DOCUMENT RESUME

ED 292 744 SO 019 050

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TITLE Visual Literacy: Art as a Basic in the Elementary School Curriculum. An Annotated Bibliography.
PUB DATE Nov 87
NOTE 69p.; Exit Project, Indiana University at South Bend.
PUB TYPE Reference Materials - Bibliographies (131) -- Dissertations/Theses - Undetermined (040)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Annotated Bibliographies; *Art Education; Curriculum Development; Elementary Education; *Elementary School Curriculum; Literature Reviews; Visual Arts; *Visual Literacy; Visual Perception

ABSTRACT

This research indicates that art education can help develop visual perceptual abilities which can be applied to all areas of learning. Skills in visual perception developed through the study of art will help integrate subject areas. The study organized research and information that emphasized the redefinition of art in the elementary school curriculum, connecting art with visual perception and cognition, and stressing art's expanding role in general education. The study includes an annotated bibliography which is divided into four sections. Section 1 includes six annotated books and articles that describe the beginning of perception as vision and indicate the relationship between the senses and visual perception. Section 2 contains 18 books and articles that discuss the connection between perception and cognition and the role of art in cognition. Section 3, containing 8 annotated books and articles, establishes that skills in visual perception can be taught. Section 4 includes annotations of 11 books and articles that examine visual literacy and its connection to the study of art. The research reveals that instruction in visual perception and thinking has increased the performance of children in mathematics and increased intelligence quotient test scores and perceptual discrimination skills. The paper also provides a glossary. (SM)

VISUAL LITERACY:

ART AS A BASIC

IN THE

ELEMENTARY SCHOOL CURRICULUM

An

Annotated Bibliography

By

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November 1987

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INTRODUCTION

It is generally agreed that elementary school children should be given art instruction in their school program. The traditional reasons for this curricular goal may not be the singular reason for the study of art. Children's art traditionally has been viewed as a means of expressing creativity in an otherwise strict classroom environment or as a way to measure, evaluate, and interpret children's feelings and emotions. Eisner (1983) has described a "cognitive character" of the arts, beginning with sensory intelligence and abilities in relation to the environment: visual perception. These perceptual abilities were described by Eisner as being a prerequisite to concept formation in cognition through the understanding of images. "Art viewed as separate from language, thinking, and knowledge has undermined the place of the arts in education and has relegated arts activities to matters of affect rather than thought" (Eisner 1983:22).

Arnheim's focus on the importance of images in thinking has linked visual perception and cognition and established art's role in the educational process as the place to build a perceptual base of thinking. Arnheim believes that perceptual thought processes use as much intelligence as intellectual concepts while schooling stresses verbal skills separate from perceptual experiences and society continues to use visual elements and images to communicate information and manipulate our sensibilities.

STATEMENT OF THE PROBLEM AND PURPOSE OF THE STUDY

In our image oriented society the use of visual images in communication and education has become as important as the use of words and language. The perceptual skills needed to deal with the constant flow of these images present a new challenge to schools in helping children cope in their environment. Through the organized study of art this challenge can be met.

The purpose of this study was to organize research and information from sources that emphasized the redefinition of art in the elementary school curriculum, connecting art with visual perception and cognition, and stressing art's expanding role in general education. Art is "a basic means of learning" (Lowenfeld and Brittain 1982:49).

LIMITATIONS OF THE STUDY

In this study it is assumed that the study of art in elementary schools is based on an organized curriculum, taught by a specialized teacher, with the goal of increasing children's physical and perceptual growth, social and emotional growth, and intellectual and aesthetic growth. Through instruction and participation children in this type of art program would gain information and knowledge about their environment through expression in many forms. In realistic terms, elementary art is usually taught by classroom teachers without experience in art or the benefit of a structured curriculum to guide them. Many existing art programs have the shaping of materials and creative expression as their only emphasis, reinforcing the idea that art is just for the 'talented' individual. Until the study of art is seen by society as important for more than these traditional purposes in education, art will remain a secondary part of the elementary school curriculum. More research must be done in the area of developing visual perception and the importance of visual literacy, with studies that show the benefits of implementing programs which focus on these goals as well as traditional art program goals. The lack of current research in the specific areas of visual perception and art's role in cognitive development has limited this study.

ORGANIZATION OF THE STUDY

To organize this study the information presented was divided into four sections. The first section describes the beginning of perception as vision and indicates the relationship between the senses and visual perception. The second section discusses the connection between perception and cognition and the role of art in cognition. It is established in the third section that skills in visual perception can be taught and then in the fourth section of the study, visual literacy is examined and its connection to the study of art revealed.

GLOSSARY

aesthetic---"anything relating to or dealing with the beautiful" (Cornia, Stubbs, and Winters 1983:v).

cognition---"the activity of knowing:the acquisition, organization, and use of knowledge" (Neisser 1976:1).

cognitive---"consciously aware, thinking, knowing, perceiving" (McFee 1970:396).

conception---"a process of using words to categorize and relate experiences, which may be direct sensory experiences or responses to the language of others" (McFee 1970:74).

concepts---"the ideas with which we categorize, relate, describe, and differentiate things, processes, behaviors, conditions, etc., through thoughts, written words, or spoken words" (McFee 1970:396).

conventional mode---a form of representation, as identified by Eisner (1982), that is an arbitrary, culturally accepted assignment of meaning to symbols.

expression---"the dynamic processes which result in the organization of perceptual stimuli...an integral part of the elemantary perceptual process" (Arnheim 1969:275).

expressive mode---a form of representation, as identified by Eisner (1982), which imitates what is seen as well as a deeper structure or character, sensed or felt.

forms of representation---"the sensory vehicles through which conceptions are given public status" including the mime-

tic, expressive, and conventional modes (Eisner 1982).

iconic symbol---a nonverbal visual symbol (McFee 1970).

mimetic mode---a form of representation, as identified by Eisner (1982), which imitates what is seen, the surface features of an object or idea.

perception---"the process by which an individual transforms sensed qualities into the world...a mode of perceiving which depends primarily on what [his/her] past experiences, values, assumptions, and purposes prepare [him/her] to see" (Wilson 1966:34).

percepts---"the visual images one develops when one categorizes, relates, describes, and differentiates processes, behaviors, conditions, etc., through visual memory, symbols, and icons" (McFee 1970:396).

perceptual training---"aims to increase observation, heighten aesthetic sensitivity, open-up sensory awareness, encourage new ways of seeing and re-experiencing the world" (Eriksson 1984:11).

symbol---"a sign, mark, a drawing, a form, or a style which has cognitive meaning to a group of people" (McFee 1970: 398).

verbal symbol---a word symbol (McFee 1970).

vision---"our creative response to the world" (Kepes 1965:i).

visual literacy---"the power to encode or decode meaning through any of the forms that humans use to represent what they've come to know" (Eisner 1982:xii).

visual perception---"what one perceives visually or the concepts one develops as a result of what [she/he] sees determines the extent of...visual perception...the ability to use imagery; to perceive objects in space; to use and to comprehend graphic language...to see visual order; to recognize beauty, symbols, excellence, and expression" (Cornia, Stubbs, and Winters 1983:vi,1).

visual thinking---"thinking by the means of visual operations" (Arnheim 1965:3).

PERCEPTION: VISION TO VISUAL PERCEPTION

Stroh, Charles. "A Brief Primer on Vision and Human Perception." Art Education July 1983: 44-45.

Stroh outlined the work done by Gibson (1966) in the areas of vision and perception. The author focused on James Gibson's description of five sensory groups into "perceptual systems" including a visual system. The latter is described as the system combining with all the others in registering sensory information. Stroh stated, "Vision is one part of a total sensory system in which each of the components operates in coordinated, overlapping, and transactional ways, each modifying the other." (p. 45) Stroh described the work done by psychologists in the 1930's concerning human response to stimuli. The Gestaltists believed that the brain grouped things in perceptual units called closures or "gestalts." The author described the influence of Gestaltists on contemporary perceptual thought through their beliefs "that human beings aren't merely a collection of passive receptors, but rather that we impose structure on what we see." (p.45) The author stated, "If knowledge and experience are important factors in determining what we see, expanding our understanding of what perception is can help expand the storehouse of information on which we draw when we search for new images." (p.45)

Neisser, Ulric. Cognition and Reality. San Francisco: W.H. Freeman and Co., 1976. 1-18.

Neisser related that most theories of perception begin with vision and the study of the retinal image, which he believed is not seen but processed. Perception then being the activity "where cognition and reality meet." (p.9) "Perception, the most fundamental cognitive act, was studied by a small group following the 'Gestalt' tradition." (p.1) The author cited James Gibson's theory of perception in cognition inadequate in that it says little about the perceiver's contribution to the activity, instead basing perception on only what is gathered from the environment. Neisser stressed that perception and cognition "are usually not just operations in the head, but transactions with the world. These transactions do not merely inform the perceiver, they transform him. Each of us is created by the cognitive acts in which he engages." (p.1) Neisser defined cognition as "the activity of knowing: the acquisition, organization, and use of knowledge." (p.1) It was indicated that the study of cognition is part of psychology, theories of cognition being psychological theories. From the early 1900s to the 60s cognitive processes were not studied. The author indicated that cognitive psychology began in the 70s, crediting the computer for a renewed interest in the study of cognitive processes, likening computer activity to cognitive activity in the aspect of information processing. He stated, "Computers accept information, manipulate symbols, store items in 'memory' and retrieve them again, classify inputs, recognize patterns, and so on." (p.5)

Gibson, James J. Reasons for Realism, Selected Essays of James J. Gibson.Eds. Edward Reed and Rebecca Jones. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1982. 262-63.

