and internal relations of the parts.

But only Arnheim (1969) studied in depth the relation between visual perception and the brain and thinking, concluding that "visual perception is visual thinking" (p. 14). He also made the link between visual perception and art and teaching. The importance given by Gestalt theory to perception clearly led to the development of the concept of visual thinking.

### Visual Perception In Relation To Cognition

Some authors' opinions about visual perception in relation to cognition and the characteristics which make visual perception an active mental process are analysed in this section, to determine the causes of relating visual perception with visual thinking.

Images as the material used in the process of visual thinking are also considered here, in an attempt to determine what kind of images participate in thought.

Read (1958) had already brought out the relevance of images for thought. After reviewing studies made by Galton who "first raised the question" (p. 49) and making further research on this matter, Read concluded that "in opposition to the whole logico-rationalistic tradition

... there exists a concrete visual mode of 'thinking', a mental process which reaches its highest efficiency in the creation of the work of art" (p. 69).

The relation of perception to cognition is stressed by McKim (1972) and by Arnheim (1969). For a long time, the cognition concept was linked to that of language. Arnheim says that "in the perception of shape lie the beginnings of concept formation" (p. 27). Forms are perceived in their most simple and general form, as shape patterns, and are thus easily identified. Therefore, perception acts as a furnisher of concepts. For him, concepts can be acquired through language or visual perception. In his opinion, "visual and language thinking are complementary" (p. 21) through their different structures. McKim explains that inasmuch as verbal (or mathematical) thinking is linear, which leads automatically to a sequence of operations, visual thinking is, by contrast, "wholistic, spatial, and instantly capable of all sorts of unconventional transformations and juxtapositions" (p. 22).

The idea of concept formation through visual perception is related to the idea of perception as a mental process. These two ideas complement each other, and emphasize the relation between visual perception and visual thinking.

Perception as an active mental process. Perception is considered by the authors who accept the idea of visual thinking as an active mental process because of certain characteristics which make its process very similar to that of thought.

McKim (1972) considers perception to be "an active, pattern-seeking process that is closely allied to the act of thinking" (p. 12).



Arnheim (1969) declares that "visual perception ... is not a passive recording of stimulus material but an active concern of the mind" (p. 37). For him, it is only when the attention of the mind is actively functioning that visual perception actually occurs.

As an active mental process, perception is considered by Arnheim to involve problem-solving. Therefore, visual perception, receiving stimuli from the visual field in different forms, from different angles, perspectives and lights, etc., is capable of abstracting the essential, of perceiving the constant element in spite of changes, thus accomplishing an act of problem-solving. Arnheim emphasizes that visual perception is also capable of discriminating in the figure-ground situation, among different types of forms, as well as comparing and differentiating.

Problem-solving by perception ranges from the simplest to the most complex artistic or scientific problems which require a high degree of visual thinking. And these problems can be solved without the necessity of leaving the strict domain of images at any time. McKim (1972) gives many examples of problem-solving in the field of visual thinking.

Howard Gardner (1973) feels that Arnheim's work on creativity in the visual arts and visual thinking is "an intelligent and logical application of perceptual principles to the area of artistic and scientific creation" (p. 16). However, Gardner expresses some reserve with regard to Arnheim's ideas, saying that he

... in his effort to illustrate the affinities between normal perception and the 'leap' characteristic of creative thought ... has insufficiently acknowledged that the required reasoning may involve mechanisms quite distinct from visual perception, notably the ability to manipulate

propositions or ignore perceptual input. As a consequence, his conclusions are more relevant for certain kinds of problem-solving than for others. (p. 16)

Gardner goes to the root of the question when he says that Arnheim considers perception to be thought. He seizes upon a weakness in Arnheim's argument: Arnheim, in his attempts to elevate visual perception to the level of thought, repeatedly declares that there is no thought without images. For instance:

I would be willing to say that true productive thinking in any field of knowledge, be it science, engineering, political strategy, or art, takes place in the realm of the senses. (Arnheim, 1964, p. 51)

In an interview with Petersen, Arnheim (1972) says "we think in images", and indeed, I am convinced that there is no thinking without images of one kind or another" (p. 56).

Arnheim (1969) suggests the hypothesis that images of thought are not always present in the consciousness, but that this does not mean that they do not exist in the sub-conscious.

On another occasion, however, Arnheim (1965) gives examples of intellectual thinking as compared to visual thinking, which contradict his affirmation. Even his criticism of the education system, as being able to develop only intellectual thinking, shows that he must believe in the existence of both types of thought. His negation of the existence of intellectual thought seems to be a way of giving greater emphasis to his concept of visual thinking. In this author's opinion, the co-existence of both kinds of thought, the visual and the logical, each complementing the other and in interaction with each other, seems more probable. Indeed, Arnheim (1962) himself says that

our understanding of how the organism - animal, child, or man - copes with its environment would be severely hampered if we insisted on artificially splitting this unitary process into non-verbal and verbal behaviour. (p. 18)

In any case, the co-existence of these two kinds of thought in no way invalidates the concept of visual thinking.

Thinking by images. Now that the process of visual thinking in its active and mental quality have been studied, we should examine the material it uses; that is, the image. There seems to be some confusion among authors as to which images are actively involved in visual thinking, and which are merely secondary or even excluded from this activity.

There are, however, two clear divisions in the classification of images: the images of the real world, and the images of the mind. Included in the latter category are conscious images, such as images of the memory or of the imagination, and unconscious images, such as the images in dreams and hallucinations.

Arnheim (1969) considers the images of the memory to be models, which have individuality or become detailed only when there is a conscious desire for this. If not, these mental images are hazy or abstract or as Arnheim says, "generic" (p. 102).

Eidetic images, for both Arnheim and McKim, are not considered to be material for visual thinking.

As for the unconscious images, Arnheim (1969), although he states that "a good deal of imagery may occur below the level of consciousness" (p. 116), does not specify whether he believes that this type of image contributes to the visual thinking process.

McKim (1972) had already surmised that all forms of imagery, conscious or unconscious, contributed towards a more effective visual thinking process, as the relaxing of consciousness leads to creative thought. He says that "by becoming more aware of dreams and related forms of autonomous imagination, you open a 'mental door' to a primary source of imagery ... access to this imagery realm is essential to fully integrated visual thinking" (p. 94).

Gowan (1979) shares this idea, stating that the image is a vehicle allowing creativity to occur in this relaxing of the conscious mind, but does not establish a specific relation with visual thinking.

The author of this paper does not share McKim's opinion regarding images of the subconscious, but rather considers them to be mere furnishers of expressive material and not as effective participants in visual thinking, which is above all a conscious and ordered mental action.

### Visual Thinking In Art

The most important examples of visual thinking can be found in the perceptual and mental operations an artist realizes while producing a work of art, such as solving problems related to the medium, to the formal composition or to the content itself.

Arnheim (1969) explains that it is not only the formal composition or the subject matter of a work of art which gives it its particular character, but rather "an abstract pattern of forces" (p. 270) which, by its very abstraction, gives the art work its general character. This is where the visual thinking of the artist is manifested; in that, for Arnheim, "the work of art is an interplay of vision and thought" (p. 273).

Gardner (1973) thinks that the creation of an art work involves problem-solving, but that this is quite different from scientific problem-solving, in that it is of a more qualitative nature, and is directly related to the medium used. Once the solution for a scientific problem has been reached, it can be repeated, but the artistic solution is unique and exists only in that particular medium; this solution cannot serve for other problems.

Dewey (1934) makes a comparison between the artistic and the scientific ways of thinking. His definition of the artistic way of thinking is in perfect harmony with the visual thinking concept. He says:

The odd notion that an artist does not think and a scientific inquirer does nothing else is the result of converting a difference of tempo and emphasis into a difference in kind. The thinker has his esthetic moment when his ideas cease to be mere ideas and become the corporate meanings of objects. The artist has his problems and thinks as he works. But his thought is more immediately embodied in the object. Because of the comparative remoteness of his end, the scientific worker operates with symbols, words and mathematical signs. The artist does his thinking in the very qualitative media he works in, and the terms lie so close to the object that he is producing that they merge directly into it. (p. 15-16)

Ernest Nash (1976) studies the visual patterns in Roman ruins, which were invisible when the buildings in question were intact, but which give a strong demonstration of the high degree of visual thought that was present in their construction.

Arnheim (1969), analysing Rembrandt's "Christ at Emmaus", shows how the artist gave meaning to the work through visual thinking, through highly abstract geometrical forms which give force to the subject of the painting. In another text, Arnheim (1964) declares

that it is the perception of generalities which makes visual thinking possible in art. For him, these perceived generalities are "the basis of art" (p. 52).

There are many examples of the presence of visual thinking in art; any visual art work, in fact, is an example of visual thinking. As Dewey says, "the production of a work of genuine art 'probably demands' more intelligence than does most of the so-called thinking that goes on among those who pride themselves on being 'intellectuals'" (p. 46).

The visual thinking in art is directly related to the medium. It has a more qualitative nature, as Dewey and Gardner point out. It involves problem-solving and the perception of generalities.

As this paper relates to visual thinking in education, in the next section the art works of children will be analysed to determine whether or not the same principles of visual thinking found in adult art works are present in children's art.

#### Visual Thinking In Children's Drawings

Many authors have been interested in and have attempted to explain children's drawings, and have even compared these with primitive art. The fact that children draw in a schematic manner has given rise to all types of suppositions. Piaget (1969) considers children's drawings as an attempt to imitate reality, and at the same time as symbolic play containing elements of pleasure. For Piaget, children's drawings, up to the age of eight or nine, are essentially "realistic in intention, though the subject begins by drawing what he knows about a person or an object long before he can draw what he actually sees" (p. 64).

Gombrich (1977) also believes that the child draws what he knows. For him, children's drawings show the development of a "conceptual image" (p. 76) in simple forms representing the object in its most general characteristics, which he calls "schema". Children follow the process of "schema and corrections", or, as Gombrich says, "making and matching", to arrive at the final result. In children, the tendency of "making" predominates over that of "matching", as among "primitive" peoples. This is why the child's drawing is schematic.

For Gombrich, children are continually absorbing and adapting the schemas of the adult world. They undergo the influence of others' drawings, therefore of other schemas, in the formation of their own schemas.

Arnheim (1969) is against the idea that children only draw what they know. He believes that they are trying to form patterns existing in the object, without trying to arrive at a realistic representation of it. For Arnheim, this is not the children's intention, but rather they are striving to develop visual concepts. He affirms that children draw what they see, because the perceiving process begins with the whole, and only afterwards with the details.

Arnheim (1971) says that children do not always draw what they see around them; often, the basic geometric forms do not evolve from the shape of the objects, but are created "for their own sake" (p. 205). These forms can be related by the children afterwards to the objects present in the environment. "There is a constant interplay between the growing complexity of the forms that can be mastered and the subtler observation of reality, to which richer forms can do better justice" (Arnheim, 1971, p. 205).

Arnheim (1969) says that the representation varies as a function of the medium. He explains that as children try to solve visual problems, they soon turn to more complex solutions in visual organization which is characteristic of visual thinking.

Claire Golomb (1973) made a study of drawings of the human figure to compare the conceptual theory and Arnheim's theory on children's drawings. Golomb concludes that

The results of this study argue against the conceptual theory of children's drawings and support Arnheim's theory that representation varies as a function of the medium, instructions, practice, the provision of parts, and the child's developmental level. (p. 199)

Schaefer-Simmern (1976) analysed children's drawings beginning from their first scribbles, showing their relation to the world and the exploration of movement itself. He sees the essential characteristics of the work of art within the child's drawing.

Gardner (1973) appears to admit the existence of visual thinking in children's drawings, saying that

When children are shown models and asked to copy them, they tend to simplify, exhibit closure, and impose increased symmetry. They attempt to organize what they see and, if possible, to give a representational quality. Incompleted models are usually completed by the child, and anomalous figures are modified so that they become easier to handle and to remember. (p. 219)

In her study on line formation in drawings, of children aged from one to five, Kellogg (1970) confirms the Gestalt theory, saying that children look at their scribbles, and their brains organize these into "meaningful Gestalts, that is, into shapes that 'make sense'" (p. 11). She notes the constant presence of certain basic forms in drawings by children from different countries, as well as in art work



by "primitive" peoples. Studying the evolution of these forms, Kellogg sees developmental stages in children's drawings which she calls patterns, shapes, designs, and pictorials. Children evolve from scribbles to symbols, and finally to conscious representations of perceived objects, or visual images, learning all the while from their own drawings. Kellogg considers that children generally begins to learn to copy the schemas of society at age five; because of this, the developmental stages, when children are really learning "through their own activities and perceptions" (p. 41), occur before that age.

Kellogg believes that the basic geometrical form, or diagrams, are internal, whereas for Arnheim there is an interplay between the internal forms, the medium and the observation of the environment. Kellogg feels that children's drawings are a valid art form, that their abstractions are organically linked with the beginnings of all visual symbols, and that there are already basic aesthetic forms in children's drawings. This opinion is shared by Schaefer-Simmern who also sees the basic characteristics of a work of art in children's drawings. In addition Kellogg sees evidence of visual thinking in children's drawings when she says:

The child who perceives circularity in his own scribbling and who repeats his perception in an oval diagram has made an abstraction even though he has not conceptualized the process. The abstraction is part of the process itself.