On the subject of perception, the author stated that "perception is the having and achieving of knowledge about the world, and visual perception is the most exact kind of perception." (p. 262) Gibson described the physical perceptual system of the body as the "lens-retina-nerve-muscle" (p. 262) the most complicated input system, active, selective, exploratory and unlimited.

Arnheim, Rudolf. Visual Perception, A Psychology of the Creative Eye.Berkeley: University of California Press, 1974. 4-5. 42-46.

Arnheim described the Gestalt Theory as having laid the foundation for present knowledge of visual perception. The German noun 'gestalt' named the theory and its followers, the word's translated meaning, shape or form. The author indicated the physical description of sight as basically an optic process where light is emitted or reflected from objects. In the eye the lenses project images onto the retinas which send messages to the brain. The image on the retina activates 130 million tiny receptors, individual stimuli transformed into what is seen. Arnheim stated that "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)

Ault, Ruth L. Children's Cognitive Development. New York: Oxford University Press, 1977. 83-106. 152-7.

The process of perception was described as combining "direct information, additional information obtained from memory concerning similar previous sensations, and information about what the person expected to see. The result is a meaningful product called the perception of the situation. Perception is thus both a process and the final product of that process." (p. 99) It was established that perception is important in problem solving because solutions depend on the available information the child has gained through attention and prior experiences. The selective attention, ability to block out distractions, attention span, and the ability to shift and redirect attention to different aspects of a task contribute to this information. Prior experience, collected with time, a wider range of experience, and abilities to identify and predict from partial information also contribute in problem solving. It followed that perception plays a central role in the development of concepts and that "concept acquisition is critical in any theory of cognitive development because concepts permit the efficient handling of enormous amounts of infomation.

Arnheim, Rudolf. "Gestalt and Ar.." Psychology and the Visual Arts. Ed. James Hogg. Middlesex, England: Penguin Books, 1969. 257-62.

In this article, first published in 1943, the author described the Gestalt Theory as a new style of science, its method being "the description of structural features, the whole qualities of 'systems',...those natural things or happenings in which the character and function of any part is determined by the total situation." (p.257) The method was also described as emphasizing the spontaneous, sensory, and intuitive nature of human beings. Arnheim related this attitude to art and artists who use sensory stimuli to organize elements, producing and demonstrating meaning and order. Arnheim pointed out that children draw what they know more than what they see, abstracting their drawing by removing some details and keeping others, is an example of "productive perception--in the sense of an activity which allows us to understand, identify, remember, and recognize things--is a grasping of basic structural features, which characterize things and distinguish them from others." (p.259)

PERCEPTION IN COGNITION: ART'S ROLE IN COGNITION

Eisner, Elliot. "On the Relationship of Conception to Representation." Art Education March 1983: 24-27.

"Forms of representation," stated by Eisner, "are the sensory vehicles through which conceptions are given public status." (p.24) These forms are multisensory within themselves and can include the visual and performing arts, mathematics, writing, speech, and more. Eisner stated, "This process of information acquisition through a sensory system in touch with a qualitative environment is totally cognitive in character. To see what is subtle is not simply a task, it is an achievement and one that requires the use of the mind. Add to these demands the task of creating in the public world equivalences for conceptions held in the private world, and the cognitive demands of the arts become even more obvious." (p.25) Art tasks, Eisner stated, are not guided by the rules of calculation as in mathematics or by rules of puncuation as in writing. "The tasks of art require deliberation rather than calculation, they demand judgement...they ask the student to conceptualize the possible, to see what he has made, to judge...its qualities, and then to act upon those judgements. It is my conviction that such tasks represent the highest form of cognitive activity." (p.26) "The lessons learned from the arts when they are well taught are among the most relevant for cultivating the potential of the human mind." (p.26)

Arnheim, Rudolf. "The Gestalt Theory of Expression". Psychology and the Visual Arts. Ed. James Hogg. Middlesex, England: Penguin Books, 1969. 263-87.

Arnheim defined expression in this article as "the psychological counterpart of the dynamic processes which result in the organization of perceptual stimuli"(p.275): describing expression as "an integral part of the elementary perceptual process." (p.275) The author continued, "Perception is a mere instrument for the registration of color, shape, sound, etc. only as long as it is considered in isolation from the organism, of which it is a part." (p.275) It was then indicated that perception is the way a person gets information about their environment and then that determines how they will react to that information, creating expression.

Madeja, Stanley S., ed. The Arts, Cognition, and Basic Skills. St. Louis: CEMREL Inc., 1978. 1-17.

Madeja outlined four research issues, one described as the cognitivist vs the non-cognitivist viewpoints in arts education. On the cognitivist side, the belief that the arts are a part of a larger domain of knowing, with unique qualities, but part of a whole in cognition while the noncognitivist side holding the belief that the arts stand alone, having their own structure and cognitive system, unique in themselves. Another issue was the role of perception in cognition related to the arts. Madeja stated, "Perceiving implies a step beyond sensing: it requires the existence of some cognitive activity concerning the data through which a response will be formulated based on the information received." (p. 13) Exposure to the arts through instruction and participation, it was established, helps link discrimination and refinement of sensory data with understanding. "Cognition includes both perceptual and conceptual information-processing, both of which can be expressed in iconic and verbal symbols...the symbols are the medium of communication for the cognitive act." (p.12) In the issue of the transfer of knowledge in the arts, Madeja lists three stages in making knowledge explicit and clearly stated: 1) the perception of the fact or event, recognizing, interpreting, and making conscious, 2)the performance of the activity, making the drawing, building the tune, telling the story, and 3)the act of making the knowledge explicit in a symbolic form, constructing, analyzing, defining in conscious terms. Madeja indicated that the goal of arts education should be "...to provide instruction that allows students to become discriminating about and sensitive to the visual, aural, and kinetic data gathered or received from the arts object/event/environment and to encourage them to analyze this data using aesthetic criteria." (p.13) On the issue of visual literacy the author remarked, "...it has a wider meaning than its usual application of reading, writing, and computation, and the arts may provide that broader context." (p. 17)

Sava, Inkeri. Emotion and Cognition in Visual Art Education. Research Bulletin No. 55. Institute of Education, Helsinki University, Finland. Educational Resources Information Center. ED 209 175. March, 1981. 1-56.

The focus of this report was "the emotional and cognitive significance of art and art education for the development of pupils." (p.4) The author described McFee's (1970) theory of information processing as being the nature of thinking and concept formation with two types of processing, verbal and visual. Sava cited Stromnes (1974) as considering "visual image formation to be of primary importance in processing information and basis for all kinds of thinking." (p. 26) In information processing the term schema is used to describe a frame of reference used to select perceptionss based on past experiences. This concept is used to "explain the nature of the individual's internal representation of his surrounding reality, how he learns, stores, and uses information from the outer world." (p.29) Sava related that verbal and visual schema interact with each other, sometimes simultaneously. Sava pointed out that nonverbal messages are easily misinterpreted and that the information that is being communicated "may remain completely ununderstandable to us unless we are in possession of the schemas that are necessary for its interpretation." (p.33) The significance of developing visual concept formation and information processing skills in students is in communication, understanding, and visual literacy. These skills are developed "by means of perception, evaluation, and activity in visual art education" making it possible to "furnish the pupils with knowledge about visual elements, the function and use of mass media and train them to make vivid and personal observations about their environment: nature, man, his activity and the products of his activity." (p.38)

Arnheim, Rudolf. Visual Thinking. Berkeley: University of California Press, 1969. 13-37. 254-69. 294-6. 301-5.

Arnheim defined cognitive as "all mental operations involved in the receiving, storing, and processing of information: sensory perception, memory, thinking, learning."(p. 13) Arnheim established visual perception as visual thinking and thinking as a process that changes raw percepts into concepts. Concept formation was described as beginning in shape perception which "operates at the high cognitive level of concept formation." (p.29) "Thinking calls for images, and images contain thought. Therefore, the visual arts are a homeground of visual thinking." (p. 254) The author described visual thinking as not just what is seen but the characteristics, personality, and experiences of the viewer, calling for "the unraveling of relations, for the disclosure of elusive structure. Image making serves to make sense of the world." (p.257) Arnheim stated that when it is realized that "productive thinking in any area of cognition is perceptual thinking, the central function of art in general education will become evident." (p.296)

Forgus, Ronald H. Perception, The Basic Process in Cognitive Development. New York: McGraw-Hill Book Co., 1966. 1-15.

Forgus listed the cognitive processes as perception, learning, and thinking, perception defined as "the process of information extraction." (p. 1) The author indicated that perception is a continuing process, running through different experiences, simple and sensory at first, then growing more complex, requiring learning and thinking. The more the perceptual skills are developed, the more information can be gained from the environment. Forgus illustrated the relationship these three processes have as multidirectional with perception preceding some types of learning, learning affecting perception, thinking influencing learning, and perception and learning affecting thinking. The author also described the physical stages in the sequence of perception beginning with energy input, then a process that translates sensory information into messages that the nervous system can process. Next, that information is organized at the sensory level so the brain can respond or select for further modification or reorganization. The output of the system, the perceptual experience or response, is expressed verbally, nonverbally, or behaviorally.

McFee,June King. Preparation For Art. 2nd ed. Belmont, Ca.: Wadsworth Publishing Co., 1970. 189-235. 251-58.

McFee defined cognition as "the process of thinking, becoming aware, solving problems, relating, differentiating, organizing, reflecting, and innovating." (p. 252) Percepts, images in the mind from sensory experiences, and concepts, ideas from experiences, were described as the tools of the cognitive process, expressed through word symbols or iconic symbols (nonverbal visual symbols). McFee related that education tends to stress conceptual learning over perceptual learning, and stated, "when conceptual learning is fostered at the expense of perceptual learning, people's cognitive processes are limited and highly abstract." (p.258) The author listed three qualities in percept development active in cognition, 1) affective quality, feeling, beyond symbolic meaning, 2) symbolic quality, and 3) the structure or organization, based on the handling of the information. She also cited a study done by Olver and Hornsby(1966) showing the effects of extended schooling on middle class boys to be the reliance of older children on function and naming to categorize over perceptual characteristics. A study done in 1954 by Attneave focused on perception as an information-handling process, based on gestalt psychology, using ways to make order out of visual information. McFee concluded,"The primary visual perception abilities are organizational,seeing similarities, differences, proximities, continuities, closures, and figure and ground; and spatial, seeing objects in differing degrees of light, distance, and viewpoint relationship." (p.251)

Eisner, Elliot W. Cognition and Curriculum, A Basis for Deciding What To Teach. New York: Longman, 1982. xii. 27-36. 47-81.

Eisner described the concept of visual literacy as "the power to encode or decode meaning through any of the forms that humans use to represent what they've come to know." (p. xii) The role of the senses and sensory data was indicated as an important part of concept formation contrary to traditional views of perception and feeling as separate from cognition. It was stated, "The formation of concepts depends upon the construction of images derived from the material the senses provide."(p.34) Concepts, Eisner contended, are formed by human experience but can't be shared with others until they are communicated in some form of representation. Eisner identified three modes of representation as mimetic, imitation of the surface features of an object, expressive, imitation of what is seen as well as a deeper structure or character sensed or felt, and the conventional mode, an arbitrary assignment of meaning that is culturally accepted. "Forms of representation are the devices that humans use to make public conceptions that are privately held...this public status might take the form of words, pictures, music, mathematics, dance and the like." (p. 47) Eisner provided suggestions for change in the curriculum through which the development of literacy may be accomplished by the expansion of the scope of schools and the encouragement of the use of different forms of representation in the content of subject areas. The increased use of the mimetic and expressive modes was named as a possible way of expanding interpretation skills beyond those used in the conventional mode in schools. Eisner concluded that "...the arts represent one of the ways through which humans construct and convey meaning and that the creation of art forms require the use of judgement, perceptivity, ingenuity, and purpose--in a word, intelligence." (p. 74)

Eisner, Elliot. "On the Relationship of Conception to Representation." Art Education March 1983: 22-23.

Eisner described the traditional ideas that language, the use of words, and the relationship of words to thinking, has "undermined the place of the arts in education and has relegated arts activities to matters of affect rather than thought." (p.22) The author pointed out that art educators are basically seen as providing opportunities for children to express themselves and not to develop any sort of intellectual abilities. Eisner stated, "As long as the arts are seen as non cognitive, they are destined to remain on the sidelines rather than in the center of educational activity within the school." (p. 23) Eisner began his description of the "cognitive character" of the arts with the sensory abilities or sensory "intelligence" in relation to the environment. These sensory abilities are developed, not automatically by maturation, but by the opportunities given an individual. When opportunities are available, "the amount of new information an individual is able to secure from the world is increased." (p. 23) Eisner stated that the ability to experience qualitites "is a precondition for the formation of concepts. To form a concept is not to name something: it is to have abstracted from a range of qualities a set of features they share." (p.23) The author referred to imagination as a way to form concepts by creating images not found in the world and giving meaning to new concepts by relating to examples from past experience.

Lowenfeld, Viktor and W. Lambert Brittain. Creative and Mental Growth. 7th ed. New York: Macmillan Publishing Co., 1982. 49-54. 97-263.

The authors viewed art "as a basic means of learning" (p.49), and described reading, writing, and arithmetic as tools for learning, which begin as meaningless symbols then are used and found to be useful outside the classroom. Art is also considered "a fundamental catalyst in the thinking process and development of cognitive ability in children." (p. 54) Perceptual growth is defined as the cultivation and growth of the senses and sensitivity, meaning more than "just the awareness of the visual appearance of objects; it includes the use of all the senses, such as kinesthetic or auditory experiences." (p.218) Perceptual awareness must be developed because it is one of the many ways a child gets familiar with her/his environment. The authors stated, "Developing a sensitive perceptual awareness becomes crucial when we realize that it is the interaction between a child and his environment that can establish the amount or kind of learning that takes place." (p. 263)

Silvers, Anita. "Show and Tell: The Arts, Cognition, and Basic Modes of Referrring." The Arts, Cognition, and Basic Skills. Ed. Stanley S. Madeja. St. Louis: CEMREL Inc., 1978. 31-50.

Silvers described the cognitivist and anticognitivist theories concerning learning in art, focusing on cognitive aspects and the idea of exemplification as a way of referring and transferring. The author stated, "Showing is an effective mode of telling. Understanding cognitive devices that function by showing--that is, that refer by exemplification--is a basic cognitive process." (p.37) Silvers concluded that the study of art cannot be separate from other cognition, especially in concept development and that in the cognitive process, "there is a close and integrative connection between concepts and the instances to which they apply." (p.47)

Perkins, David, and Barbara Leondar, eds. "Introduction: A Cognitive Approach to the Arts." The Arts and Cognition Baltimore: The John Hopkins University Press, 1977.1-5.

Cognition was defined as "the act of knowing" (p.2) in this article which outlined three themes in the cognitive approach to the arts. The first theme described by the authors was the idea that all human activity relates to knowledge. For example, perception is seeing what is there as well as responding to past experiences, related or not. Secondly, emotions affect our knowledge of the world and our perceptions which are "our reactions, while indeed dependent on knowledge, also constitute ways of knowing." (p.2) Thirdly, cognition includes "knowing how" as well as "knowing that" as we use conscious and unconscious knowledge to react to and cope with the world. "Knowing how" calls upon "perception as action." (p.3) The authors compared viewpoints traditionally expressed about the arts as emotion vs cognition and as the subjective vs objective but they both contended that "a cognitive approach holds that perception and production, invention and innovation involve crucial know-how and that an artist or audience member... can no more disregard [these] realities than can an engineer or politician." (p. 3)

Olson, David R. "The Arts as Basic Skills: Three Cognitive Functions of Symbols." The Arts, Cognition, and Basic Skills. Ed. Stanley S. Madeja. St. Louis: CEMREL Inc., 1978, 59-81.

The author discussed "intellectual functions of symbols-symbols as exploratory devices and symbol systems as modes of thought."(p. 59) Olson indicated that analysis showed that "'the arts' are no less symbolic than language and mathematics even if they often employ symbols having somewhat different properties from ordinary language." (p.60) Olson contended that scientists and artists apply symbols to experience to explore new ideas just as in children's drawings, new symbols used need prior information for understanding in a new way, to elaborate on previous perceptual knowledge. The author listed three ways in which symbols serve cognition: 1) exploring with knowledge using verbal symbols,2) as modes of thought, and 3) as application of symbols to problems, which can take place in the arts. Olson went on to name two cognitive effects education in the arts will have on the child in expanding cognitive skills. The first described as the development of the awareness of aesthetic qualities in verbal and written expression, on two levels, meaning and structure, and the second,expanding knowledge of the structure of symbols and how they can be manipulated and used to communicate ideas. "Children's encounters with art, and particularly their attempts at art, therefore develop their sensitivity to both levels of structure." (p.78)

Engel, Martin. "An Informal Framework for Cognitive Research in Arts Education." The Arts, Cognition, and Basic Skills. Ed. Stanley S. Madeja. St. Louis: CEMREL Inc., 1978. 23-30.

Engel named the traditional justification of teaching the arts in school as "the enhancement of the quality of life, self-development, facilitation of academic performance in basic skills, recreation, and similar 'affective' reasons" (p. 24) This view of the role of the arts in education, pointed out by the author, does not encompass the cognitive aspects of learning in the arts being researched. Engel stated that the arts "are languages of comprehension, of thinking, of knowing, of receiving, and of expressing information...like other disciplines in the schools, are basically about knowledge." (p.24) The author continued by saying that the schools are responsible for teaching the basics which include the skills of "languaging and logical, symbolic thinking." (p.24) Engel described the arts as symbolic codes, thus "basic skills, no different from the reading comprehension skills that also call for the ability to aggregate, discriminate, conserve, structure, and restructure patterns, relationships, and configurations." (p.27)

Gardner, Howard. The Arts and Human Development. New York: John Wiley and Sons, Inc., 1973. 37-46. 126. 154-58.

Gardner defined cognition as being concerned with the systematic investigation, description, and analysis of the world" (p.45) Three cognitive systems were outlined which included making (acts and actions), perceiving (discriminations and distinctions), and feeling (affects). The perceiving system was described as concerning "the aspects of the environment to which the organism is sensitive." (p. 37) The perceiving system becomes integrated with a symbol system for graphic representation as the child becomes preoccupied in giving a label or meaning to every symbol. Gardner stated, "the principles permitting development of the perceiving system remain the same throughout the organism's life, but are greatly enhanced and newly directed by the child's increasing capacity to handle symbolic systems." (p.158) When ideas or objects are given symbolic significance, Gardner contended, this process is analogous to when an artist, "seizes upon an idea or percept in his environment and then embodies and transforms it in an available symbolic medium." (p. 126)

Eisner, Elliot W. "What We Know About Children's Art--and What We Need To Know." The Arts, Human Development and Education.Berkeley: McCutchan Publishing, 1976. 5-18.