The continuities between the artistic capabilities and actions of children and those of adults are thus based in visual thinking. Both children and adults see and produce esthetic forms without reference to natural objects. (p. 62)

Pariser (1976), in a study conducted with elementary school children, had them draw a wrecked car, with the intention of leading the children to "reflect upon and distort the qualities of a visual image" (p. 5). His position is that children do not distort forms

through ignorance or ineptitude, but rather to obtain an effect.

Three experiments were carried out: in the first, the children drew their "own" car, "before" and "after"; in the second, the stimulus took the form of a car drawn by an adult and the children drew the wrecked car; in the third, a combination of both was used.

In analysing the results, Pariser concludes that "children at all levels have access to, and use essentially the same kinds of shape and line transformations" (p. 242). Pariser found an even more interesting result when he compared the drawings with graphic designers' drawings; he found the same strategies in the drawings of both. He found that the "legibility [for the information] is of importance here, 'realism' is irrelevant" (p. 243). He also showed in this study that exposure to an adult's drawing has a positive effect on the children's drawings:

An analysis of the quantifiable features of the stimulus and control drawings suggests that exposure to the visual stimuli has the effect of increasing the complexity and sophistication of the drawings. (p. 196)

In another study, Pariser (1979) analyses two currents in the teaching of drawing: one emphasizes perception and the other emphasizes the learning of cultural forms, or conventions. To test the validity of these two currents, he gave two exercises to the children. One was a blind contour drawing which "focused on drawing as the registration of perceptual cues, and the other [a copying problem] focused on drawing as the assimilation of graphic conventions" (p. 33). Pariser found evidence of both types of representation in children's drawings; that is, in drawings that leaned more heavily on perceptual cues, and others on conventional forms. Many children showed both types of representation in the same drawing.

Pariser concludes that both kinds of exercises are equally valid, as the child benefits as much from observing the external world as from learning from the masters, in which "new graphic codes are revealed, new ways of dealing with the medium are exemplified" (p. 203).

Pariser points out at the same time that we are so surrounded by ready-made images that it is much easier for children to simply copy than to make the effort to develop the capacity to draw a visual experience; this could be a problem. Therefore, "training vision in the service of a medium is central to the task of maintaining vital, personal expression. Without knowledgeable seeing and skilled use of media, no child can give full vent to his or her own feelings and concerns" (p. 203).

Looking at this short review of the opinions of several psychologists and art educators about children's drawings, it is evident that there are two main currents regarding the subject: one of these considers, with Piaget and Gombrich, that children draw what they know, and the other, with Arnheim, Golomb, Schaefer-Simmern, and Kellogg, considers that children draw what they see. The latter group shares the idea of Gestalt psychologists regarding perception.

Gombrich emphasizes the importance of graphic conventions in the child's art work. Kellogg takes an entirely opposing stance, seeing adult interference as completely detrimental to the child's work. In this, her view is similar to Lowenfeld's.

Pariser is in favour of an equilibrium between the two currents, but emphasizes the development of perception as essential to expression. His work shows that observation influences children's drawings, thus confirming Arnheim's hypothesis of interplay between the internal

forms and the perception of the environment. This contradicts Kellogg's opinion that children's drawings evolve without any observation of the environment.

For visual thinking to exist in children's drawings, there must be evidence of an attempt at organization as well as an evolution as the child grows older; that is, as certain problems are solved, the child will turn to more complex visual problem-solving. These elements have been clearly shown by the authors that have been examined so far.

Besides this, Piaget's idea that the child does not draw in a realistic manner because he does not know how to has been totally rejected by these same authors.

#### Visual Thinking As A Learning Process

The study of this aspect has a great importance, because this paper discusses the development of visual thinking in schools. It is essential to this work to define whether visual thinking is or is not teachable.

Visual thinking in its relation to the learning process can be seen from two different points of view. The first is the question of whether visual thinking is important in pupils' learning. The second is the question of whether visual thinking can be taught.

Arnheim (1969) thinks that visual thinking is present not only in art but in all types of human activity. Therefore, "the discipline of intelligent vision cannot be confined to the art studio" (1974, p. 206). For him, visual thinking should be developed as an integrated process in all school subjects, not just in art classes. He affirms that visual thinking is an innate human ability, and that it even exists in

a more rudimentary form in animals. However, it must be developed. Our education system is directed towards the development of abstract thought at the expense of perception, and consequently, at the expense of a more direct link with the world through the senses. Visual thinking is brought about by this link, and it atrophies with lack of use.

What [the child] needs is perceptual challenge, something that mobilizes the mind through the senses. You have to teach the child how to respond to images that are of some use to him and how to create such images himself. (Arnheim, 1972, p. 96)

Arnheim (1972) declares that we all suffer from a grave deficiency in our sensory experience, and that this is an epidemic disease, caused by a "12 to 20 year apprenticeship in alienation" (p. 55) in our schools.

McKim (1972) thinks that visual thinking can and should be taught.

He suggests two methods:

The two most successful approaches to the education of thinking are the "discovery method" and what I will call the "strategy method". In the discovery method, the student is not required to memorize concepts but is stimulated to discover them for himself: the student learns to think independently because he is challenged to do so. In the strategy method, the student is not only challenged to think, he is also taught how to apply a number of thinking strategies. (p. 23)

He explains that although visual thinking is obviously central to the practising of architecture, design, and the visual arts, it is also present in science and technology, and he gives examples of scientists who have made discoveries through the development of visual thinking.

Outside of art and design education, few educators are aware that thinking can occur in other than verbal and mathematical modes. Yet sensory modes of thought, especially the visual mode, are at the very heart of thinking. (McKim, 1972, p. 24)

McKim also warns of the dangers of a one-sided education which is based on an idea that man thinks only with words. This kind of education robs the child of sensory experience, leaving the child, with few exceptions, visually atrophied. Many people have a large and undeveloped potential for visual thinking. To see is a capacity which must be developed.

McKim (1972) believes that to develop new thinking skills, people need active participation and a sequence of exercises, as in the learning of a sport. In his opinion, there is an interaction between the three kinds of visual imagery: seeing, imagining, and drawing, and the flexible use of all three is more fruitful.

The opinions of these authors on visual thinking as a learning process show that they are in agreement. The author of this paper agrees with the opinions: that the ability for visual thinking is innate, but that it can and should be developed through teaching, and also that children's visual thinking is atrophied by our present education system.

#### Comparison Of Concepts Of Visual Thinking

Before ending this chapter, it is still necessary to compare the opinions of these authors on visual thinking to see whether or not they agree.

Among the authors who have directly approached and analysed the concept of visual thinking, Arnheim (1969) is certainly the one who has had the most influence.

Arnheim's theories on visual perception are based on Gestalt theory and his own previous studies, by means of which he arrived at the conclusions in his work on visual thinking in 1969.

As we have seen, Arnheim (1969) considers visual perception as presenting the same complex operation as intellectual thought, and for this reason an active rather than a passive process which he calls visual thinking, because he sees unity between perception and thought. He believes we perceive generalities and as a consequence, visual concepts are formed. The mechanisms of thought with which the brain manipulates these concepts operate as much in direct perception as in the interaction between direct perception and stored experience, as well as in the imagination.

Arnheim (1962) points out children's drawings and the art of "primitive" peoples as clear examples of the first stages in the formation of these perceptual concepts. Elsewhere, Arnheim (1969) declares that artistic activity "is a form of reasoning, in which perceiving and thinking are indivisibly intertwined" (p. v). It is not only in art that this occurs, according to him; the way the senses apprehend the environment is identical to the operations of thought. And, for him, there is also evidence that productive thought in any area of knowledge occurs in the realm of imagery.

This author concludes that for Arnheim, visual thinking, and visual perception are one and the same, that all thought possesses imagery, which, if not conscious, is at least unconscious, and that visual thinking occurs in all areas of human knowledge.

McKim (1972) also presented a study on the subject. Arnheim's studies are more on the theoretical side, while McKim develops a more pragmatic study of visual thinking based on the theories of Arnheim. McKim proposes practical solutions for the development of visual thinking. These exercises are not designed for schools, but are exercises that the reader can do alone to develop his or her visual thinking capacity. His intention is not to present didactic solutions but to perfect the intellectual capacities of the reader.

McKim (1972) says that thought is a constant fact in human life. According to him, we think all the time with the whole of our bodies. Thought is processed at many levels of consciousness, and a great part of our thought is not productive.

McKim's objective in his work is to increase productive thinking. To this end, he advocates greater flexibility in utilizing thought below the level of consciousness and all the possibilities of the operations of thought, and exploring all of the existing vehicles for thought such as language, sensory imagery, mathematics, etc. McKim places pattern-seeking, visual memory and orthographic imagination among the basic mental operations of visual thinking. He explains that

Pattern-seeking is a natural and important part of every act of visual thought. It is the first step of a two-step process: pattern, then analyze. When you see, you perceive first an undetailed pattern; then, according to your interest, you analyze the initial pattern for details. When you imagine, you



develop inner imagery in much the same way. When you draw, you carry this natural process through by roughing-in an overall pattern before you develop your drawing in detail ... Creative visual thinking is characterized by flexible pattern-seeking, (p. 53)

McKim thinks that visual thinking involves the image of the external world and the images of the mind, that is, those of the memory, of the imagination, or of dreams. For him, visual thinking is closely related to creativity.

We see that McKim, contrary to Arnheim, accepts verbal thinking as independent from visual images but believes that thought cannot occur without a vehicle. For him, visual thinking and verbal thinking are complementary.

The concepts of these two authors with respect to visual thinking are quite similar. Arnheim's basis is in Gestalt theory, and McKim's basis is to a large extent in Arnheim's theories. Thus, only minor differences seem to exist between the two. One of these differences is whether or not there is thought without imagery. As has already been mentioned in this paper, Arnheim contradicts himself on this particular point, whereas McKim accepts the existence of verbal thought.

Another difference between them is that McKim seems to give greater importance to the unconscious image than does Arnheim. McKim's direction is turned toward the imagination, while Arnheim's direction is essentially toward visual perception. The author of this paper considers both sources, that of imagination and that of visual perception, to be of equal value for visual thinking, but does not agree with McKim's insistence on the importance of the images of the unconscious.

### Definition Of Visual Thinking In This Paper

Through this study, it is possible to conclude that the origins of the idea of visual thinking remain in the extroverted current of thought and in the valorization of visual perception.

After studying the subject, this author defines visual thinking as an active perceptive and mental process. We perceive generalities before perceiving particularities, and because of this, visual concepts are established. This process involves highly complex operations, such as problem solving, abstraction of the essential, analysis and synthesis, but it never leaves the domain of images.

Visual thinking takes place in all areas of human knowledge. Visual works of art can be seen as the highest expression of its development.

Visual thinking can be accomplished with the images of the imagination, of the memory, or of the real world, but the use of all three sources of images results in a more fruitful development of this kind of thought.

The author accepts the existence of thought without images, a non-visual thought which can be verbal or mathematical, and agrees with McKim's idea that the two kinds of thought, verbal and visual, complement each other. Also, people can vary in their individual tendencies towards visual or verbal thought.

It is this author's opinion that the development of visual thinking in school can help the student to develop his mind in a much more integral way, facilitating the comprehension of the world around him through the observation of its organization. Another result of this development will be a better grasp of all subjects in school, not only art.

However, McKim's use of the images of the unconscious by means of the relaxing of the consciousness does not seem to be of any great use in the school environment.

It can be also concluded that education is still tied to the theories of developmental psychologists who considered visual perception as a furnisher of raw material for thought, and logical thought as the highest operation of the mind. In analysing the ideas of many art educators, it could be verified that the influence of Gestalt theory is very strong in art education, with a resultant valorization of perception.

The relation that exists between visual thinking and visual perception has been confirmed by the study of perception as an active mental process.

The presence of visual thinking in art and in children's drawings leads to the question of whether or not visual thinking is an innate capacity of human beings and if it can be taught. The authors agree on this particular question, saying that visual thinking is innate but can and should be taught in schools.

These conclusions lead this author to the subject of the next chapter, that is, the teaching of visual thinking in schools.

This presents some problems, such as who should teach visual thinking, and by what means. As has been seen, art is the best discipline for the development of visual thinking because of its characteristics and its relation to the areas where visual thinking is actually present, that is, in fine art and children's art.

As was seen in the analysis of psychologists who studied visual perception, Gibson (1971) and Kennedy (1974) emphasize the importance of picturing as a means of communication. Gibson says that thinking directly in terms of visual information, as opposed to verbalizing, is visual thinking.

Based on the opinions of Gibson and Kennedy, visual communication seems to this author to be the best means of starting the development of visual thinking in schools, because both visual communication and visual thinking use images as their basic elements. In the next chapter will be presented a deeper study of this relation to suggest a way of developing visual thinking in schools by means of visual communication.

## CHAPTER II

THE RELATION BETWEEN VISUAL THINKING, VISUAL LEARNING,  
VISUAL COMMUNICATION AND VISUAL EDUCATION

One of the main objectives in teaching visual thinking is to develop the inner capacity of thought. Another objective is to prepare man to live in contemporary society, where visual communication is growing each day. As man learns to communicate visually, he is also compelled to think visually, because it is impossible to communicate without thinking. It is this relation which will be studied in this chapter, to determine if it is possible to develop visual thinking in schools through the teaching of visual communication. The opinions of several authors will be studied to find out if they feel that students can be led to perceive visually and to develop visual thinking by studying visual communication through the principles of design, its elements and techniques, and by learning to understand visual language and to appreciate works of visual communication from fine arts to the mass media.