Eisner discussed the study of children's art of the past 100 years by psychologists and educators. In the field of psychology, Alfred Binet used art related tasks to create measures of intelligence, Edward Thorndike tried to measure drawings scientifically, and Sigmund Freud and Herbert Read used drawings for interpretations of feelings and emotions. In psychological measurement,Florence Goodenough's Draw a Man Test, and Dale Harris's Draw a Woman Test, developed a visual scale for scoring drawings. From the educational viewpoint, in the 1920s and 1930s art was used for diagnosis of emotional problems and to bring out the creativity of the child in the otherwise strict classroom environment.

McFee, June King. Preparation For Art. 2nd ed. Belmont, Ca.: Wadsworth Publishing Co., 1970. 74. 117-63. 395-99.

McFee defined perception as "a cognitive process that is not dependent upon words" and conception as "a process of using words to categorize and relate experiences, which may be direct sensory experiences or responses to the language of others. Both...are cognitive processes." (p.74) In the area of cognitve development, the author cited Goodenough's 'Draw-a-Man Test' (1924) as a nonverbal IQ test which measures a child's development "as modified by culture and experience, his memory of past perceptions, and his ability to sort visual information into ideas which are then symbolized in a drawing." (p. 117) Described in a study by Mendelsohn and Griswold (1964) were relationships between individual differences in cognitive perceptual ability with creativity. It was concluded that the students classified as 'high creatives' were more effective in processing and receiving information and that differences in cognition and perception are readiness factors for creative ability.

Silver, Rawley A. Developing Cognitive Skills Through Art. United States Department of Education. Educational Resources Information Center. ED 207 674. 1981. 1-24.

This paper consisted of teaching and testing procedures based on the premise that "cognitive skills can be evident in visual as well as verbal conventions." (p.3) These skills, which have been traditionally identified through language, are shown by the author to also be identifiable through children's drawings. It was stressed that children's thinking is reflected in their drawings and that "children with inadequate language [skills] are deprived of many opportunities to represent their experiences.

Silver described the Silver Test of Cognitive and Creative Skills as using "visual-spatial activities, notably art activities...to develop, reinforce, and assess children's cognitive skills." (p.9) The test was based on three concepts or structures usually developed through language but also able to "be perceived and interpreted visually." (p.10) These were the concept of space, of group, and of sequential order, applying to relationships. Three main subtests of the instrument were 1)drawing from imagination,2)from observation and 3)predictive drawing with a pre- and posttest included to measure progress and program effectiveness. A study by Moses (1980) was cited on the effects of instruction in visual thinking on performance in mathematics. The study found that spatial and reasoning abilities improved and that successful problem solvers used visual thinking in reaching their solutions. Ten studies using the Silver Test were discussed, all of which showed the test to be accurate in its assessments. In the study done by the author and others it was found that the Silver Test compared closely with six traditional tests of intelligence and achievement in the effective measurement of cognitive skills. Cited in a study by Hayes (1978) were significant correlations between the subtest in drawing from the imagination and two reading achievement inventories. Silver concluded that, "...teachers need to be aware that all pupils can benefit from nonverbal activities" and that "children can visualize, imagine, invent, observe, predict, and solve problems through the media of drawing, painting, and modeling." (p.29)

Wolff, Robert Jay. "Visual Intelligence in General Education."Ed.Gyorgy Kepes. Education of Vision. New York: George Braziller,1965. 220-230.

Wolff described the importance of visual education in student learning. The author named the presence of visual perception in human thought as "the coordination of optical and verbal-cerebral activity...the prime, functional basis of learning." (p.221) Visual development was explained as not being highly praised in children unless it can be verbalized and that "sensory intelligence, gathered by the sensibilities, basic visual studies have expanded their perceptual awareness. by the eyes in particular, that education, as it proceeds from one stage to the next, ignores, until finally it is all but lost sight of as a factor in the learning process." (p.221) The author pointed out that many college students find it difficult to go beyond recognizing and identifying skills in learning and suggested that visual education is the answer to extending knowledge. Illustrative examples were given of work by college students who through basic visual studies have expanded their perceptual awareness.

Eriksson, Gillian I. "Developing Creative Thinking Through an Integrated Arts Programme for Talented Children." Educational Resource Center. ED 260 981. August 1984.1-21.

This paper described a highly rated integrative arts program, grades Kindergarten through twelve, at Schmerenbeck Educational Center, Johannesburg, South Africa. The main focus was the development of educational strategies to foster creative thinking, which was established as having four perspectives, "perception, affect, cognition, and behaviour"(p.11). Eriksson portrayed perception as "thinking through the use of sensory images" (p.11) and as an underdeveloped skill because of school curriculum's emphasis on verbal and mathematical thinking. "Perceptual training aims to increase observation, heighten aesthetic sensitivity, open-up sensory awareness, encourage new ways of seeing and re-experiencing the world, increasing imaginative use of visual, aural, tactile,[and] kinesthetic percepts." (p.11) Skill based courses were offered in communication, sound and movement exploration, learning and thinking skills, and in visual perception. Ten week, two hour workshops were also offered in different art disciplines at both the primary and secondary levels which focused on the creative process and used techniques which emphasized competency in expression. Unfortunately, the program was administered to only children described as "talented" as an extra-mural enrichment. Eriksson concluded that research in the area of the development of individual potential was needed in creating new programs.

Arnheim, Rudolf. "Visual Thinking." Education of Vision. Ed. Gyorgy Kepes. New York: George Braziller, 1965. 1-15.

Visual thinking was described as being used in problem solving, the elements of which "are changed, rearranged, and transformed; the emphasis is shifted, new functions are assigned, new connections are discovered. Such operations, undertaken with a view to attaining solutions, constitute what is known as thinking." (p.1) Arnheim stated that perceptual thought processes use as much intelligence as those in intellectual concepts although, traditionally, schooling stresses skills separate from perceptual experiences. Although visual aids may be used in illustrating these skills, Arnheim contended that exposing students to visual materials does not automatically produce visual thinking. "Visual thinking is thinking by means of visual operations." (p.3) The author described fine arts as "the epitome of visual thinking" by its aim at "clarity obtained by significant order." (p. 12)

Arnheim, Rudolf. "A Plea for Visual Thinking." New Essays on the Psychology of Art.Berkeley: University of California Press, 1986. 135-52.

Arnheim stated, "Productive thinking operates by means of the things to which language refers--referents that in themselves are not verbal,but perceptual." (p.138) Thinking was referred to as mostly visual, needing perceptual images to solve problems, and a visual connection between the arts and science was made, similiar to the connection betweenn pictures and words. Arnheim emphasized the relevant role art education will have in establishing a perceptual base of thinking. "Artwork, intelligently pursued, lets the student take conscious possession of the various aspects of perceptual experience." (p. 147)

Hurwitz, Al , and Stanley S. Madeja. The Joyous Vision. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1977. 7-11.

Madeja defined four levels of perceptual learning as observation, description of visual relationships, selectivity, and generalization of form, based on the work of Arnheim. Madeja stated that skills of observation can be taught just as skills involved in reading can be taught."The student can be trained through art, as in the science lab, to develop a capacity for receiving and judging a variety of visual phenomena." (p.8) Description of visual relationships, focuses on the establishment of relationships between the whole of the visual field and parts within it, as a cognitive function. The authors stated "that if children were able to recognize and describe either visually or orally relationships between such art elements as line, shape, color, and texture, their chances of later being able to generalize and discuss formal relationships would be enhanced." (p. 8) Selectivity, Madeja's third level, was discussed in terms of direct perception, a necessary part of conceptual thinking. When children are give. isual stimuli they must select, sort out, and make judgements about meaning and context. Madeja stated, "The problem of selectivity involves the cognitive function of recognition and the ordering and simplification of visual phenomena...how much to include, how much to exclude is the crucial aspect of problem solving." (p.9) Generalization of form was defined as "the ability to synthesize visual principles...the ability to take apparently unrelated visual phenomena and bring them into a generalizable whole." (p. 9) This kind of perception was distinguished from the other three levels by the ability to explain and generalize about features found in the composition of a painting, for example.

Wilson, Brent G. "An Experimental Study Designed to Alter Fifth and Sixth Grade Students' Perceptions of Paintings." Studies in Art Education 8 (1966): 33-42.

Wilson called perceptual training a major goal of art education but questioned if this goal has been successfully reached. The purpose of this study was to find ways to help art educators reach this goal. Perception was defined as "the process by which an individual transforms sensed qualities into the world" and then uses "a mode of perceiving which depends primarily on what his past experiences, values, assumptions, and purposes prepare him to see." (p. 34) The study was done with control and experimental groups of fifth and sixth graders from Utah with similar socioeconomic backgrounds. The Wilson Aspective Perception Test was the pre and posttest, the control group receiving regular art instruction emphasizing producing art products while the experimental group were given lessons using new language and comparison techniques in looking at famous art, as well as in making art products. The test results showed that it was possible to change the perceptual mode the children used in looking at art, emphasizing the aspective over the literal, after instruction.

Salome, R.A. "The Effects of Perceptual Training Upon the Two-Dimensional Drawings of Children." Studies in Art Education (Fall 1965):18-33.

Salome identified art education as including perceptual growth as a goal but lacking specific learning to reach this goal. Investigations into the "contributions of art education to the development of visual perception result from psychological studies indicating that visual perception may be improved through systematic teaching of selected perceptual skills." (p.18) The author indicated that societal and cultural experiences may provide an informal perceptual training which can limit the way a child represents visual information. This study involved two fourth and fifth grade public school classes from California, with minimal socioeconomic differences. There were experimental and control groups, the experimental given exercises with visual instruction and demonstration, the control group given regular instruction in drawing. All subjects drew three objects for the test,before and after instruction, as means for comparison, with a rating scale based on individual criterion, communicative symbol, closure-clarity, and proportion. "As a result of this experiment, it appears that relevant perceptual training may increase the elementary child's ability to render representational drawings," (p.32) shown by a higher level of performance in a comparison of mean scores. Salome stated that it "appears that improved visual perception may not be a naturally occurring by-product of art activities, but a specific objective for which one must teach." (p.33)

Jensen, Arthur. "Social Class and Perceptual Learning." Mental Hygiene (1966):226-239.

Jensen focused on the effect of the environment in perceptual learning. The author stated, "This perceptual learning is an important foundation for later, more advanced forms of learning." (p. 226) Perception was defined as, "the process by which a person gets information from his surroundings [and] develops through both maturation and learning ." (p.233) Jensen hypothesized that children from different social backgrounds have different perceptual abilities and that this difference is of great importance in school "readiness". The author described a study done by Covington (1962) of kindergarten children who were classified as "upper-status" or "lower-status" depending upon their parent's educational background. The data showed upper-status and lower-status group scores as significantly different on a pre-test in perceptual discrimination ability. After repeated exposure to standard forms, the lower-status group's gain on the posttest was greater than the upper-status group's. "The lower-status children...did show a marked benefit from the additional perceptual experience provided by the treatment." (p.237) Jensen concluded that some children are more perceptually literate before they go to school and recommended that further study be done to help children overcome these perceptual deficiencies.

Greh, Deborah. "Art Education in the Third Wave." Art Education March 1984: 40-41.

The author reported that educators are unaware that "we are in a visual information society emphasizing visual communication and visual images."(p. 40) The majority of the information received by students is from visual sources, affecting their attitudes and opinions. Greh called attention to the development of the camera, the influence of television and the impact of the computer as sources for this reliance on the visual image. Greh cited Arnheim (1969) who believes that thinking is perceptual and that art as well as other subjects need to put more emphasis on visual training. The author stated, "The verbal literacy encouraged by back to basics advocates is being replaced by a larger visual literacy," with a need to "redefine current educational strategies and develop skills that will enable students to understand, judge, and create visual information with intelligence, and understand the manipulation and influence of visual media and technological gadgetry of the present society." (p. 40) Greh described the role of art education in the development of visual literacy as crucial in this process because it "deals with visual literacy by emphasizing the use of visual language and elements, developing visual perception and thinking, and using visual images in personal expression." (p. 41)

Preusser, Robert. "Visual Education for Science and Engineering Students." Education of Vision. Ed. Gyorgy Kepes. New York: George Braziller, 1965. 208-219.

Preusser emphasized the education of vision as an important means through which students can deal with the expansion of knowledge and its application because "perception and formation of visual order can prototype response to, and structure of, order on all levels." (p.208) While studies in the basic skills become more complex as students progress in school, it was pointed out that visual education follows no logical sequence of development, even though visual as well as mental aspects in learning continue. The author compared science and art, stressing that the "discipline of visual invention, organization, and expression focused upon subjective-qualitative values, serves as a counterbalance to inductive-quantitative learning on which scientific education is based..." (p.209) Preusser included examples of student work from a visual design course at M.I.T. and explained that students with a scientific background found a challenge in understanding the creative process in producing their own visual images. It was concluded that visual training for students of the sciences, beyond a vocational approach to art, develops high inner standards and develops "the power of visualization (which is as basic to human performance as verbalization)" while enhancing "the collaboration of intuition and intellect." (p.219)

Metzger, Wolfgang. "The Influence of Aesthetic Examples." Education of Vision. Gyorgy Kepes, Ed. New York: George Braziller, 1965. 16-26.

This paper explored the question of how artistic taste is developed in children. The study explored how children's norms of taste were affected by the art they found in their environment. A drawing experiement was done in Germany with seventy-five kindergarten children from middle-class backgrounds, divided into five groups. Four groups were shown different illustrations of three subjects: a basket, tree, and man. Group 1 was exposed to reproductions from an Egyptian tomb of the eighteenth dynasty, Group 2 to drawings by a modern graphic artist, Group 3 to drawings from a coloring book, Group 4 to drawings from older children, and Group 5,as a control group, were not exposed to any drawings. All wall decorations were removed from the classroom for the four weeks except for the examples for each group. The experiment had three phases in which the children drew the three subjects before, during, and after the four weeks of influence. A rating scale was used to evaluate the drawings which was based on the counting of individual features in the graphic development. It was found that Group 1 improved in their drawings most then groups 2, 3, and 4. Group 3, exposed to the coloring book examples, reacted negatively, making fun of the simplicity of the drawings. Group 4, exposed to the drawings of older children, also reacted in a negative manner, rejecting the examples even though they were drawn at a higher developmental level than their own drawings. It was concluded that children have a basic feeling for visual artistic merit and that their drawing ability can be affected in both positive and negative ways by the art examples to which they are exposed. The need for further investigation was emphasized but the author stressed that media influences in style and appreciation are definite forces that can be controlled.

Arnheim, Rudolf. "The Perceptual Challenge in Art Education." New Essays on the Psychology of Art. Berkeley: University of California Press, 1986. 231-39.

Arnheim defined 'perceptual challenge' as "where an outside situation confronts people in such a way as to mobilize their capacities to grasp, to interpret, to unravel, to improve." (p. 238) The author discussed the overwhelming amount of sensory stimulation children receive in society today and their lack of skills for dealing with this. Arnheim stated, "The blunting of their perceptual and cognitive responses may be a defense against incomprehensible, frightening, overwhelming sensations." (p.238) A need was outlined for developing children's awareness of the importance of visual things in their lives and that there is a big correlation between "what there is to see and what there is to know." (p.239) To bring about this awareness Arnheim suggested, "the perceptual challenge of artwork well conceived and well understood is a natural introduction to the tasks of life and to the best ways of going about them." (p.239)

Kepes, Gyorgy, ed. Education of Vision. New York: George Braziller, 1965. i-vii.

Kepes spoke of vision as "our creative response to the world" and as "basic, regardless of the area of our involvement with the world." (p.i) The author explained that we draw our visual experiences from our sensory connections with our environment and that the "unity of firsthand sensation and intellectual concept make artistic vision different from scientific cognition or simple sense-feeling response to situations. It combines both." (p.iii) Kepes emphasized the importance of developing "visual sensibility" in a world which is "formless" due to "environmental chaos...social chaos...[and] inner chaos..." (p. ii) by building "bridges between man and nature...between man and man...[and] building bridges inside ourselves." (p.ii)

Feldman, Edmund Burke. "Art, Education, and the Consumption of Images." The Arts, Human Development, and Education. Ed. Elliot W. Eisner.Berkeley: McCutchan Publishing, 1976. 137-48.

This article focused on the power of visual images in society, the use of these images referred to as 'image consumption'. Feldman urged the development of visual literacy and felt that as educators " we are obliged to cultivate the tools that will enable intelligence to be free and to cope with the new problems of information and education posed by our civilization." (p. 148) Four areas were outlined through which art educators are involved. The first area is concerned with the redefinition of the teaching of art in school as "the critical study of visual images". (p.144) The second area related that the traditional means of teaching art has not kept up with image consumption, culture and media taking over as the "teachers" by creating those images. The third area was the strategic position of art educators as the print oriented schools deal with increasingly image oriented students. Art educators were described as well suited "to develop popular skills in analyzing and evaluating images that might function as a countervailing force." (p.146) In the last area the function of the image was stressed "as a cognitive vehicle and as a hypothetical model for behavior." (p.147) Feldman called for a change in the art curriculum to "encourage artistic performance as a fact-gathering , image-organizing, and material-forming activity," organizing "art teaching practices so that they entail the use of verbal and written expression as well as the selection and shaping of visual materials." (p. 147)

Boger, Jack H. "An Experimental Study of the Effects of Perceptual Training on Group I.Q. Scores of Elementary Pupils in Rural Ungraded Schools." Journal of Educational Research 46 (1952): 43-52.

Boger investigated group I.Q. test scores of rural school children before and after exposure to "stimulating visual materials involving reasoning ability of a perceptual nature." (p.43) Children in rural Virginia elementary schools were selected as an experimental group,who were exposed to visual perceptual materials, and as a control group, who continued with their regular school program. There were two of each group, grades one through four, one consisting of white children and one of black children. (It should be noted that this study was done in 1952 in the rural South.) The Otis Quick-Scoring Mental Ability Test and the California Test of Mental Maturity, were given before and after the study and five months after completion of the study to measure how the skills were maintained. The materials used by the experimental groups consisted of "scrambled comic strips, hidden picture puzzles, motor coordination exercises, designs for copying,...pictorial and geometric likenesses and difference discriminations, directional drawings,...incomplete picture puzzles, design progression problems, and scaled pictures for reproduction by the pupil." (p. 44) Boger stated that the purpose of the exercises was to give practice in "(1) following directions;(2) noting details;(3) perceiving spatial relationsips;(4) detecting likenesses and differences in pictorial and geometric patterns;and (5)developing increased coordination of hand and eye movements." (p.45) Significant increases were reported in the experimental group's I.Q. and non-verbal scores, the black group, in addition, also increased their verbal scores. The checktest given five months later found that the skills learned by the experimen-tal group were maintained. "The study suggested that training in visual perception may enable rural pupils to react more effectively in situations requiring perceptual discriminations. Pupil achievement in such subject matter fields as reading, spelling, and arithmetic is affected by the ability to discriminate amoung symbols." (p. 52) d

Ritson, John E. and James A. Smith. Creative Teaching of Art in the Elementary School. Boston: Allyn and Bacon Inc., 1975. 40. 166-7. 207-18.