The mechanisms of the perception process, the way we receive and interpret visual information, and the elements of design will be analysed to determine how to teach visual communication in order to develop visual thinking. The suggestions made by the authors about the learning of visual thinking and about changes in education will also be analysed.

Some programs already existent in schools and universities will be studied to determine their validity and the possibility of their use as a basis for other programs.

Based on this study this author will make a few proposals for the teaching of visual communication to develop visual thinking in schools.

### The Term Visual Communication

Before starting the analysis of the relation between visual thinking and visual communication, it is necessary to define visual communication. Some authors' definitions of visual communication will be seen along with the meaning of the term as it is used in Brazil, as this author intends to make recommendations for the teaching of art in that country.

### Definitions

The term Visual Communication is now used very frequently, and has a wide meaning. Because of this, several authors' definitions of visual communication will be analysed and compared.

The selection of these authors was based on their contributions to the field of visual communication, combined with their specialities in a specific field. McFee has related visual communication to her field of art education, Schwalm to visual literacy, Kennedy to the analysis of pictures as information, Kepes to the language of vision, and Moorhouse to science, as well as visual thinking.

All of these authors find the development of visual communication to be of maximum importance. Some of them stress the aspect of aesthetic information, and others the aspect of practical information.

In a paper presented at the Seminar in Art Education for Research and Curriculum Development (Mattil, 1966), McFee defends the social function of art, and its importance for communication:

If we believe that art is to be produced and enjoyed only by an aesthetic and intellectual elite or sub-culture of our total society, then we might have reason for believing in social isolation of the arts. If, on the other hand, we consider art as a phenomenon of human behaviour to be found wherever form, line, colour are used to create symbols for communication and to qualitatively change the nature of experience, then art is related in some degree to all of society. If we accept this definition, we as art educators, become involved in problems of society and social change; we recognize art as one of the major communication systems of social interaction and of society in transition. (p. 122)

McFee believes that art has a very wide use in contemporary society, and can be found in all of the major visual communication systems. For her, included in the term visual communication are

those traditionally called the fine arts,  
... all product design including the hand-crafted to the mass produced,  
... all advertising, display, and packaging,  
... architecture, city planning and urban renewal,  
... television, publications and moving pictures,  
... interiors and costume design. (p. 123)

At the First National Conference of Visual Literacy, Schwalm (1970) defines visual communication as

the process of understanding and being understood through the sense organs of sight. It is one of the most vital forces affecting our daily life, our world of commerce, our industrial economy, and our way of transmitting knowledge and aesthetics. (p. 48)

Schwalm brings out the pragmatic aspect of visual communication in his definition. McFee on the other hand considers visual communication to be intimately linked to art, as art, for her, is one of the principal forms of communication.

Kennedy (1974) studies pictures as sources of information:

As a means of communicating, pictures are as old as history, for they were among the first recording devices ever used. Pictures have been as common as the wheel and fire in past cultures, and today they are more common than ever: in magazines, textbooks and albums, outdoors as signs, and in our homes as entertainment. As coins are to economics, pictures are to communication. (p. 1)

Kennedy does not analyse pictures from the aesthetic or expressive point of view, but only from their informative aspect. His analysis is therefore more social and less artistic. But his statement above is interesting in that it reveals the breadth of visual communication.

Kepes (1951) studies the language of vision and emphasizes its importance in modern society, and its role as an integrating element between man and the exterior world. He considers visual communication to be one of the most pervasive forms of communication:

The language of vision, optical communication, is one of the strongest potential means both to reunite man and his knowledge and to re-form man into an integrated being. The visual language is capable of disseminating knowledge more effectively than almost any other vehicle of communication. With it, man can express and relay his experiences in object form. Visual communication is universal and international: it knows no limits of tongue, vocabulary, or grammar, and it can be perceived by the illiterate as well as by the literate. (p. 13)

Kepes has brought out yet another function of the language of vision, which is the organization of the visual image in terms of structure. Contrary to Kepes, the author of this paper believes that visual



communication can only be considered "universal and international," within certain limits, because it depends on symbols, and these depend on culture. Gombrich (1972) feels that the use of pictorial images at international events can only solve a communication problem among persons who speak different languages if the number of meanings conveyed are restricted. In the same way, peoples of other cultures will not understand symbols that are obvious to us.

Moorhouse (1974) thinks that we are suffering from a growing lack of ability and fluency in communicating visually. He stresses the importance of developing visual communication, stating that

there is a particular and special place for visual communication of the kind which employs images and symbols instead of, or in addition to, words, and that there are, in fact, many fields of human endeavour and thought in which its use is not only desirable in the interest of explanation, but essential for conveying ideas effectively. (p. 1)

Moorhouse feels that everything which reaches our eyes is in some way visual communication. He differentiates between casual visual communication (accidental communication) and intentional communication. This last category has two subdivisions: aesthetic information and practical information.

The author of this paper considers the opinions of McFee and Moorhouse to be the most comprehensive definitions of visual communication. Moorhouse's distinction between casual and intentional visual communication and the subdivisions of the latter appear valid to this author, and they will be used in the definition of visual communication for the purposes of the paper. The author finds McFee's position in relation to the social function of art as a means of communication to be immensely important.

### Connotation Of Visual Communication In Brazil

In Brazil, the use of the term visual communication has been related to aesthetic and practical messages in the modern communication media. Thus, a message transmitted by a traditional medium of the fine arts such as painting or sculpture, although it may be considered in the wider sense of visual communication to be included in the meaning of the term, would only be understood as such with an accompanying explanation, because of the more common use, in Brazil, of the term with reference to the "modern media." On the other hand, artistic work done in the mass media, or done in a more recent medium such as photography, serigraphy, or film, would easily be accepted as being visual communication.

This is most likely because professions dealing with visual communication in Brazil are concentrated in advertising agencies, publishing and printing, television, industrial and commercial enterprises, or "visual programming" agencies (Ante-Project for a Course in Visual Communication at the Federal University of Santa Maria, 1978, p. 8).

Artists who create with the more traditional techniques such as painting and sculpture are called plastic artists, while those in commercial art are called visual communicators. The term visual communication is used more in relation to commercial art than to what has traditionally been called fine art, perhaps for this reason.

Nonetheless, a wider meaning of the term has gained acceptance, as can be seen in this definition in the Curriculum for Visual Arts, Industrial Design and Visual Communication, at the Pontificia Universidade Catolica of Rio de Janeiro (1980):

Visual Communication involves the comprehension and preparation of visual systems which communicate ideas, instructions, directions and emotions in an organized manner. (p. 19)

#### Definitions In This Paper

Based on Moorhouse's classification, the term visual communication will be restricted in this paper to intentional visual communication in its two sub-aspects, aesthetic information and practical information.

Another aspect of the term which must be considered is the extent of its meaning for the purposes of this paper. Because the paper is dealing with its application in education, the term visual communication will be taken in its broadest sense, that is, including the fine arts.

The author feels that visual communication in all of its aesthetic and informative aspects should be used to develop visual thinking in students. It is for this reason that McFee's definition will be adopted because it gives visual communication its broadest sense, derived from her view of art as a social phenomenon and as a phenomenon of communication. McFee knocks art from its pedestal, as Dewey (1935) wished, to give ordinary people access to it.

Based on this analysis, the author's definition of visual communication is this:

Visual communication is the process by which a visual message is received and transmitted. The message can be aesthetic or not, and can transmit information and/or emotions. For this process to occur, the message must be organized in such a way that it is visually comprehensible to the receiver.

## Visual Thinking In Relation To Visual Communication

### In The Learning Process

#### Learning Of Visual Communication

Visual communication is omnipresent in the modern world, and the importance of its influence cannot be ignored. As mass media developed, visual communication became a symbol of modern society.

This was not accompanied, however, by an equivalent development in education, as McFee (1969) points out, saying that "too few teachers or students are educated in how to use this communication to best advantage" (p. 196).

Feldman (1976) also reflects on this problem, saying that people who look at advertisements on television or in magazines are able to understand and react to the messages contained in them, but are unable to understand "the rhetoric, the persuasive devices, employed in visual communication" (p. 195).

Moorhouse (1974) thinks that visual education should be directed towards the understanding and use of visual messages, and be concerned with analysing and criticizing them as well as producing them. He emphasizes the role of visual thinking in this process:

For the purpose of productive and inventive thinking in a large number of fields, words and numbers, although necessary are not sufficient ... it is in the realm of imagery where this kind of thinking often takes place. We can say, then, that visual education should be concerned with the use of all kinds of graphical means of assisting thinking as well as with visual messages. (p. 3)

Norhouse emphasizes that there must be a wider view of visual education which should not be restricted to developing aesthetic awareness, to producing artistic objects, or even to using visual aids. Rather, "it should be concerned with the nature of visual communication, its strengths and weaknesses, and with the proper and effective employments of visual messages" (p. 4).

After having examined the process of visual thinking in its active and mental aspects, the aspect of learning is now discussed in this section.

The learning of perception. An important factor in visual education is an understanding of the perception process. The influence of past experience, prior learning, and even of feelings on perception must be taken into account for the teaching of visual education to be effective.

E.J. Gibson (1967) made a study on the development of perception and learning. She says that there are two distinct types of perception: the perception of the environment and the perception of symbols. She says that a person responds to only a part of the visual information that falls on the retina, as "perception is selective by nature" (p. 3).

According to her, a newborn baby can already distinguish figure from ground. The perception of "Gestalten of higher order structural units" (p. 345), develop later in life (at about two weeks). "The development of object perception begins with the discovery of distinctive features, progressing to grasping of higher order structure in the object" (p. 357). The feature contrasts are discriminated first and sensory dimensions are developed later. The ordering of objects

according to brightness of colour is an exercise which helps the child to develop the capacities of categorizing and abstraction. For Gibson, perceptual development depends as much on learning as it does on maturation. "The trends in perceptual development emerge as the product of both experience with an environment and the maturing powers of an individual" (p. 446). The perception of symbols is determined by social conventions, and thus must be learned. In the same way, the perception of depth in a picture is also related to conventions and must be learned.

Regarding the controversy as to whether children perceive at first the whole or the parts, Gibson believes that these two theories are closely linked, because objects are characterized not only by their structure, but also by their distinctive features; therefore "the very notion of parts and wholes in perception is mistaken" (p. 447). In this, Gibson disagrees with the Gestalt psychologists. For her, perceptual learning is characterized by a progressive increase in the specificity of discrimination of stimulus information. Attention is important as a selective aspect of perception. As perception evolves, there are changes in attention strategies. Attention becomes more exploratory, then more systematic, and finally, more selective. Gibson says that there is a progressive economy in the pick-up of information, which is attained through the distinguishing of the most characteristic features, by the discovery of "invariants," and the major unities of structure. She defines these invariants as "the relation that remains constant over change" (p. 463). An example of this economy would be the caricature. Children appreciate caricatures or cartoons at an early age, and are capable of recognizing the characters by a few essential details.

McFee (1969) says that we begin our visual training by identifying things. The next stage is ordering; that is, we exercise visual ordering as well as conceptual ordering or categorizing.

We need to order information to be able to retain it. Thus, we transform it into schemas so that it will be simple enough to remember, McFee gives the example of a box full of objects which we must order to be able to remember what it contains; "visual ordering makes the message of content easier" (p. 201).

McFee remarks that some pupils use the organization of perceptual information intuitively, whereas others will only do so after learning how.

Arnheim (1962) declares that "visual education presupposes that the world can present its inherent order to the eye and that seeing consists in understanding this order" (p. 20).

The author of this paper agrees with E.J. Gibson that perception depends on learning as much as it does on maturing, and that the realm of perception of symbols depends on conventions, and thus must be learned.

Gibson stresses the role of attention in the learning of perception. This must be taken into account by art teachers in developing their pupils' visual perception.

For McFee, organization is the principal factor in perception. Arnheim and Gibson also bring out the importance of organization as an essential factor.

Visual information. In addition to the organization of perceptual information, Gombrich (1972) emphasizes the importance of customs and conventions as well as past experience in the interpretation of visual messages..

The chance of a correct reading of the image is governed by three variables: the code, the caption, and the context. It might be thought that the caption alone would make the other two redundant, but our cultural conventions are too flexible for that. (p. 86)

According to Gombrich, for a message to be properly interpreted, the code must be known. The more selective the code used, the more possible it is to simplify the information. The context is of great importance, as a change of context will completely alter the interpretation of the message.

Gombrich thinks that language and image complement each other in communication, and this union facilitates memorizing. However in some cases, a visual message gives a much more accurate understanding; Gombrich gives the example of a family tree diagram. Cartoons can reduce the necessity of commentary to a minimum, he points out, or can be represented by the image alone. In commercial art, the use of ancient symbols, metaphors, and newly invented symbols aid memorization. An example of these new symbols is the trademark, he adds, where the form is reduced to its essential characteristics. This reduction serves to attract attention to the symbol. As he says,

The incomplete image and the unexpected image set the mind a puzzle that makes us linger, enjoy and remember the solution, where the prose of purely informational images would remain unnoticed or unremembered. (p. 95)



Gombrich feels that, whereas in commercial art, it is important that there be only one possible interpretation of the message, a purely aesthetic work of art should not be thought of merely as communication, because its message is subject to many interpretations.

The author of this paper estimates this distinction made by Gombrich to be of primary importance for the understanding of visual communication in these two kinds of art. Where commercial art transmits a closed message because it allows for only one interpretation, fine art transmits an open message because it allows for many interpretations.

Design or good Gestalt. Regarding the closed visual image, McFee (1969) says that to arrive at visual communication, it is necessary "to structure both the content, the 'what is said' and the design, the 'how it is said'" (p. 198). McFee says,

Design is the grammar of the visual world. It is the ordering system that makes the symbol more or less readable. It helps the content come through to the viewer. If the symbols have no background referent for the viewer, they will have little meaning for him. (p. 196)

In McFee's opinion, Gestalt principles are still useful for the understanding of visual organization and in the elaboration of a good visual message. She explains that in design, the interaction of the parts as a whole is the basic principle. She states that the elements of design are colour, shape, texture, space and lines, and that the key principles of design are balance, rhythm and emphasis. All of these items have their basis in perceptual organization.

In visual communication, however, McFee says that the elements of design are no longer lines, colours, etc., but rather the way in which these elements are organized by the observer. She identifies the

Gestalt principles of grouping as being: similarity, proximity, closure, good continuation, averaging processes, information points, figure and ground. These only appear in isolation in very simple stimuli. Usually several of these organizing processes appear together in the same image, reinforcing each other. Tension can be created by the contrast between two or more organizing processes.

Visual ordering for Gombrich (1972) has an important role in making a message more readable, and also in awakening emotions. "Configurations of lines and colours have the potential to influence our emotions" (p. 85).

One of the most important studies made in the field of visual language is that of Kepes (1951). He suggests that Gestalt principles are present in the organization of a good design. In his study, he analyses the image's organizational relations in fine art and in publicity, as, for him, the same principles are at work in both kinds of art. He declares that the plastic image has all the characteristics of a living organism in which forces are acting, and attains a dynamic unity through balance, rhythm and harmony. He says that we transform the visual signals received from the outside world into structured and meaningful entities. According to Kepes,

to perceive an image is to participate in a forming process; it is a creative act. In the simplest form of visual orientation and in the most embracing unity of work of art there is a significant common basis: the sorting and organization of sensory impressions from the visual field. (p. 1)

Just as organization is essential in the reception of a visual message, it is also essential in the transmission of the message. According to Kepes and McFee, this organization, or design, can be reached by Gestalt principles.

Visual communication in science and everyday life. The presence of visual communication can be seen in every aspect of modern life, from science to the most everyday situations.

Visual language is an important factor in science. Visual scientific information must be clear, precise, and simple in order to be understood. Because of this, each scientific discipline or profession has its own specific codes which would be clear in the proper context.

In a study on the visual message in science and technology, Hawkins (1974), concludes that "our prospective scientists and technologists could benefit from some training in the use of visual media" (p. 76).

Moorhouse (1974) describes the use of visual language in engineering. He divides engineering drawings into two groups: one represents objects, and the other relationships. Projection systems are used to represent objects, and symbols are used to represent relationships. Moorhouse gives an interesting example of the use of the principles of engineering drawing in Braque and Picasso's cubist phase. He quotes Braque, who says "It was necessary to draw three figures to portray every physical aspect of a woman, just as a house must be drawn in plan, elevation and section" (p. 96). In Picasso's works, Moorhouse points out that "many of his faces consist of front elevations and side elevations superimposed on one another but undoubtedly used in an attempt to convey the impression of a solid object" (p. 96).

Another author to analyse visual communication in science is Tippet (1974), who brings out the importance of the visual message in architecture. According to Tippet, two kinds of visual communication are necessary in architecture. The first is the communication between designer and builder, which is governed by the same unemotional,

concise and efficient principles that exist in engineering; the second is the communication between designer and user. Here the methods utilized must lead to an emotional response. Rules and regulations are less important than the transmission of feeling; this is a much more subjective and aesthetic visual communication.

The majority of people are not aware of the importance of visual communication in daily life, because it has already become an integral part of the system of our society. However, the fact is that visual information, much of it poor or harmful in quality, reaches us every day from morning to night.

Cumming (1974) has studied visual communication in everyday life, and gives examples of the improper use of visual messages in street signs, in the distribution of control buttons in household appliances, and even in the discrepancy between the way numbers are arranged on the face of a calculator, and on a pushbutton telephone, making it difficult for a person to use both side by side. The differences in the way the numbers are arranged in the two machines leads to what Cumming calls a "negative transfer of training" (p. 123).

From a review of these authors' comments, we can see how training in visual language is necessary in schools to prepare young people for future professions, or even non-professional life, because of the omnipresence of visual communication in human activity. This training should be seen in a careful and serious light.

#### Development Of Visual Thinking

Arnheim (1972) says that teaching today has isolated the pupil from the senses, surrounding him with numbers and words and leaving him

a stranger to the real world. According to him, this brings about an inhibition of the senses as well as a rigidity of concepts, which remain attached only to the words and numbers, and are not exposed to life experience.

He emphasizes that "the concept and the percept are united," (p. 58) and that "problem-solving has much to do with the reordering of the perceptual image" (p. 56). For him, the perceptual experience of existence, where things are comprehensible to our senses, was at the origin of cognition. And it was also at the origin of art, "because art depends on perceptual experience as the carrier of ideas" (p. 58). He says that each object has a dynamic character which transmits a message to us. He also says that our lives are much too separated from the basics, and man's relation with nature is no longer seen and felt; it is a remote relation. If thought occurs on a perceptual level, then it is necessary to develop an education system "that keeps the senses united with thought" (p. 94).

Arnheim (1971) says that we see the object as a dynamism of forces which determines its form. "The work of art defined as an experience turns out to be a Gestalt of the highest degree" (p. 197). For him, this dynamism would explain why the dynamic, or expressive qualities are stronger and more easily perceived than the aesthetic qualities of shape, size, and line location, which are less active.

He also suggests that the study of these qualities of form and their organization into integrated patterns is effective for training young students. "Visual thinking manifests and develops general intelligence, and the stepwise progress of visual order reflects the development of the person as a whole" (p. 205).

The author of this paper agrees with Arnheim's criticism of our education system, and with his opinion that perception is affected by the distance which has separated us from nature. The dynamic character of objects, which Arnheim sees as responsible for expressive qualities, and the organization of forms in patterns, are ideas from Gestalt theory, which, although they have been criticized by psychologists from other schools of thought, are still respected and accepted by the majority of the art educators that have been examined in this paper.

McKim agrees with Arnheim in his criticism of our education system, and attributes to the inadequate system two incapacities which are found in students today: the inability to use their imaginations productively and their inability to draw.

McKim says that the first stage for teaching visual thinking "is to stop unteaching it" (p. 24). Opportunities for visual expression generally cease after the first few years of primary school, and thenceforth, an education restricted to the use of words and numbers results in visual atrophy and the death of the capacity for visual fantasy and creativeness. Not only the imagination must be stimulated, but also the capacity to see. McKim (1972) states that no one lacks imagination, but that the majority of people do not have the ability to consciously contact their imaginations, or to direct their imaginations productively. He points out another failing in our education system when he says that all children are capable of drawing: "Were education to nurture this natural drawing impulse, as it does reading and writing, virtually everyone would draw" (p. 25).

Based on the studies mentioned above, the author of this paper feels that a change in the education system is necessary to permit the development of visual thinking in pupils. This implies the development of a closer relationship between the pupils and the outside world through the senses and a greater understanding of the organization of the "basic pattern of forces characteristic of what happens inside and outside of us all" (Arnheim, 1964, p. 52); it implies the development of visual reasoning, the capacity to "see" in space, to find visual solution, to imagine images, to develop the tools to be able to express the images; that is, to learn visual language, to be able to use it with ease. To develop visual thinking is to develop intelligence.

#### Suggestions For Changes In Education

To achieve the change proposed in education, it is necessary to define the items that should be modified in the curriculum, and more specifically in the art program.

Several authors' opinions were studied, and they all show a high degree of agreement on the new directions which must be taken by art education, and by education in general.

In the analysis of their opinions, the author of this paper has chosen the most important items for elaboration of an art education program:

1. Re-establishment of the unity in teaching perception and thought.
2. Training of perceptual thinking.
3. Extension of perceptual training to other disciplines of the curriculum.
4. Development of problem-solving skills through visual thinking.

5. Re-establishment of the unity between visual thinking, visual learning and visual communication, and development of the teaching of these.
6. Development of communication skills through creative expression.
7. Development of appreciation of art in all its manifestations, and understanding its influence on society.
8. Making students aware of the influence of mass media on society and providing them with the means to understand and judge those media aesthetically.
9. Relating art to daily life and society.

The first item is the most important, because it is the main point to be changed. A program for visual education must be conceived with the aim of re-establishing the unity between perception and thought.

Arnheim (1969) strongly advocates this change, but he does not make suggestions which could be adapted to a related program. His contribution is to study the mechanisms of visual thinking and its relation to visual perception. It seems that he leaves programs up to art educators, because his role as a psychologist is to make people aware of visual thinking.

Some art educators have presented suggestions for programs which are very related, or even based on Arnheim's theory of visual thinking.

Among these art educators, Edgar (1974) points out the importance of a program to develop visual thinking in schools. She emphasizes that perception and thinking are processes which interact in practice.

James (1975) is another art educator who points out the false separation of perceiving and thinking as a cause of distortion in children's education. Another traditional distortion, in her opinion,



is the separation between feeling and thinking, the first being associated to the arts and the other to the real world. This separation she says, has consequences in education.

They [the children] do not move freely from the general to the particular and back again, and so lose an important aid to thinking. They learn all the time to communicate through verbal and mathematical symbols, but they are deprived of iconic, and equally of the enactive modes of representation. ... Few children learn to use sketch or three-dimensional models as an aid to clarifying their ideas, seeing relationship between data, and predicting the way in which a study may develop by visualizing its implications. (p. 11)

Edgar (1974) also says that the lack of sensorial and perceptual experience can influence the cognitive structure in the child.

The characteristic of a good curriculum according to James (1975) is that it embodies "certain kinds of behaviors" (p. 10). This is more important than the actual contents of the curriculum. What is important is the way of life encouraged by it. She names three fundamental kinds of behaviours:

Inquiry, which includes exploration, experiment, and the search for explanation.

Making, which includes not only invention, but also doing, executing, applying.

Dialogue, openness to experience, whether it be material, of an object, a creature, a person (one-self included) or of a process.

These art educators' opinions stress the necessity of training perceptual thinking, the second item considered by this author for an art curriculum. Arnheim points out the influence of art in this training:

Once it is recognized that productive thinking in any area of cognition is perceptual thinking, the central function of art in general education will become evident. The most effective training of perceptual thinking can be offered in the art studio. (p. 296)

However, Arnheim says that this perceptual training should not be restricted to art. For him, the development of intelligent vision would only be possible if it were not misunderstood in the other areas of the curriculum. Heightened perception should not be considered merely artistic or aesthetic, because it is actually present in all human activities.

Visual thinking calls, more broadly, for the ability to see visual shapes as images of the patterns of forces that underlie our existence - the functioning of minds, of bodies or machines, the structure of societies or ideas. (p. 315)

The extension of perceptual training to other disciplines of the curriculum is also advocated by Edgar (1974) who suggests that perceptual training can be used to aid learning in other disciplines.

Children should be able to achieve a concrete, perceivable result from what they are learning; things take on a more profound meaning and understanding comes more quickly if perception is a part of the learning process. James (1975) puts forward her model, not only for the art program, but for the entire curriculum, because she believes that children benefit from this kind of exploratory and inventive teaching. Arnheim (1969) also says that the development of problem-solving skills through visual thinking is related to all disciplines, but can best be developed by the art program.

It is easy, James emphasizes, to recognize the schools where art teachers are effective by the liberty with which the pupils deal with visual problem-solving processes, working on them in a concrete way.

The development of problem-solving skills through visual thinking is also suggested by Edgar (1974) when she says that an art program should be carefully planned to include "the necessary mental and physi-

cal responses, of problem-solving, assimilating, manipulating, forming and evaluating visual configuration through different materials, textures and forms" (p. 159).

She feels that there is "little understanding or practice of visual teaching, visual thinking, or visual learning in schools" (p. 149).

Visual learning in relation to visual thinking was discussed at the conference of Visual Learning, Thinking and Communication at the University of Iowa in 1976. Randhawa (1978), who published the proceedings of this conference, writes in his conclusions that there is a link between these three elements, which he calls the "visual trinity." He affirms that "the whole act of visual learning provides visual knowledge to the learner; at the same time it also provides opportunities for visual thinking - re-organizing, restructuring, and interrelating prior knowledge to communicate" (p. 191). According to him, these three activities are inseparable in human beings.

Communication, for James (1975), "arises naturally in its proper context of inquiry and making" (p. 10), when these two behaviours are stressed in the curriculum.