The authors focused on perception as the experiences that shape us and "the way in which we gather knowledge through the refined use of all our sensory abilities." (p. 207) "Perception does not always mean helping children to see more clearly or to represent objects more truly. It may mean developing in children a reaction to life so that the feelings, smells, tastes, sensations, and sounds are absorbed and classified and normal relationships are used to evoke new patterns in forced relationships." (p.166-7) Ritson and Smith considered the intellect as part of the senses, intuition and emotions. The authors described ways to teach perception through linear movement, for example in games, and use of maps. Perception can be taught through analogy in "the ability to perceive common relationships between dissimilar things and situations" (p.213) and also through exploring space with large motor activities, dramatizing stories, constructing mobiles and through perspective, a perception of depth and distance, with ways to create these visually.

Talbot, Walter D. et al. A Course of Study for Art is Elementary (Teaching Visual Thinking Through Art Concepts) K-6. Utah State Board of Education. State Division of Curriculum and Instruction. Educational Resources Information Center. ED 210 236. November 1977. 1-59.

First in a series of two studies designed for Utah elementary teachers, this study outlined objectives for teaching visual thinking through art concepts. Maturity level goals, as open-ended continuums, were the basis for the organization of the study and were listed in eight levels as intellectual, ethnic-moral-spiritual, emotional, social, physical, environmental, aesthetic, and productive maturity. All the instructional objectives were from the preschool to the seventh grade level and a number code was developed to show objective application to other curriculum areas. Diagnostic charts, based on present perception level of student drawings of familiar objects, are included to place children at the correct level in the program. The purpose of the study was stated as stemming from the belief of the authors that perceptual development of learners is being overlooked in education today and that " art concepts can now be identified and taught in a systematic method that will give students a highly developed skill in visual perception and [that] skill will enhance their potential to provide the world with creative, innovative thinking in all fields of study." (p.14) The study was based on a concept approach, categorized as "awareness" and "skill" concepts, each lesson focusing "on seeing and thinking processes." (p.20) Included in the appendix was a chart illustrating connections between art concepts and reading skills and a sample student progress form.

Cornia, Ivan E. Charles B. Stubbs. Nathan B. Winters Art Is Elementary, Teaching Visual Thinking Through Art Concepts. Layton, Utah: Gibbs M. Smith. 1983. 1-458.

This publication was the second in a series designed for Utah elementary teachers to help students develop visual thinking skills. Visual perception was defined as, "the ability to use imagery; to perceive objects in space; to use and to comprehend graphic language...to see visual order; to recognize beauty, symbols, excellence, and expression." (p.1) The guide was presented in a looseleaf notebook containing 206 basic concepts arranged in developmental order from preschool to seventh grade. Diagnostic charts gave teachers information for placement of children into the program. Lessons and activities were given to suggest a variety of ways to achieve the objectives. A glossary of fine art terms used in the program was included as well as a pronunciation guide for artists' names and terms. The strength of this program seemed to be in the ease of application for any teacher in implementing the program due to its clear and practical guidelines. Art teachers would benefit from the structured sequence in the developmental stages outlined which are usually unavailable in art programs. The authors encouraged art teachers using the program to "plug in" their own projects wherever applicable in the sequence.

Feldman, Edmund B. "Art is For Reading: Pictures Make a Difference." Teachers College Record. 82.4 (1981): 649-60.

Feldman focused on visual images and their importance in learning to read. He explained that "youngsters understand visual images better than they understand printed letters, words, and sentences." (p.652) The author commented on the simple nature of some visual material used in children's texts and argued that it is assumed that children cannot understand more complex pictures because "the visual,aesthetic, and intellectual capacities of children are usually assessed on the basis of their ability to read and write words." (p.657) Children, Feldman believed, are relying on television in seeking out more complex imagery and experience, over reading. Feldman stated that "practice and skill in looking at pictures and endeavoring to make sense out of what we see in them involves more than optical power or good eyesight:it is a creatively and intellectually demanding activity." (p.657) Feldman concluded that a visual-verbal approach is important to instruction in any area and that educators must learn to effectively use the visual resources available.

SUMMARY

The process of perception was explained as stemming from a visual system, discussed by Stroh as combining with other sensory systems in the registering of information from the senses. Neisser related that most theories of perception begin with vision and the physical perceptual system of the body established by Gibson as the "lens-retina-nerve-muscle" (Gibson 1982:262). Arnheim stated that "vision deals with the raw material of experience by creating a corresponding pattern of general forms" (Arnheim 1974:46) which can be applied to many situations. The process of perception was described as combining "direct information, additional information obtained from memory concerning previous sensations, and information about what the person expected to see" making perception "both a process and the final product of that process" (Ault 1977:99). Stroh outlined work done by German psychologists in the 1930's concerning human responses to visual stimuli. They believed that the brain grouped things in perceptual units called closures or "gestalts." Arnheim and Stroh agreed that the theories in gestalt psycology had a definite influence on contemporary thought in the area of visual perception with the belief that "human beings aren't merely a collection of passive receptors, but rather that we impose structure on what we see" (Stroh 1983:5). Gibson stated that "perception is the having and achieving of knowledge about the world and visual perception

is the most exact kind of perception" (Gibson 1982:262).

As an information acquiring and handling process, visual perception was discussed as "where cognition and reality meet" (Neisser 1976:9). "This process of information acquisition through a sensory system in touch with a qualitative environment is thoroughly cognitive in character" (Eisner 1983:25). Arnheim and Neisser disagreed with Gibson's theory of perception in cognition because of its focus in only the gathering of sensory information from the environment, neglecting the perceiver's contribution to the process. "Perceiving implies a step beyond sensing: it requires the existence of some cognitive activity concerning the data through which a response will be formulated"(Madeja 1978:13). McFee described a study done by Mendelsohn and Griswold (1964) in which relationships between individual differences cognitive perceptual ability were compared with creativity. It was found that the students in the study classified as 'high creatives' were more effective in processing and receiving information and that cognition and perception were readiness factors for creative ability. Sava related McFee's (1970) theory of information processing as being the nature of thinking and concept formation with two types of processing that interact with each other, verbal and visual. Sava used the term 'schema' to describe a frame of reference in the selection of perceptual responses, "the individual's

representation of [her/his] surrounding reality, how [he/she] learns,stores, and uses information from the outer world" (Sava 1981:29).

Cognition was defined as including "all mental operations involved in the receiving, storing, and procesing of information" (Arnheim 1969:13). Perception, learning, and thinking were listed by Forgus as the three cognitive processes whose relationship is multidirectional in their effect on one another.

Tools of the cognitive process were related by McFee as percepts and concepts, expressed through word symbols or iconic symbols. McFee described percepts as images in the mind from sensory experiences while concepts represent the ideas from those experiences. Three qualities in the development of percepts active in cognition were indicated by McFee as being affective, symbolic and structural in the handling of information. Arnheim established visual perception as visual thinking and thinking as a process that changes raw percepts into concepts, beginning in shape perception which "operates at the high cognitive level of concept formation" (Arnheim 1969:29). Perception was indicated as playing a central role in the formation of concepts "because concepts permit the efficient handling of enormous amounts of information" (Ault 1977:156), verbal and nonverbal. Sensory data collected from the environment was viewed by Eisner as important to concept formation, contrary to traditional views of perception and the affective as

separate from cognition. "The formation of concepts depend upon the construction of images derived from the material the senses provide" (Eisner 1982:34). Eisner stated that the ability to experience and perceive qualities is an essential prerequisite to the formation of concepts. "To form a concept is not to name something: it is to have abstracted from a range of qualities a set of features they share" (Eisner 1983:23). It was contended by Eisner that concepts are formed by human experience but are not communicated to others unless they are expressed in some form of representation. "Forms of representation are the sensory vehicles through which conceptions are given public status" (Eisner 1983:24). These forms were presented as having multisensory qualities within themselves and can include the visual arts as well as mathematics, writing, speech, and the performing arts. Eisner identified three modes of representation as the mimetic, expressive, and conventional modes. Arnheim described expression as "an integral part of the elementary perceptual process...which [results] in the organization of perceptual stimuli" (Arnheim 1969:275). Perception determines how a person will react to information from their environment, that reaction being expression.

The role of art in cognition was considered "a fundamental catalyst in the thinking process and development of cognitive ability in children" (Lowenfeld and Brittain 1982:54). Madeja described the cognitivist versus the noncognitivist view of art within art education as the belief that learning

in art is a part of a larger 'whole' of cognition but with unique qualities in that larger domain of knowledge, while the noncognitivist view contends that art stands alone, having its own structure and cognitive system, unique in itself. Silvers concluded that the study of art cannot be separate from other cognition, especially in concept development. In the cognitive process "there is a close and integrative connection between concepts and the instances to which they apply" (Silvers 1978:47). Art viewed through "a cognitive approach holds that perception and production, invention and innovation involve crucial know-how" and "knowing how" calls upon "perception as action" (Perkins and Leondar 1977:3). Olson named two cognitive effects learning in art will have on the child in expanding cognitive skills: the development of awareness of aesthetic qualities in verbal and written expression on two levels, meaning and structure, and the expansion of knowledge of the structure of symbols, their use and manipulation to communicate ideas. "Children's encounters with art, and particularly their attempts at art, therefore develop their sensitivity to both levels of structure" (Olson 1978:78). Engel described the arts as symbolic codes, thus "basic skills, no different from the reading comprehension skills that also call for the ability to aggregate, discriminate, conserve, structure and restructure patterns, relationships, and configurations" (Engel 1978:27). Olson outlined three means through which symbols serve cognition: exploring with knowledge using verbal systems, as

modes of thought, and in application of symbols to problems, which can take place in the visual arts. It was indicated that the arts "are no less symbolic than language and mathematics even if they often employ symbols having somewhat different properties from ordinary language" (Olson 1978:60). Perception becomes integrated, contended Gardner, with a symbol system for graphic representation as the child becomes preoccupied in giving a label or meaning to symbols. When ideas or objects are given symbolic significance, this process is comparable to when an artist "seizes upon an idea or percept in [her/ his] environment and then embodies and transforms it in an available symbolic medium" (Gardner 1973:126).

Eisner discussed the use of children's art by psychologists and educators to evaluate cognitive development and measure intelligence. The Draw A Man Test and the Draw A Woman Test were developed as nonverbal IQ tests designed to measure a child's cognitive development "as modified by culture and experience, [his/her] memory of past perceptions, and [her/his] ability to sort visual information into ideas nnich are symbolized in a drawing" (McFee 1970:117). The Silver Test of Cognitive and Creative Skills was created by Silver using "visual-spatial activities, notably art activities...to develop, reinforce, and assess children's cognitive skills" (Silver 1981:9). Silver contended that "cognitive skills can be evident in visual as well as verbal conventions" (Silver 1981:3) and that these skills traditionally

identified through language can also be identified through children's drawings.

Wolff named the presence of visual perception in human thought as "the coordination of optical and verbal-cerebral activity...the prime, functional basis of learning" (Wolff 1965:221). Forgus described visual perception as a continuing process, running through different experiences, simple and sensory at first, then growing more complex, requiring learning and thinking. Arnheim, Eriksson, and Wolff agreed that visual development is not considered to be highly praised in children unless it can be verbalized and that visual perception is an underdeveloped skill because of school curriculum emphasis on verbal and mathematical thinking. McFee cited a study done by Olver and Hornsby (1966) which showed the effect of extended schooling on middle class boys as the reliance of older children on function and naming strategies over perceptual characteristics in categorizing new visual information. While studies in the basic skills become more complex as students progress in school, Preusser pointed out that visual education follows no logical sequence of development, even though visual as well as mental aspects in learning continue.

Eisner indicated that the arts play an important role in developing sensory intelligence which is not automatically developed by maturation, but by opportunities given to an individual. When opportunities are available "the amount of new information an individual is able to secure from the

world is increased" (Eisner 1983:23). Exposure to the arts through instruction and participation, Madeja established, helps to link discrimination and refinement of sensory data with understanding. Three stages in the transfer of knowledge in and through the arts were listed by Madeja as recognizing the perception of a fact or event, the performance of the activity, (drawing, building, telling), and making the knowledge clear in symbolic form, (constructing, analyzing, defining). Perkins and Leondar concurred with Madeja in a cognitive approach to the arts, expressed in three themes, stressing that all human activity relates to knowledge.

"Image making serves to make sense of the world...the unraveling of relations, for the disclosure of elusive structure" (Arnheim 1969:257). Arnheim focused on art's role in developing visual thinking in perception, describing the fine arts as "the epitome of visual thinking" by its aim at "clarity obtained by significant order" (Arnheim 1965:12). Although visual aids are used in illustrating skills in the classroom, Arnheim contended that exposing students to visual materials does not automatically produce visual thinking. Arnheim also referred to thinking as mostly visual, needing perceptual images to solve problems with a visual connection being made between the arts and science, similar to the connection between pictures and words.

Hurwitz and Madeja provided four levels of perceptual learning as observation, description of visual relationships, selectivity, and generalization of form. It was stated that

observation, a major skill of visual sensitivity, can be taught just as the skills involved in reading can be taught. "The student can be trained through art as in the science lab, to develop a capacity for receiving and judging a variety of visual phenomena" (Hurwitz and Madeja 1977:8). In the level of selectivity, in terms of perception, visual stimuli given children must be selected, sorted out, and then judgements must be made about meaning and context. The purpose of Wilson's study (1966) was to find ways to help art educators realize the goal of perceptual training in art education. Wilson described perception as "the process by which an individual transforms sensed qualities into the world" and then uses "a mode of perceiving which depends primarily on [her/his] past experiences, values, assumptions, and purposes prepare [him/her] to see" (Wilson 1966:34). Through the study it was concluded that it was possible to change by instruction the perceptual mode children use in looking at art, emphasizing the aspective over the literal. It was stated "that if children were able to recognize and describe either visually or orally relationships between such art elements as line, shape, color, and texture, their chances of later being able to generalize and discuss formal relationships would be enhanced" (Hurwitz and Madeja 1977:8).

Societal and cultural experiences, as indicated by Salome, may provide an informal perceptual training which can limit the way a child represents visual information. "Visual perception may be improved through systematic teaching of

selected perceptual skills" (Salome 1965:18). Also focusing on the effect of the environment in perceptual learning was Jensen who named perceptual learning as "an important foundation for later, more advanced forms of learning"(Jensen 1966: 226). Jensen cited a study done by Covington (1962) in which kindergarten children from different social backgrounds,some of whom had parents with less formal education than others, were found to increase their perceptual discrimination abilities markedly after exposure to standard visual forms. Jensen concluded that children from different social backgrounds have different perceptual abilities and that this difference is of great importance in school readiness.

"The verbal literacy encouraged by back to basics advocates is being replaced by a larger visual literacy" with a need to "redefine current educational strategies that will enable students to understand, judge, and create visual information with intelligence, and understand the manipulation and influence of visual media and technological gadgetry of the present society" (Greh 1984:40). Education of vision was emphasized by Preusser as an important means through which students can deal with the expansion of knowledge and its application because "perception and formation of visual order can prototype response to, and structure of, order on all levels" (Preusser 1965:208). Wolff agreed and suggested that along with perceptual awareness, visual education is the answer to extending knowledge. The significance of developing visual concept

formation and information processing skills in students is in communication, understanding, and visual literacy. These skills are developed "by means of perception, evaluation, and activity in visual art education" making it possible to "furnish the pupils with knowledge about visual elements, the function and use of mass media and train them to make vivid and personal observations about their environment" (Sava 1981:38). Lowenfeld, Brittain,and Jensen concurred that perceptual awareness must be developed because it is one of many ways a child gets familiar with her/his environment. In a study done with kindergarten children in Germany Metzger exlored the idea of artistic taste and questioned how it is developed in children. Five groups of children were exposed to one variety of illustrations of different styles and artistic complexity. Metzger concluded that children have a basic feeling for artistic merit and that their drawing ability can be affected in both positive and negative ways by the art examples to which they are introduced. Metzger expressed the need for further investigation but also stressed that media influences in style and appreciation are definite forces that can be controlled. The overwhelming amount of sensory stimulation children receive in society was discussed by Arnheim, focusing on their lack of skills for dealing with it. A need was outlined for developing children's awareness of the importance of visual things in their lives and that there is a big correlation between "what there is to see and what there is to know" (Arnheim 1986:239). Greh reported

that educators are unaware that "we are in a visual information society emphasizing visual communication and visual images" (Greh 1984:40), the majority of information received by students coming from visual sources, affecting their attitudes and opinions. Kepes explained that we draw our visual experiences from our sensory connections with our environment while Feldman urged the development of visual literacy and felt that as educators "we are obliged to cultivate those tools that will enable intelligence to be free and to cope with the new problems of information and education posed by our civilization" (Feldman 1976:148). Eisner stated that "the arts represent one of the ways through which humans construct and convey meaning and that the creation of art forms require the use of judgement, perceptivity, ingenuity, and purpose--in a word, intelligence" (Eisner 1982:74).