This author suggests that the unity between visual thinking, visual learning and visual communication be re-established in schools, so that through the study of visual communication the students can learn to think and to express themselves visually. As Edgar (1974) points out, a visual communication program, besides developing perception, should also develop the ability to communicate through creative expression. "The complete art work is both an intellectual and an emotional expression of an attitude of experience presented in a personal manner" (p. 159). She believes that children should be given the opportunity of

developing their ideas at their own speed, but a teacher's guidance is necessary.

Along with perception and creative expression, Edgar stresses the importance of another requisite in an art program; that is, appreciation of art through art history. It is through this appreciation that children can become conscious of their culture and develop critical judgment, particularly with regard to the mass media. For her, art must be integrated with other activities so that children can learn the role of art in society. She also suggests that films and television be studied because "film, as painting, is an important demanding means of visual communication" (p. 165).

The influence of the mass media with their stereotypes and often misleading messages is also stressed by Feldman (1976), who sees a possibility of resisting this influence through the study of the varieties of visual images and their meanings.

We shall employ art to help students to see with their own eyes, to represent what they see, and to share their discoveries with each other. That sharing will take the form of critical discourse about the images students make themselves, the imagery that surrounds them, and the images of man and the world handed down to them. (p. 12)

Another way to fight the influence of the mass media, according to Feldman, is to expose students to the widest possible collection of images created by artists, from all periods and places. Crosscultural study, comparison of forms and styles, technical analysis, and studies of themes and types are the approaches by which the art teacher can lead students to understand, through art, the importance of perceptions, visual organization, and artistic expression.

McFee (1966) also talks about art appreciation and the importance of mass media in contemporary society. According to McFee, we must work to develop in the student the necessary criteria to appreciate and value all the forms of the visual arts. She says that aesthetic criteria should be developed through the analysis of works of art, by the understanding of their relation to society, and through knowledge and understanding of design elements.

This author agrees with the opinion that students should learn to appreciate art in all its manifestations, and that they should understand its influence on society, particularly the influence of mass media, so that they may have the means to understand these media and judge them aesthetically.

The importance of relating art to daily life and society is emphasized by Arnheim (1969) who feels that art in our times has become isolated from everyday life. According to him, we should consider great art works as "the most evident results of a more universal effort to give visible form to all aspects of life" (p. 295). Human existence should be the primary concern of art. "This broader concept ... must be supplemented by a psychological and educational approach that recognizes art as a visual form, and visual forms as the principle medium of productive thinking" (p. 295).

James (1975) estimates that the separation between art and life which exists in modern times is responsible for the whole education situation today. She says that the art educator should "liberate, foster, and maintain behaviors which to other people may seem to be art, but which to him are just living" (p. 9).

Another author who stresses the relationship between art and life is McFee (1966). She feels that the directives for the development of an art program should be based on the relation between society, art and education. According to McFee, an important function of the art educator is to analyse manifestations of popular culture so that the students can preserve their cultural continuity by learning to respect the symbols of their own culture, and at the same time by having the opportunity to accept and appreciate all forms of visual art.

McFee also mentions the influence of the mass media in today's world, saying that art educators must become aware of its importance and of the values that are being projected by these communication media. The art educator must set before the pupil

the tools with which to evaluate the obvious and the subtle messages of this one-way communication system. This requires that we be aware of what they are receiving; that we analyse the art forms being used so that we may help them develop and use aesthetic criteria in their evaluations. (p. 131)

McFee points out that this approach to art, which takes into consideration the role of art in the life of all people, does not negate the role of an "aesthetic creative elite" dedicated to artistic discovery. This elite is of great importance to society, and merits recognition and encouragement. But again, the recognition and appreciation of the fine arts does not imply a negation "as non-art, the ethnic and popular arts that have meaning to large segments of society" (p. 133).

This author agrees with the foregoing approaches to art. It is through an art related to life that the student can learn to understand his or her own epoch.

This author believes that it is through the study of visual communication that this understanding can be achieved. For this reason, visual communication is important. Through visual communication the student can develop perceptual thinking, increase problem-solving skills, and learn to connect perception and thought. Through visual communication, the student can learn the visual language, learn to appreciate and understand all the manifestations of art - the fine arts, the applied arts and also the art used in mass media - and recognize their influence on society and on his or her own life.

#### Exercises In Visual Thinking

The authors that have been examined in this paper are unanimous in the opinion that our education system does not develop perceptual thought, or visual thinking. Few of them, however, have come up with any practical solutions to apply their conclusions toward changes in the present educational system, which they see as inadequate.

One of the authors studied who present a practical solution is McKim (1972), whose book contains a series of imaginative exercises for the development of visual thinking on the part of the reader. The same exercises, moreover, can be used by art teachers or teachers of other disciplines.

These exercises can be helpful because they are organized according to several problem-solving situations and explain clearly which aspect of the process is to be developed. They are easy to follow and the teacher can have a more immediate goal for the classes, besides the main goal of developing visual thinking. Drawing methods books can also be used, because probably all art exercises and techniques are

suitable to develop visual thinking, even if their author did not mention this term. But McKim's book can be used as a basis because of its explanation of the process itself going along with the exercises.

McKim's exercises in visual thinking are arranged in three parts: seeing, imagining, and idea-sketching.

The section on seeing aims at revitalizing vision and integrating the sense of sight with the thinking process. "Seeing is treated not as a passive process but as a creative and active art that can be educated" (p. 39). McKim presents each stage with an explanation of how the visual thinking process occurs, with accompanying corresponding exercises. He begins with "externalized thinking"; that is, thinking in the direct context of seeing, uniting perception, thought and action. In the exercises accompanying this stage, it is possible to "see" the solution. In the second state of this section, McKim presents what he calls "recentering"; that is, observing the familiar from a new point of view. Here, exercises in drawing are presented, as a new way of invigorating vision. "By drawing, you will experience the pattern-seeking as well as the analytical nature of seeing, and you will explore perceptual cues that will make the visual world three-dimensional" (p. 26).

In the section on imagining, attention is turned toward the interior, and the exercises aim to develop the inner imagination. "The thrust of these experiences is to open up inner imaginative resources essential to creative visual thinking" (p. 26).

The third section on idea-sketching aims to train the expression of visual ideas on paper, "using the graphic language that is most appropriate to the idea's level of abstraction" (p. 26).



McKim does not recommend a step-by-step method, but rather a flexible one. Expansive thinkers should be able to learn to converge their ideas and pay attention to details, whereas tight thinkers need to expand their thought and leave the details aside. Some people think better in three dimensions, others with sketches, and still others with inner images. McKim warns the reader:

One should also be careful not to confuse drawing skill with overall visual thinking ability. The individual whose drawings show a flair for concrete realism, for example, frequently finds abstract thinking difficult. To increase skill in abstraction, this individual should use graphic languages that embody abstract relationship ... and draw images that are highly abstract. (p. 26)

McKim suggests that to accelerate the learning of visual thinking, one should compare observations, discuss dreams and experiences (inner imagery) with other people, and cover the walls with drawings and idea-sketches. Observing others at work is also interesting, because "much visual learning occurs by direct example". (p. 26).

This author considers McKim's exercises very useful to the teacher because, as a type of puzzle, they amuse children, and help to develop visual thinking. McKim is the author who extensively develops this kind of exercise.

McFee (1969) is another author presenting exercises. She is more concerned with problem-solving in design. She analyses an example of organization through the aspects of grouping, creating patterns of forces by the changing of form, position, dimension, texture, or colour. Tension or aesthetic feeling can be created, or even a stimulus for a new organization. McFee also gives some examples of tasks for the exploration of "the interaction of elements in the organizing process" (p. 213).

McFee's exercises are good examples of the visual language which can be learned through visual communication. The design is the instrument for making and understanding visual messages.

Another example of visual thinking exercise is given by Arnheim (1969). He mentions drawings made in preliminary experiments with pupils, with the intention of representing specific concepts without any intention of aesthetic value. Concepts which were considered abstract were presented, such as "Past, Present and Future, Democracy, Good and Bad Marriage ... [and] Youth," (p. 120). After the drawing, verbal explanations were solicited. Arnheim noticed that there was no difficulty in representing the abstract concepts visually. A concept such as marriage, which is composed of only one word, was represented in most cases by an entity composed of two elements.

A variation on these exercises is to encourage the pupils to use many sheets of paper, and progressively perfect their original idea. To really work on an idea, they must be "resourceful, disciplined, insistent" (p. 297). The exercises can help pupils to realize that "no standard of right and wrong can derive from purely formal criteria ... [and] any organized pattern is a carrier of meaning, whether intended or not" (p. 297).

Arnheim noticed that several types of visual thinking done by the pupils in their attempt to perfect their drawings are similar to those shown by certain artists; Picasso, in "Guernica," for example. "The amateur drawings contain a pidgin version of the rich and precise vocabulary characteristic of good art" (p. 134).

These are the only concrete examples of exercises to develop visual thinking that Arnheim gives in his study.

The art teacher can use these exercises as a base to teach visual thinking and to develop new exercises of his own with the aid of the children.

### Programs Designed To Teach Visual Thinking In Schools

#### Visual Literacy

One of the consequences of the change of attitude toward visual thinking and visual communication can be seen in the movement known as visual literacy, whose aim is visual learning using the analogy of verbal learning. This movement has many followers, but there exist some related issues which have to be taken care of. One of them concerns this relation of visual language to verbal language and reading, which can lead to the problem of using art, not as an end in itself, but only as an aid to verbal learning. Another problem is the separation which is made between visual literacy and the aesthetic aspect of the visual message, which is almost always disregarded.

At the First Conference on Visual Literacy, Debes (1970) defined the term as follows:

Visual literacy refers to a group of vision competencies a human being can develop by seeing at the same time he has and integrates other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, and/or symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to comprehend and enjoy the master-works of visual communication. (p. 14)

Dondis (1973) says that the aim of visual literacy is to educate everyone as makers and receivers of visual messages, that is, to make everyone visually literate.

She thinks that visual communication has been left to subjective judgments in the belief that no methodology was possible in this area. However, Dondis points out, there are guidelines for visual compositions; there are basic elements that can be learned and understood by all pupils, which, "along with manipulative techniques, can be used to create clear visual messages" (p. 11).

There is no easy way to develop visual literacy, Dondis explains, but teaching it is vital in these times when visual intelligence is increasingly necessary. The invention of the camera brought a dramatic change in communication, and, at the same time and in a parallel way, in education. For her, "the camera, the cinema, television, and video tape, and visual media not yet in currency will modify our definition - not only of education but also of intelligence itself" (p. 18).

Dondis sees two things as basic to visual literacy. The process of composition or the organization of parts on the one hand, and on the other, the perception mechanism are responsible for the meaning of visual messages.

Using Gestalt perception studies, Dondis lists the psychological elements of a visual message: balance, stress, leveling and sharpening (harmony and stability), preference for lower left, attraction and grouping, positive and negative.

According to Dondis, the basic elements of composition are the dot, the line, shape, direction, tone, colour, texture, scale, and movement.

She explains that we express and receive visual messages at three levels: representation, symbolism and abstraction. Among the visual techniques, she sees contrast as being the most important means of expression.

Dondis explains that form and contrast are intimately linked in visual communication. "The artist must seek through his compositional strategies solutions to questions of beauty and functionality, of balance and the mutual support of form and content" (p. 108). She feels that visual intelligence and the control of the elements in the visual media possess the same characteristics of any skill that needs to be developed and perfected.

This author agrees with Dondis that visual thinking needs to be developed and perfected.

Dondis makes a very good study of the elements of visual language, presenting them in a didactic sequence of learning. But she does not depart from this kind of study to relate it to the aesthetic aspect. She is very concerned with the techniques of visual communication, but not with the artistic element. It seems to this author that Dondis considers visual literacy only as the study of making and receiving visual messages, in much the same way as we transmit and receive verbal messages, with no relation to the study of art.

Drawing a parallel between visual and verbal literacy, Feldman (1976) points out that the mere ability to read does not imply a critical understanding of the rhetoric of words. In the same way, the simple act of receiving a visual message and acting in consequence does not imply an understanding of the rhetoric of images.

Feldman considers that "visual communication relies on an innate grammar of images" (p. 196) which resembles the grammar of verbal language. When we learn to read, we "dislearn" or repress our visual grammar. He believes that there is a language of images that can be learned, and the disciplines such as art history, iconography, art criticism and aesthetics, "constitute well-established ways of reading visual language" (p. 199). However, these disciplines have been given an unimportant place, or none at all, in the school curriculum. Feldman stresses that visual literacy should not be seen as a substitute for conventional literacy. He adds that "[his] contention is that everyone must learn to read images because our culture is increasingly represented and perceived in visual terms" (p. 200).

Feldman also argues that when "we read anything - a sentence, a map, a visual situation - we screen out aspects of its total reality" (pp. 197-198); thus the definition of "reading" should be broadened to include "making sense out of signs, symbols and structures" (p. 146).

This argument from Feldman is analysed by Sacca (1979) who says that "broadening the term to include interpretation of both pictures and words ... [certainly has] not added to the understanding of the relationship between these processes" (p. 30). Sacca goes on to say that for Feldman these two processes have a common basis, but he does not prove it. However, this affirmation can lead to conclusions and theories which try to justify "learning to interpret pictorial signs ... as a facilitator of learning to read words" (p. 30).

Sacca explains that certainly if the term "reading" is broadened in that way, it will include some aspects of the perception of art, but she asks what this has accomplished for the understanding of the relationship between the process of reading pictures or reading words.

Sacca claims there is another drawback to justifying the learning of art solely as a facilitator for reading: placing art in a secondary position in schools at the service of other academic subjects, and not as a discipline having its own value.

Dworkin (1970) warns against exaggerations which can accompany a change in the curriculum, recalling the great emphasis that was given to written language in previous times. He also warns that interests outside of education can influence the adoption of cinema or photography in the school curriculum.

Dworkin emphasizes that the development of sensitivity involved in the learning of visual literacy should be directed toward the individual's integration.

Jonassen and Fork (1975) made a bibliographic survey on visual literacy. They present recent projects (Ross, 1972, and Van Holt, 1972) which tried to develop a practical knowledge base. But they cite the Milford Visual Communications Project (Fransecky and Ferguson, 1973) as being "the most comprehensive, systematic attempt to define and implement a consistent sequence of visual literacy training" (p. 9). However, Jonassen and Fork consider that "a paradigm and theoretical foundations for all of these projects ... appear to be either absent or ill-defined" (p. 10).

The Milford Visual Communications Program, begun in 1970 and conducted in elementary and secondary schools in the Cincinnati suburb of Milford, Ohio, is described by Fransecky and Ferguson (1973) as a program emphasizing the parallel between visual and verbal communication. Children are encouraged to use both languages freely, one being auxiliary to the other. The program offers the pupils a variety of experiences in verbal and visual languages in five phases.

The children begin by learning perception of the environment, of forms and their relations. They then go on to more complex elements, learning to communicate their perceptions through drawing, speaking, and writing. After this, they learn about more complicated media such as slides, videotape, and film. Sound is also studied as an effective means of communicating.

The pupils are encouraged to continue their work outside of school to get involved with the community. "The students at Milford have 'discovered' their community as a viable resource for their own learning" (p. 148).

The project has the value of being a very organized attempt at developing visual literacy.

But, as in Dondis, what seems really lacking is a relation to artistic qualities. According to the explanation of the project by Fransecky and Ferguson, it seems that only the aspect of communication is emphasized, and the artistic aspect is left aside. The relation to the community seems to be one of the main points of the project, and the use of modern media is also a good point.



Another project which emphasizes developing community involvement through modern media is commented on by Ross (1972). He presents the results of a program of visual literacy developed by Melvin Roman with a group of children from South Bronx, New York, in a project called the Youth Communications Centre. Its goal was to "foster a sense of community in the slums by establishing a youth communications and community action center" (p. 14).

Film techniques were used because of their strong appeal, especially to young people. The results of the project were favourable with regard to involvement of the children with the community as well as its aspect of "self-discovery and self-confrontation" (p. 14).

This project is not as broad as the Milford Project but has the advantage of emphasizing the artistic aspect to the children. The involvement with the community, as in Milford, is a good point.

Another project in visual literacy using modern media is described by Van Holt (1972). It involved about 26,000 students in the Kansas City School District. The basis of the project was the use of photography as a means of expression and visual communication. Van Holt explains that

While a variety of approaches were taken to enhance visual literacy skills at each school, the basic framework called for students to take pictures either on field trips or individually. The pictures then became the visual media that they described in writing or speaking. (p. 134)

An improvement in the children's reading, comprehension and vocabulary acquisition was noted.

This project emphasizes even more the tendency to draw a parallel between visual communication as similar to verbal communication, and uses visual communication as an auxiliary to develop verbal skills.

The author of this paper feels that these projects put too much emphasis on modern media, leaving traditional art forms aside. An artistic education should also include an appreciation and comprehension of the great works of the past, which are an illustration of the effectiveness of visual language. The implementation of new techniques in communication is necessary in art education, but should be a complement and not simply a substitute for traditional techniques.

Feldman is concerned with art appreciation, but he appears to be the exception among the authors that we have cited on visual literacy. Care should be taken to see that the pupils' natural enthusiasm for new techniques does not distract the teacher from the true goals of art education.

This author feels that visual language involves much more than what has been elaborated by the visual literacy movement. The term itself seems hardly appropriate for designating the highly complex mental operations which are necessary for the perception and comprehension of a visual message. The term visual thinking seems more appropriate, as that of visual literacy connotes the mechanical learning of a skill, where reactions become automatic, such as the act of reading. Not everyone who knows how to read is capable of appreciating literature.

A positive aspect of these programs is that of involvement with the community. Generally speaking, the social aspect has been seriously neglected in education. Learning within the community makes the pupils aware of their position in society; this is in agreement with the idea

but should change in proportion according to the level.

In the area of perception, the accent should be on "seeing," integrated with thought. Students should be led to perceive the intimate relations existing within objects, the visual patterns of forces which hold our visual world together. To train visual thinking, they should be led to develop a close relationship with the outside world through the senses, and to observe the familiar from a new point of view, as McKim (1972) suggests.

With regard to expression, this author agrees with Eisner (1972) that a program should "be useful for helping children learn to produce art having aesthetic and expressive quality, ... to respond aesthetically to the visual world ... and [to] understand the role and functions of the visual arts in culture" (pp. 171-172).

The study of visual language should be present in both of these areas. The students should learn to organize visual information; that is, to perceive the order of the world, and also to transmit information. The students must be given the proper tools to be able to express their ideas and feelings visually.

This can be achieved through the study of design, which, as McFee (1969) says, "is the grammar of the visual world" (p. 196). The students must learn to use the principles of perceptual organization and the dynamics of forces (through balance, rhythm, and harmony); they should learn to use the basic elements of design: the line, the point, shape, size, and colour. By studying design, the students will be stimulated to find visual solutions, to use visual reasoning, and to perform problem-solving operations in different media.

In the third area of the proposed program, appreciation, the students would learn to read the symbols of our culture and other cultures, and to develop aesthetic criteria for the analysis of all levels of art and their influence on society, and to understand the elements of design. The program should include the study of modern means of visual communication, because this is the form of art with which the students are in contact. They must be made aware of the importance of the mass media, and given the instruments to evaluate these with aesthetic and critical awareness.

The fourth area of the program aims to give the student an understanding of society and his productive role in it. As McFee (1964) says, "children can be taught to speak and listen to others by means of art. They can become aware of the uses of art to themselves as individuals and as members of a larger group. They can understand how the culture is held together by the communication of art" (p. 19).

Besides understanding his culture, the student must be led to participate in the community, to integrate with it through art.

As has been mentioned above, these four areas should be present at all levels, but in different proportions. Thus, in the first years of school, perception and expression should be emphasized, but the element of integration into the community and appreciation should already have begun. For the older students, particularly for adolescents, appreciation should be stressed, and integration with the community can become more effective. Perception for the younger students should be directed towards the perception of the environment, whereas for the older ones, the concentration should be on visual symbols.

Even younger children show an interest in caricature, or cartoons; that is, the economical representation of essential traits, and this way of drawing can be developed fairly early. Children tend to copy comic-book characters; they should be encouraged to create their own cartoon characters to meet the interests of their age.

Older children are interested in the rules of composition (the principles of organization); this should never be considered as an end in itself but as an auxiliary in visual expression. Therefore, its use should be restricted to more advanced students, because a younger child will neither be able to understand nor be able to apply these principles. Adolescents, however, can profit greatly from composition exercises.

Drawing ability should be developed early, and its teaching should never be interrupted. Learning to draw is equivalent to learning to read or write, and needs time and training. Although reading and writing are practised in all the other parts of the curriculum, not only in literature courses, drawing is restricted to art courses. There is a tendency, even in art courses, to introduce new techniques and neglect drawing which must be a systematic and continuous study to be effective. As McKim (1972) says, everyone is capable of drawing.

Drawing is a major aid to visual thinking. It encourages the students to search for structures and to see analytically. To lead students to use idea-sketching, graphic language, and three-dimensional models to clarify ideas and see relations is to teach them to think visually.

Another source of material for visual thinking is the imagination which should and must be explored. In his book, Experiences in Visual Thinking (1972), McKim has formulated a series of exercises to develop the productive imagination; these exercises can be carried out in the classroom.

McKim has also developed exercises in problem-solving, idea-sketching and visualization in space which can be teaching aids. From the first years, the teacher should initiate exercises to develop visual thinking, but without neglecting the perceptive and expressive aspects.

McKim (1972) believes another technique which has demonstrated beneficial results is that of discussing and comparing observations, dreams and visual experiences with others.

Some of McKim's exercises will be discussed here as examples the teacher can use to develop certain kinds of visual thinking or alternative ways to think about problems.

Experimenting with different drawing materials is one exercise which makes children relate to the material itself. They should be allowed to try different markers and paper combinations, and experiment with line quality, such as light strokes and bold strokes. McKim explains that "visualization materials, literally an extension of the visual thinker's being, are extremely personal, so experiment with other materials and their combinations" (p. 30).

"Free-doodling" is another exercise with materials where children can simply enjoy seeing what they are causing to happen on the paper. They can be made to feel rhythm by varying the pressure of pencil or brush, for example. They can also fill in areas with dots, texture and patterns.

Another exercise is to have them draw expressive lines by holding the stick in ways other than for handwriting. Graphically expressing verbs such as Leap, Dance, Struggle, etc., could be a way to do this exercise. It could be done to music as well. "Before drawing, let the feeling associated with each action come to the fore; imagine your-

self leaping, for example, and feel the leap" (p. 52).

The drawings could then be compared and the differences discussed, including differences in spontaneity and freedom of gesture.

This author suggests that as a follow-up to these exercises for children, the teacher should present and discuss works of artists who have done free line drawings.

To develop attention, the teacher can use exercises related to this specific aspect and make children more aware of it. McKim suggests having children concentrate their attention for a brief period on a certain object, observe how it becomes clearer by dimming out the space and objects around it, then turning to another object and noting how the first one becomes part of the unfocused background. This is the "figure-ground relation," studied in Gestalt psychology. The children should then try to express their feelings about the object.

By continuously staring at an object, the children can see how it goes out of focus. This happens because of the dynamic nature of attention. They are then told to move their eyes around, and consequently see how the object goes back into focus.

McKim adds that children can also get to know objects better by making exploratory drawings of them from memory or by observation.

Three-dimensional thinking can be improved by exercises too. McKim suggests some exercises with blocks and cubes, and also spatial sketches such as models constructed with paper or other materials, where thinking is directly related to the material. Exercises that can be resolved just by thinking are also suggested, such as solving problems mentally by rotating objects in space.

"Recentring," for McKim, is to make the familiar strange by looking at things from another angle or in another context. Looking at the world upside down is an example of recentring, as well as looking at it by means of distorted reflections, trying to imagine the classroom with its colours changed, reversing functions for objects, or imagining how a particular situation would appear from a mosquito's point of view. This author suggests having them draw this image.

Another of McKim's recentring exercises is to cut images out of magazines and create a new composite image where the images have at least two identities; for example, an eye which is still an eye, but also a wheel, or a flower. Putting the object in a new or unfamiliar context can also change its meaning.

To follow up this exercise, this author suggests that the teacher should show works of artists making use of recentring, distortions, etc.

Pattern-seeking, says McKim, can also be developed by exercises such as matching, categorizing, pattern completion and grouping.

Imagining can be developed in a productive way through exercises which make children use their imaginations, such as looking at an object as if they had x-ray vision, or mentally following verbal descriptions of displacement of persons or objects. In this exercise, the children with eyes closed would follow the movements and changes another person makes in an environment or in coloured game pieces through that person's verbal description of what he or she is doing. The children could then draw what they imagined before seeing the actual changes.



Imagination is a powerful source if it is disciplined and used well. McKim says man knew through imagination that the earth was round before going into space and actually seeing it. This is an example of productive imagination.

Mental manipulation of mind's-eye imagery is another kind of imagination, says McKim. An exercise to develop it is to take a painted cube and cut it mentally, "seeing" which sides are painted and which are not. Keep cutting and counting how many sides are painted. Then do it physically and compare the results.

Idea-sketching is stressed by McKim as one of the best ways to aid visual thinking. It can help to bring vague inner images into focus. Some problems are more easily solved by graphic means.

Drawing from memory is also a good exercise. After observing and feeling an object they like, the children should make a drawing of it.

Abstract visual thinking, for McKim, is to see things in schematic patterns. For example, the earth and an apple have the same abstract characteristic, their roundness.

This author suggests that this abstraction can be pointed out to children in works of art, such as Mondrian's abstraction of a tree. To make children find the hidden likeness between two objects is to encourage original thinking. This is the type of thinking that artists and scientists use to develop new ideas. The use of metaphors and analogies also promotes new ideas.

McKim stresses that this imagery should be used to do something. Idea-sketching is suggested by him as the first step for doing.

It is up to the art teacher to bring out the value of visual thinking, in the opinion of this author. It is up to the school administration to support the teacher, but more than that, to spread the use of visual thinking into other areas of the curriculum, so that this change in attitude will extend progressively into all areas of education.

Visual thinking must be developed on all levels. Visual perception should be emphasized not only in the primary years, as is already being done, but throughout the school years including university, to allow it to become an inherent quality in the student and to change the limited way in which adults "see" their world today.

Of course, the emphasis on visual thinking should not diminish the study of language, as both of these forms of expression must complement each other in the integrated human being.