Madeja stated that visual literacy "has a wider meaning than its usual application of reading, writing, and computation, and the arts may provide that broader context" (Madeja 1978:17). Greh and Arnheim agreed that thinking is perceptual and that art as well as other subjects need to put more emphasis on visual training. Arnheim suggested that "the perceptual challenge of artwork well conceived and well understood is a natural introduction to the tasks of life and to the best ways of going about them" (Arnheim 1986:239). The role of art education in the development of visual literacy was described by Greh as crucial because it "deals with visual literacy by emphasizing the use of visual language and

elements, developing visual perception and thinking, and using visual images in personal expression" (Greh 1984:41). Silver stated that "teachers need to be aware that all pupils can benefit from nonverbal activities" and that "children can visualize, imagine, invent, observe, predict, and solve problems through the media of drawing, painting, and modeling" (Silver 1981:29). Engel related that the schools are responsible for teaching the basics which include the skills of "languaging and logical, symbolic thinking" (Engel 1978: 24). Feldman proposed four areas through which art educators can develop visual literacy: 1) by redefining the teaching of art as "the critical study of images" (Feldman 1976:144), 2) by keeping current with the image consumption of students and images created by the media and popular culture, 3) by realizing art's strategic position in schools that are print oriented dealing with students who are increasing image oriented and 4) by viewing the function of images as that of a "cognitive vehicle and as a hypothetical model for behavior" (Feldman 1976:147). "Perceptual training aims to increase observation, heighten aesthetic sensivity, open-up sensory awareness, encourage new ways of seeing and re-experiencing the world" (Eriksson 1984:11). Investigations into the "contributions of art education to the development of visual perception result from psychological studies indicating that visual perception may be improved through systematic teaching of selected perceptual skills" (Salome 1965:18). A study was done by Salome which involved

fourth and fifth grade pupils, one group at each grade level given exercises in drawing with more specific visual instruction and demonstration while the control group received their regular art instruction. The extra instruction given increased the experimental group's drawing ability shown by a higher performance in a comparison of the mean scores on posttests of drawings given ratings based on individual criterion. Salome indicated that it "appears that improved visual perception may not be a naturally occuring by-product of art activities, but a specific objective for which one must teach" (Salome 1965: 33) and that perceptual training, while a generally accepted goal in art education, seems to lack sppecific learning experiences in reaching this goal. Feldman called for a change in the art curriculum to "encourage artistic performance as a fact-gathering, image-organizing, and material-forming activity" organizing "art teaching practices so that they entail the use of verbal and written expression as well as the selection and shaping of visual materials" (Feldman 1976:47). Boger's study investigated group IQ test scores of rural children before and after exposure to "stimulating visual materials involving reasoning ability of a perceptual nature" (Boger 1952:43). Significant increases were reported in the experimental group's IQ and nonverbal scores as well as new skills learned in the study being maintained. Boger concluded that training in visual perception helped rural students with perceptual discrimination tasks and stated that

student achievement in "reading, spelling, and arithmetic is affected by the ability to discriminate among symbols" (Boger 1952: 52).

Ritson and Smith described ways to teach perceptual skills through linear movement in games and through the use of maps. Perception can be taught through analogy in "the ability to perceive common relationships between dissimilar things and situations" (Ritson and Smith 1975:213). Perceptual skills may also be taught, as indicated by Ritson and Smith, through exploring space with large motor activities, dramatizing stories, constructing mobiles, and through perspective, a kind of perception using visual images to create depth and distance. Talbot outlined objectives for teaching visual thinking and perception through art concepts. Eight maturity level goals were the organizational basis of the study. The study was based on a concept approach categorized as "awareness" and "skill" concepts, each lesson focusing on "seeing and thinking processes" (Talbot et al 1977:20). The purpose of the study was based on the belief that perceptual development of learners is being overlooked in education and that "art concepts can now be identified and taught in a systematic method that will give students a highly developed skill in visual perception and [that] skill will enhance their potential to provide the world with creative, innovative thinking in all fields of study" (Talbot et al 1977:14). In the second part of the study, Cornia, Stubbs, and Winters organized 206 basic concepts identified in the Talbot study

and arranged them in developmental order from preschool to seventh grade for practical application by art or classroom teachers.

Engel stated that the arts "are languages of comprehension, of thinking, of knowing, of receiving, and of expressing information...like other disciplines in the schools, are basically about knowledge" (Engel 1978:24). Suggestions were provided by Eisner for change in the curriculum through which the development of visual literacy may be accomplished by the expansion of the scope of schools and the encouragement of the use of different forms of representaion in the content of the subject areas. The increased use of the mimetic and expressive modes of representation was suggested as a way to expand interpretation skills beyond those used in the conventional mode in schools. Silver cited a study done by Moses (1980) on the effects of instruction in visual thinking on performance in mathematics. The study found that spatial and reasoning abilities improved with instruction and that successful problem solvers used visual thinking in reaching their solutions. Greh established that perception is important in problem solving because solutions depend on the available information the child has gained through attention and prior experience. The selective attention, ability to block out distractions, attention span, and the ability to shift and redirect attention to different aspects of a task, contribute to this information. Prior experience, collected with time, a wider range of experience, and abilities to

identify and predict from partial information also contribute in problem solving. Arnheim described visual thinking used in problem solving as the elements which are "changed, rearranged. and transformed; the emphasis is shifted, new functions are assigned, new connections are discovered. Such operations, undertaken with a view to attaining solutions, constitute what is known as thinking" (Arnheim 1965:1). Feldman emphasized the importance of visual images and their importance in learning to read, "youngsters understand visual images better than they understand printed letters, words, and sentences" (Feldman 1981:652). Feldman also commented on the simple nature of some visual material used in children's texts and argued that it is assumed that more complex pictures can't be understood by children because "the visual aesthetic, and intellectual capacities of children are usually assessed on the basis of their ability to read and write words" (Feldman 1981:657). Children, Feldman indicated, are relying on television in seeking out more complex imagery and experience, over reading. Reading achievement inventories and the Silver Test were found to have significant positive correlations on a subtest that used drawings from imagination, found in a study by Hayes (1978) cited by Silver. Feldman stated that "practice and skill in looking at pictures and endeavoring to make sense out of what we see in them involves more than optical power or good eyesight: it is a creatively and intellectually demanding activity" (Feldman 1981:657).

CONCLUSION AND RECOMMENDATIONS

Visual literacy "has a wider meaning than its usual application of reading, writing, and computation, and the arts may provide that broader context" (Madeja 1978:17). Art, through the use of language in describing visual elements in images, through the development of visual perception and thinking, and through personal expression by visual images, plays a significant role in the development of visual literacy (Greh 1984). It is generally agreed that art is important in education but this research shows that it is not just to give children opportunities for creative visual expression that art must be included in the curriculum, but because art education can help develop visual perceptual abilities which can be applied to all areas of learning. Skills in visual perception developed through the study of art will help integrate subject areas, simulating the real world, society and environment, in the learning environment of the school.

Visual perception is a continuing process (Forgus 1966) but is an underdeveloped skill in school curriculums because of the expanding emphasis on verbal and mathematical thinking (Eriksson 1984). The role of visual perception in cognition is the basis of visual literacy in its sorting and selecting processes, making visual order and structure out of sensory information, changing percepts into concepts. The development of perceptual skills in art cannot be separate from

other cognition, especially in concept development (Silvers 1978).

Children lack the visual skills needed to deal with the overwhelming sensory stimulation they receive from their environment (Arnheim 1986). Social and cultural influences may even limit a child's visual literacy with informal perceptual training, which could result in a negative influence or manipulation by the visual media (Salome 1965). Skills of visual perception can be taught just as the skills involved in reading can be taught (Hurwitz and Madeja 1977). Perceptual skills can also be improved by teaching perceptual skills in an organized and systematic way (Salome 1965). Perceptual training and visual instruction does not happen just by doing art activities but by teaching to specific objectives as in Art is Elementary (Cornia, Stubbs, and Winters 1983) which uses 206 concepts arranged in developmental order to help children develop visual thinking skills.

Through research it has been discovered that instruction in visual perception and thinking has increased the performance of children in mathematics (Moses 1980 in Silver 1981), increased IQ test scores and perceptual discrimination skills (Boger 1952), increased drawing skills (Salome 1965), and increased skills in describing fine art (Wilson 1966). Perceptual training has also affected or influenced the development of cognitive skills (Silver 1981), perceptual awareness needed for school readiness (Covington 1962 in Jensen 1966),

and the aesthetic development in children (Metzger 1965).

Evaluation and measurement of cognitive development have used the art efforts of children to assess IQ and cognitive skills: the tests using nonverbal means to identify children's abilities in organizing visual information from past experiences and perceptions (McFee 1970). These cognitive skills can be identified, developed, and reinforced visually through the study and practice of art, as well as verbally (Silver 1981). These tests have been found to accurately describe abilities through images and the perception of images.

Art education is in a unique position in education to help develop visual literacy in that images are its basic tools. The power of visual images in society and our consumption of those images makes art the logical choice to increase children's perceptual awareness and strategies needed to cope with the daily barrage of information (Feldman 1976). Feldman's four ways art educators are involved in the development of visual literacy call for a change in curriculum, the art curriculum. These areas of involvement are basic starting points for art education programs: the redefinition of the teaching of art to include the study of images, keeping up with image use in society, dealing with student use of media images, and identifying and reinforcing image use in cognition through visual perception (Feldman 1976). Eisner (1982) suggested the expansion of the scope of schools as a change in curriculum to encourage the use of different forms of the representation of knowledge, shifting from the

conventional mode to a more expressive mode. With the expansion of the scope of schools and a change in the curriculum to develop visual literacy in the content of subject areas the increased use of the mimetic and expressive modes of representation could be a way to expand interpretation skills beyond those used in the conventional mode. In the mimetic and expressive modes, relationships to corresponding images, either directly or indirectly related, are present which are not present in the conventional mode. These image relationships used in the mimetic and expressive modes can be developed and encouraged through perceptual skills identified and taught in the study of art.

To help reach the goal of visual literracy art educators must devise and implement art programs which teach specific concepts in perceptual development through art. In Art Is Elementary, Teaching Visual Thinking Through Art Concepts (Cornia, Stubbs, and Winters 1983) and the preliminary study for the program (Talbot et al 1977) the authors have developed a program that identifies concepts that teach art skills while also focusing on increasing children's perceptual awareness, through understanding and doing, and developing visual perception. This program could be a flexible beginning in the development of a standardized elementary art curriculum for the organized teaching of art concepts and the development of visual perception and literacy. Art Is Elementary demonstrates how art can be learned like any other subject in school: "not only can but must be learned, for it

is the foundation for effective visual perception, and the development of visual perception is fundamental to learning in any field" (Cornia, Stubbs, and Winters 1983:1).

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