This author suggests that optional courses be offered in universities, to students in all faculties, so that this new attitude can spread to all areas of professional life, and particularly, as Arnheim (1969) advocates, to those related to teaching.

In the next chapter, these proposals will be adapted to the existing situation in Brazil.

## CHAPTER III

RECOMMENDATIONS FOR THE APPLICATION OF THE PROPOSALS  
OF VISUAL EDUCATION TO CONDITIONS IN BRAZIL

The purpose of this chapter is to elaborate on the application of the proposals set out in the previous chapter, adapting them to conditions in Brazil. To do this, we must analyse the teaching of art in Brazil, taking into account cultural and social conditions, as well as existing art programs.

Brazil is a gigantic country with sharply diversified regions. Making a global analysis of the existing conditions is impossible. Highly developed, densely-populated areas contrast with sparsely-populated regions with little industrial development and difficult climatic conditions.

On the other hand, the primary and secondary education curriculum in Brazil is composed of a "common nucleus," in which certain disciplines are compulsory throughout the country, and a "diversified part," which can be adapted to local needs. Because art education falls into the common nucleus, any state (the major administrative division in Brazil) can be used as an example for the teaching of art in the country.

This author, being a native of the State of Rio Grande do Sul, chose it for her analysis. The city of Santa Maria, in the same state, was selected as a sample for an analysis of cultural and educational conditions. This city was chosen because of its geographical location in the centre of the state, its medium size, and its position as a pioneering cultural centre of the state. The choice was also made because of the author's personal knowledge of this local situation,

having been educated there, and having taught art education in secondary schools and at the university.

An Analysis Of The Cultural And Educational Resources In  
The City Of Santa Maria, Rio Grande do Sul, Brazil

Cultural Resources

Because of its central location in the state of Rio Grande do Sul, Santa Maria is the cultural focal point for the region, and influences many of the surrounding towns and villages. The population from a considerable area looks to Santa Maria for culture. It has three museums: two natural history museums and a historical museum. It has two libraries: a municipal library and the federal university library. There are also two universities, one private and one public.

As for communication media, the city has two newspapers, five radio stations, one of which is a cultural station run by the federal university, and two monthly magazines. One of the two television stations only retransmits programming from Porto Alegre, the capital, whereas the other one broadcasts local and regional programs and advertising, as well as programs from the capital.

Its public university, the Federal University of Santa Maria, is one of the largest and most prestigious universities in the country, and has an important influence over the region. It has several branches in other cities in Rio Grande do Sul.

The city's artistic life is articulated through the university's Centre of Art and Literature. The Centre organizes weekly exhibitions in the city and on campus, in a very large exhibition hall, showing not

only local artists but artists from all over Brazil, as well as travelling educational exhibitions.

There are four art galleries in the centre of Santa Maria, a result of the work carried out by the university. However, art is not really a tradition in this milieu. The people do not generally take an interest in the artistic activities, which is limited to certain elements of the upper class and the university milieu.

This author realizes and would point out that the work done here is a pioneering effort; but it is only through the intermediary of art teachers and artists that the people will be reached. The art teachers trained by the local university are beginning this work, taking their students to the theatre, organizing exhibitions, etc.

Municipal community centres whose purpose is to serve the community as centres for health and recreation are springing up in several towns and could play a major role in bringing art to the people. There is already a centre in Santa Maria showing art exhibitions and offering applied arts courses for the general population, which has successfully attracted the lower economic levels of society in the area. However, the task demands much more time for any lasting repercussions to show in the population.

Thus Santa Maria radiates culture to the surrounding region, capable of diffusing art and attitudes to the people of this region.

But the teaching of art in Santa Maria, although the elements necessary for its development are present, is still suffering from the lack of emphasis placed on it by the curriculum and mainly by authorities.

### Educational Resources

The city has enough schools to provide compulsory schooling for children between the ages of seven and fourteen, and for any who wish to continue their studies. The number of schools in Santa Maria, according to the technical assessor of the Eighth Educational Delegation (1980) is as shown below:

State Schools: Elementary.....25  
 Combined elementary & secondary..... 3  
 Secondary..... 4  
 State primary schools (in the process  
 of being taken over by the municipal-  
 ity)..... 5  
 Total State Schools...37

Private Schools: Elementary.....19  
 Combined elementary & secondary..... 4  
 Secondary..... 1  
 Pre-school.....1  
 Special schools..... 1  
 Total Private Schools...26

Municipal Elementary Schools.....193

Federal Secondary Schools..... 2

Total Number of Elementary & Secondary Schools in Santa  
 Maria....258

These schools serve the 163,000 inhabitants of the city, according to the 1980 census. The average number of students per class is between forty and fifty. Not all schools have an art room or teaching material such as slide projectors or film equipment.

Because they are expensive, photography, cinema and television techniques have not been developed in the schools. Photography is encouraged in the secondary schools through contests among the students, who must do their work outside of the school because it does not have the necessary equipment.

Art teachers are encouraged to use any and all material available, which stimulates both teacher and pupil, and interesting results have been achieved.

With regard to the teaching of art appreciation, the university contributes with modern art exhibitions by artists from the region. The Art Museum of Rio Grande do Sul also organizes travelling exhibitions which are shown in the schools.

However, it must be pointed out that these influences which can be used by teachers for the benefit of their students are isolated. But the greatest visual influence on young people in Santa Maria is television. It is the most important fund of daily information for them.

Added to this are the multifarious aspects of advertising in newspapers and magazines, but this is not comparable. Even the influence of cinema on the minds of Brazil's young people is not as important as that of television. The teaching of art should give pupils the means to live with, understand and have an informed judgment of this influence, as well as tactics to cope with it. The environment will also inevitably undergo the resulting change in attitude.

As has been seen, the city has cultural and educational resources for the application of the proposals suggested in this paper. The author's recommendations will take into account both the strong and the weak points of the education systems and the environment.

### The Existing Curriculum In Art Education

Besides the cultural and educational resources in Brazil, another factor which must be considered for the formulation of recommendations for visual education is the existing art curriculum. It will be examined to see if any conscious attempt has been made to stimulate visual thinking in the students, to see how much emphasis is placed on visual communication in the art program, and to see which aspects of visual communication are the most developed.

Before beginning the study of the art curriculum, it is necessary to explain the way the terms art and visual communication will be used in this section.

For this author, all kinds of visual arts are visual communication, but this is not always the case in the curriculum. For this reason, the two terms will be used with different connotations: art will be used as a general term for visual arts, and visual communication will be used in relation to art in its specific aspect of communication.

### Organization Of The Curriculum

The curriculum in Brazil is composed of a common nucleus which serves as an integrating element for national unity, and a diversified part, adapted to local differences.



The Federal Education Council determines the basic content for the common nucleus, and the State Education Councils determine the basic content of the diversified part. Each school can then add subjects it judges apt according to the existing social and economic conditions. Each school then establishes its own curriculum based on these defined contents. The Education and Culture Department published a manual called Diretrizes e Bases para o Ensino de 1° e 2° Graus do Rio Grande do Sul (Teaching Guide for Primary and Secondary Schools in Rio Grande do Sul) (1972a) which clarifies the organization of curriculum:

In a country of continental proportions like Brazil, where one can find practically any stage of cultural development, the organization of a curriculum based on only one model would fall short of its objectives. For this reason there is the necessity for every establishment to organize its curriculum to consider ... regional and local particularities.

... However, all this diversification in the curriculum should not lose view of maintaining nation unity ... and for this, it should contain an integrating element, which is to be found in the common nucleus of certain fields of study, established by the Federal Education Council. (pp. 18-19)<sup>1</sup>

Art teaching falls within the common nucleus; its basic content is fixed by the Federal Education Council, and it is taught in all primary and secondary schools (Schuch, 1976). Thus the analysis of an art program in a particular state is sufficient to attain an overall view of art teaching in Brazil.

Primary and secondary education in Brazil is composed of eight years of primary school aimed at developing general knowledge in the pupils, and three years of secondary school where the teaching of general knowledge is gradually replaced by more specialized subjects.

1. Translated by Darcy Dunton.

Thus, the students should be able to acquire a technical job upon leaving high school.

#### Activities, Areas Of Study And Disciplines

In Brazil, the curriculum is divided according to the level of study into three parts called activities, areas of study, and disciplines. Teaching follows this same organization throughout the country.

Under activities, in the first three grades of primary school, the children are taught all subjects by one teacher, without divisions of knowledge.

In the fourth, fifth and sixth grades of primary school the subjects are organized into three areas of study: sciences, social studies, and communication and expression. There is one teacher for each area, except in the area of communication and expression which is composed of three subjects: national language, physical education and artistic education. There is normally a teacher for each of these subjects. All of the above should be integrated by the teachers.

The last two grades of primary school and the secondary school are organized by disciplines, with one teacher for each subject.

#### The Curriculum In Rio Grande do Sul

The curriculum directives established by the Bureau of Education and Culture for the State of Rio Grande do Sul for primary and secondary schools will be examined to discover what guidance the schools are given for the elaboration of their art programs.

Activities. In the teaching of activities, the general objectives established by the Bureau agree with this author's ideas on the development of visual thinking. For instance, the author's proposal to develop the pupils' relations with society is in agreement with one of the Bureau's objectives, which is to "develop the capacity to integrate into a new social group" (S.E.C., 1972a, p. 11). In the area of development of perception, its objectives also support the author's views. One objective is to "develop the capacity to observe beings and phenomena in the surrounding milieu, and to establish relations with these ... [and also] to observe the beauty and the order in nature, relating it to the existence of a supreme being" (S.E.C., 1972a, p. 11). The author's views on teaching visual communication also concord with the objective of "communicating with a facility and an efficiency corresponding to age and educational level" (S.E.C., 1972a, p. 11).

Art is included in the integrated contents of the curriculum. There is only one teacher for all the material for this seven to nine year age group. It would be relatively easy to include exercises for the development of visual thinking at this first stage of the curriculum. In the activities section, motor and perceptive development is emphasized already; all that would be needed is that the teacher know about visual thinking and which activities can be encouraged to better develop it in the pupils (games, exercises, imagination, etc.). Thus an awareness on the part of the teacher, by means of changes in his or her education, will effect change in this section of primary school.

Study by activities is the phase in the curriculum where the teacher has access to all the material, and can develop the subjects in an integrated way; thus the teacher can develop visual thinking in

a general way. Drawing as an instrument of communication and expression should be emphasized; the first drawing classes should be carried out with the same intensity as the first reading or writing classes, so that the pupil will develop visual and verbal abilities in a homogeneous manner.

Areas of study. In this stage the artistic education teacher is responsible for the material in musical education, dramatic education and plastic education. Artistic education takes up two hours a week. The areas of study stage is the most difficult in which to introduce the development of visual thinking and the teaching of visual communication. One reason for this is the time involved, which is hardly sufficient for the teaching of three areas of art; another reason is that the teacher's training in these three forms of artistic expression is usually superficial, because they are educated in a two-year art education course, where only notions of these arts can be learned.

This second problem is presently being attenuated by the introduction of an extension to the course to allow specialization in one of the three areas. For the development of visual thinking to occur through the teaching of visual communication, the art teacher must have a specialized knowledge of the forms of visual communication, both traditional and modern.

As for the problem of limited time, this author feels that artistic education should be offered for the same number of hours as other subjects (five or six hours a week). Only thus can the teaching of artistic education fully develop the three arts by integrating them with each other and with the other disciplines, and accomplishing the aim of the area of study system which stresses integration. According

to the aims of this system, artistic education should integrate with the other disciplines within the same area of study, and integration should be attempted with disciplines of other study areas in the curriculum. Here, care must be taken that in this integration process, art does not become a mere aid for the teaching of the other disciplines.

In the communication and expression area, the Bureau of Education and Culture of the State of Rio Grande do Sul (S.E.C., 1972b) recommends that curriculum material be structured according to communications theory, through the process of "emitter, receiver, message and code" (p. 13). The objective elaborated for this area of study is the development of "efficient communication and creative expression for self-fulfilment and social integration" (p. 16). This objective obviously is in accordance with the development of visual thinking through visual communication, although these specific terms are not mentioned.

There are objectives which are common to more than one discipline. The idea of visual communication related to words is common to both artistic education and national language. One of the activities proposed for this integration is the telling of stories by drawing in comic-strip style.

The Bureau also urges that pupils express themselves as "emitters" through different techniques of drawing and painting, wood-cuts, two-dimensional and/or three-dimensional compositions, and other projects, working with different textures and materials.

To develop the pupil's capacity as a "receiver", the following are emphasized: perception, spatial orientation, selective criteria, criticism, and appreciation.

As for the "message", exploration in visual communication techniques as well as visual language can be started.

In the teaching of the above-mentioned "code", primary and secondary colours as well as their names and use are included along with diverse materials, techniques of plastic expression, and the history of art in Brazil.

Although the curriculum is organized according to communications theory, this author still feels that there could be a greater stress on visual communication.

In this phase, visual communication is to be developed through posters, signs, scenarios, lettering and stories in comic-strip form. Geometrical drawing is also included in the visual arts section of the S.E.C.'s 1972 directives, stemming from the long tradition in Brazil of geometrical design as the basis of art teaching. It was only after the general diffusion of the expressive theory in art education that geometrical drawing lost its prominent position. More recently, geometrical drawing was removed from art teaching and put into the mathematics section (S.E.C., 1977). Admittedly, one of the applications of visual thinking lies in the capacity for spatial vision of geometrical shapes and solids, and the elimination of geometrical drawing from the art curriculum should not be allowed to result in the loss of the capacity for spatial visualization.

Disciplines. In the disciplines curriculum, from the second-last year of primary school to the end of secondary school, the integration of the arts and their association with other disciplines continue to be stressed. Some of these suggestions for integrating activities at all levels (S.E.C., 1977) can be seen to favour the development of

visual thinking and visual communication: for example, in integration with theatre, making puppets or scenery for plays, and slides to use in scenarios; in integration with music, making percussion instruments and audio-visual montages.

Other studies suggested which are related to visual communication are the organization of photo-documentaries on proposed subjects; the study of television equipment and making up television schedules; the study of the language of cinema and its technique, analysing films for their message, direction, acting, lighting and photography, as well as their quality as works of art. Window dressing, using elements of equilibrium, colour, harmony, light, etc., is also among the activities where visual thinking and visual communication can be developed.

However, all the suggestions involving techniques needing photography, film or television equipment are quite unrealistic for Brazil. This author, in making recommendations for teaching art in Brazil, will take into account the fact that most schools cannot furnish this equipment, and teaching these particular techniques must be limited to a theoretical knowledge.

The most interesting suggestions are that the teacher emphasize contemporary art, first studying present works of art and then looking back at the past (p. 105), that the students participate in workshops as a complementary activity, and that the artistic activities be extended "to the family and the community" (p. 16).

This author recommends that the study of modern means of visual communication be increased in this phase because of the pre-adolescent and the adolescent's enthusiasm to learn new things, and because the communication media are very attractive to them.

In the directives for secondary school curriculum (S.E.C., 1976), it is specified that artistic education is to be taught as a compulsory discipline in the first year of secondary school in accordance with the following orientation:

In the first semester, the acquisition of knowledge through the foci of "Art in Education" and "Art in Time and Space". In the second semester, the self-expression of the pupil, through artistic activities.  
(p. 89)

This author is very much opposed to the separation of theory and practice, as the pupils' artistic activities should not completely cease during an entire semester, to be started again afterwards. Even worse, the theoretical material learned in the first semester can only be applied much later. The pupil should learn theory by applying it practically, and not the reverse. Even art appreciation becomes much easier if the student is involved in artistic creation in any form.

In the material suggested for the first semester, there is the theoretical study of the elements which compose art: form, rhythm, harmony, ground, etc., and even of techniques and methods used in artistic expression. But the practical application of these elements is only developed in the second semester which results in the separation of knowing and doing. This can be harmful and has no justification.

In the same directives, there is too much emphasis given to cognitive aspects; for instance, the capacity to express, verbally or in writing; knowledge acquired or observations that have been made. These are the only objectives that seem related to communication.

This author feels that this is the stage of the Brazilian curriculum which needs the most extensive change. It should be restructured to integrate theory and practice, and more emphasis should be given to



visual communication for the same reasons given above. There should be studios and workshops in all schools, even if they must be quite rudimentary. The teacher should be allowed to spend several hours in the studio or workshop.

Specific objectives for the development of visual communication should be added to the directives, such as the acquisition of the capacity to make use of the grammar of visual communication, to understand, appreciate, analyse, and criticize messages, to be aware of the environment, and to act usefully in the community.

The activities suggested by the S.E.C. for the second semester contain several possibilities for exploration and research, from the exploration of the elements of visual language to studying elements of the mass media. The separation between the directives and Brazilian reality as seen in the S.E.C.'s directives for disciplines (1977) is much less here. There is still a discrepancy between these objectives, which do not mention visual communication, and the activities related to it.

The study of visual communication is presented in a way which is compatible with the resources of most schools; it is also integrated with theatre and music studies. The following illustrates this integration:

the use of sources of light [existing in the schools, such as] ... lanterns, candles, ordinary lamps, ... reflecting light; [the composition of scenes through] ... angles, planes, masks, scenery, posters, murals, musical instruments; ... two- and three-dimensional works, ... photo-montages, slide-shows, ... audio-visual productions, comic-strip stories. (S.E.C., 1976, p. 94)

Generally speaking, the activities suggested for the secondary level seem compatible with the idea of developing visual thinking through the teaching of visual communication. However, the two-hour period assigned to artistic education every week is only enough for a minimal number of the suggested activities. The creation of studio and workshops could be the solution to this problem.

Artistic education is compulsory only in the first year of secondary school, while it still is a part of what is considered general knowledge. The area gradually gives way to specialized disciplines aimed at professional training, which take up a larger and larger part of the students' time, and it is not further developed. This author firmly believes that visual thinking should and must be developed not only throughout the general knowledge stage of education, but within the professional training elements of secondary school education.

The schools are free to offer the professional training courses that they judge most useful according to area conditions and their own resources. The teaching of visual communication to develop visual thinking can be included within these professional training disciplines in a manner which is more closely related to the particular course. The teaching of drawing can also stay in the curriculum in a form which is adapted to the professional options chosen by students.

As has been seen in the above description, the art curriculum in Rio Grande do Sul corresponds, in its objectives and activities, to this author's general idea for the development of visual thinking.

The four areas suggested in the proposals for visual education are all present in the teaching of art in this state at the present time, but they could be increased extensively. The suggestions for inte-

grated activities can be used, but there must be greater emphasis on spatial visualization, visual reasoning through problem-solving tasks, and visual thinking directly related to expressive creation.

Visual thinking is never mentioned by the S.E.C.; however, visual communication is present, as can be seen by the organization of the study areas and by the activities suggested for the disciplines.

### Recommendations

Based on the proposals for visual education already made, the cultural and educational resources available, and the existing art curriculum, this author has made up a series of recommendations for the teaching of art in Brazil. These are recommendations related to curriculum, to teaching, to administration and to society.

#### Recommendations related to curriculum:

- To develop a program for schools based on the four areas suggested by this author: encouraging seeing, doing, appreciating, and communicating.
- To develop visual thinking by teaching visual communication in art classes. To lead the students to understand and to execute visual works, using the traditional as well as the most modern techniques in visual communication.
- To lead the students to develop a critical sense towards the works of visual communication of the past, and particularly towards communication as propagated by the mass media.

- To increase the teaching of drawing at all levels, giving it the same importance as the other basic skills of reading and writing, and continuing it throughout the students' education.

Recommendations related to teaching:

- To develop a different structure for the material presented for the secondary level.
- To use the mass media as a resource for the teaching of visual communication, and develop visual thinking through them.
- To develop visual vocabulary.
- To use exercise to develop visual thinking.
- To use design to develop visual thinking.

Recommendations related to administration:

- To change attitudes of school administrators and teachers towards a greater emphasis on art and the development of visual thinking through the teaching of art.
- To increase the time given over to the area of artistic education.
- To make the studios and workshops function effectively in both elementary and secondary school, principally after the seventh grade. Time should be allotted for the art teacher to participate in the studios and workshops.
- To create courses at the secondary level, designed to develop drawing and visual communication, giving emphasis to the kind of visual thinking most necessary for the professions chosen by the students.
- To create university courses offered by the art centres for all

students, to develop visual thinking.

- To include in the training of art teachers material relevant to the development of visual thinking through the teaching of visual communication.
- To create symposia and conferences for teachers and professors to meet and discuss their ideas and experiences in these new fields.

Recommendations related to society:

- To lead the students towards an understanding of the social function of art, through visual communication.
- To take art to the community at large.

These recommendations may serve as an example for application by other regions of the country, to be modified to suit local needs.

## CONCLUSIONS

This analysis of the concept of visual thinking and its relation to visual communication has suggested the hypothesis that the teaching of visual thinking through visual communication may lead to the child's integrated development. The possibility of its application in the education system in Brazil was also confirmed by examining the present state of the teaching of art in that country.

To summarize the major points that have been developed in this paper, the author wishes to present the following conclusions:

1. Visual thinking is of the greatest importance for a human being's development.
2. There is an intimate relation between visual thinking and visual communication, which can be used to stimulate pupils.
3. The teaching of art should be given greater importance in schools to minimize the barrier separating art from life and to allow art to penetrate all levels of society, thus giving individuals the necessary tools to confront the modern world and the ever-increasing influence of the mass media.

The author has remarked here that the present state of education with its over-emphasis on verbal development is a detriment to perceptual development. It is the result of developmental psychology theories where, in proposed stages of human development, the intellectual aspect is classified as the highest stage, whereas the perceptual aspect is reduced to the role of a mere furnisher of material for the intellect. The neglect of perceptual development which has been described in this paper is a result of this misunderstanding of perception.

The consequences of this separation of man from the perceptual world can be seen in the poor quality of visual information transmitted by the mass media, the total ignorance of visual language and the indifference to art shown by the majority of people today. The distance between art and daily life is also responsible for this situation. This particular distance is a result of the separation which was made between art and the crafts, isolating art by putting it into museums and lowering crafts to the status of non-art.

To summarize, there are three imperative points: 1) to develop perception and stress its importance; 2) to reintegrate art into daily life; 3) to re-establish the unity between art and the applied arts. Those are the essential changes to be made.

Regarding the first point, namely the importance of visual thinking for human development, this paper has traced the changes in the concept of visual thinking and arrived at the idea of visual thinking as seen by psychologists and art educators today. Arnheim's work has been particularly significant in this respect. The author of this paper has largely based her own conclusions on Arnheim's theories. Arnheim's theories of visual perception suggest that there exist complex operations carried out by visual perception in obtaining and interpreting visual information. He considers this process to be identical with the thinking process, and therefore calls it visual thinking. This author considers Arnheim's opinion to be the most important theoretical foundation for the hypothesis presented in this paper, mainly for its explanation of the visual thinking process. The study of visual thinking in its perceptive and cognitive aspects confirms this opinion; the fact

that visual thinking is present in great art works as well as in children's drawings proves that it is an innate human capacity, but a capacity which must be developed. The development of visual thinking can give young people the necessary equipment to deal with the visual world around them and can liberate them from modern society's perceptual lethargy.

The second point, the relation between visual thinking and visual communication, has been suggested by literature. The perceptual learning process, the transmission and reception of visual information, the visual thinking involved in these operations, added to the study of design and the application of visual thinking to all aspects of life: these are all concepts which have led this author to conclude that the relation between visual thinking and visual communication is a very profound one, and that because of this, teaching visual communication skills will help develop the capacity for visual thinking in students.

One author stands out for his contribution to the practical application of visual thinking: just as Arnheim has developed the theoretical aspect of the study of visual thinking, so McKim has elaborated the practical aspect of this study. His most important achievement is the corpus of exercises specially selected for the perfecting of every aspect of the perceptive and mental process of visual thinking. McKim organizes the exercises according to types of images, classified as images that we see, images that we imagine, and images that we draw. McKim's work is the incentive towards the development of the use of these three image types in thinking. He analyses the processes involved in visual thinking, the interrelation and flexibility of the vehicles used, and makes practical suggestions for learning to develop and use



visual thinking.

The last point refers to the relation between art and society, and the importance of this relation for visual thinking and visual communication. The major influence in this area has been McFee, with her "perception-delineation theory". This theory includes a study of the overall structure of the process of perception and transmission of visual information, within which the differences which separate individuals are identified. One reason for these differences is the individual's preparation for responding visually to things, and for selecting information. This preparation depends on the individual's culture, physical environment, past experience and previous learning, as well as personality. McFee feels that the psychological environment is another factor influencing perception and the capacity to organize information received. Communicating the responses to this information, that is, creating and organizing symbols, is the ultimate aspect of the structure of perception and communication through visual means.

McFee deals with all of the points which the author of this paper considers essential for a justification of the teaching of visual thinking in schools. Although she does not use the term "visual thinking", it is present in her theory, which helps us to understand this process and its relation to visual communication, as well as the relation of both of these to the environment. Thus, the last conclusion stresses that the interrelation between these three processes, perception, the relation with the environment, and communication, justifies the teaching of visual thinking through visual communication.

The emphasis which McFee gives to the influence of the environment can also be seen in the work of Arnheim and McKim. All three authors stress the link between art and life, and the resulting definition of the applied arts as "art". This has reinforced this author's opinion that it is only through daily artistic experience that contact with the world around us can be stimulated. The development of visual thinking can favour this contact, and can also benefit from it. Visual communication is an integral part of this whole relationship.

The analysis of the present situation in Brazil subsequently revealed that the hypothesis in question can be well applied to concrete learning situations.

This author feels that Brazil could benefit in several ways from this study. The first of these refers to the development of pupils who, through visual thinking, will be able to develop their intellectual and perceptive capacities in a balanced way, allowing a more integrated growth as human beings. The thus-developed sensitivity to the world around them will be reflected in their relation to the community and the environment, as well as giving them a critical attitude towards the mass media and visual pollution elements.

Through daily contact with art - learning to understand and discriminate - young people can develop their capacity for the appreciation of the more complex forms of visual art. Their knowledge of visual language will allow them to communicate visually in an aesthetic and efficient way.

This author hopes that her study will be of use, particularly in the area of art education in Brazil. She also hopes that the application of the theories and practices discussed will help the students of Brazil to improve their society and that society's relations to its environment.

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