A History of Design Theory in Art Education

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Since Discipline-Based Art Education (DBAE) began to advocate the teaching of art based on art subjects and knowledge rather than creative self-expression, the elements and principles of design have taken a firm place in various art curricula, textbooks, and national and state Visual Arts Standards. Elements and principles were around before DBAE, but their ubiquitous and eminent presence in the elementary grades could not have been imagined two or three decades ago. Nevertheless, young art teachers who are trained under the current standards will rarely question their legitimacy in the curriculum or the pedagogy for teaching them as presented in DBAE-oriented textbooks.

Despite the presumably important status of these art concepts in current art education practices, there has not been much theoretical debate. Are they really so fundamental as to not raise questions? Are they universal? Who decided which fundamentals are more fundamental than others? Are we modeling the practice of the professional artist, as other disciplines in DBAE model the professional art critic, art historian, or aesthetician? Are we following the teaching strategies of college foundation design courses in a more or less diluted version? What if the practice of the professional art world changes?

Indeed, substantial changes have occurred in the art world in the name of postmodernism, and its influence is already strongly felt in the current theoretical orientation of art education. For postmodernists, the elements and principles of design typically represent some of the grand premises of modernism, which they question, such as the premise that there are irreducible components of form and that they are universally applicable.1 Considering the vigor of postmodern voices in art education, will these so-called design fundamentals be discarded two decades from now?

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This article intends to trace the history of design theory in the teaching of art, especially at the elementary level. Design elements and principles are a kind of lore that have been handed down for so many generations and from so many different sources that even though they have become a familiar formula, nobody knows exactly how they all got started or how they have changed and why. For this reason it is difficult to trace the influences that have contributed to today’s list of design fundamentals or the methods of teaching them. However, we can identify some landmarks of design theories that have directly or indirectly influenced the teaching of design in schools. By tracing this historical development we will be able to understand the workings of design theory in relation to art education and to the broader professional art field, and this in turn will make us better equipped to arrive at an informed decision on the what, why, how, and when of teaching design.

A History of Design Fundamentals

Design Fundamentals as Vocabulary for Art Criticism
Having a vocabulary for designating a certain set of basic aspects through which artwork is analyzed, understood, or praised has a long tradition, especially in cultures where art is institutionalized. For example, until Romanticism and empirical philosophy, the idea that beauty lies in the harmonious proportion of parts, which derived from Pythagoras and was consolidated by classicism, dominated Western aesthetics for two thousand years. However, the components of such a list and their relative importance are not universal but rather depend on the given culture’s art. For example, in the Chinese painting tradition, line and value are the most important elements. This reflects the fact that Chinese painting developed from Chinese calligraphy, in which the variation and aesthetic qualities of the light and dark of strokes of lines were most important in determining beauty.

Regarding balance, Western artists have prized symmetry for two thousand years, from the Greek period onwards. In Chinese painting, asymmetry is a more desirable compositional strategy than symmetry because of the importance of negative space. In the Taoist concept of space, a void is not nothingness but rather is full of energy. Being Korean I have heard throughout my life of “the beauty of the void” in Korean art. The famous Japanese compositional strategies that influenced Western modern art so much have their aesthetic roots in the Chinese tradition.

The Beginning of Teaching Design Theory: Arthur Wesley Dow
The teaching of design elements and principles in an institutional setting—not as a nomenclature for art criticism but as a perceptual and creative skill
in studio practice—was initiated by Arthur Wesley Dow. He taught at the Pratt Institute, Columbia Teachers College, the Art Student’s League, and his private Ipswich summer art classes. Deeply dissatisfied with the traditional academic focus on exact representation and inspired by Japanese art, Dow formulated his own composition theory into elements and principles in his Composition, published in 1899.3

In Composition Dow listed line, “notan” (dark-light in Japanese), and color as three major elements, and his five main principles of composition (“ways of creating harmony”) were opposition, transition, subordination, repetition, and symmetry. Notan was especially unique to Dow’s theory. It is the arrangement of dark and light value areas in a composition in relation to its frame. Because of the existence of strong value difference in the concept of notan, it actually implies contrast, and because of the importance of the frame, notan also deals with the arrangement of visual weights of different values (balance). Notan is therefore different from shape and even from value or chiaroscuro. The current term closest to notan seems to be “value pattern.”

Among Dow’s compositional principles, that of opposition seems to be similar to contrast in a narrow sense. It was exemplified by horizontal and vertical lines meeting at a ninety-degree angle, showing “severe harmony.” Transition is a way of softening this severe harmony, as exemplified by a rounded line tucked under the angle of the two lines. There are many examples of transition in the details of architecture, such as door frames and molding. Even though Dow did not list proportion or good spacing among his principles, proportion is a synthesizing and overarching principle. It applies to all the elements and other principles and determines whether a composition is artistically superior or mechanically commonplace. With these elements and principles, Dow explained the harmony of many works of fine arts and crafts, such as painting, sculpture, architecture, furniture, patterns on ceramics, textiles, and metal works.

Design was taught before Dow published his theory, during the last decades of the nineteenth century, but it was taught as an integrated part of linear drawing, which derived from the industrial drawing system imported by Walter Smith, a drawing master from South Kensington Design School in England, and his successor, Henry Turner Bailey.4 It consisted of studies of historic ornaments, stylization (called “conventionalization”) of natural forms, and inventive design. Before Dow, therefore, the concept of design was related more to craft or ornamentation, a kind of art that was differentiated from fine arts, than to organizational principle.

Regarding design principles, repetition and symmetry were well-acknowledged principles of design in patterns (called “ornaments”), as shown in Owen Jones’s huge collection of ornaments drawn from all around the world with which Smith, Bailey, and Dow were very familiar.5 Therefore,
even though "Dow's ideas on design did not enter a vacuum within the field . . . [but] developed within a receptive context of shared interests and traditional elements and principles,"6 it was not until Dow that design theory in the modern sense as we understand it came into art instruction. He treated compositional components and their structural organization as distinctive features that can be discussed, practiced, and applied apart from drawing, ornamentation, or subject matter, and his theory was meant to be applied to all branches of art, not just fine arts or crafts.

Through the repeated republication of his book until as late as the 1940s, his students' teaching at various art schools, especially in Chicago and California, and their textbooks, Dow's theory had a substantial impact on art education from the professional level to the elementary level.7 Among artists, Georgia O'Keeffe was his student from 1914 to 1916 at Teachers College. She said of him, "This man had one dominating idea: to fill a space in a beautiful way—and that interested me. After all, everyone has to do just this—make choices—in his daily life, even when only buying a cup and saucer. By this time I had a technique for handling oil and water color easily; Dow gave me something to do with it."8 However, Dow's theory also inevitably showed the kind of art he had a penchant for at that time, namely, Japanese art and the Arts and Crafts Movement, in which great importance was given to flatness of design, distribution of dark and light areas, and asymmetrical balance (even though symmetry was one of his principles, Dow professed a preference for asymmetrical balance in his book).

Based on various historical records, Stankiewicz emphasizes that Denman Ross, a contemporary of Dow, also influenced design education.9 His design principles were harmony, balance, and rhythm, and these were the three terms most frequently used in art textbooks in 1929. Ross's book, A Theory of Pure Design, was indeed organized around these three principles,10 but its dry text and uninspiring illustrations composed only of dots and lines would have prevented easy access by a general education population.

Dow's theory and method also influenced art education practice through Bell Boas's Art in the School.11 In Boas's book, notan became "mass," meaning the massing of dark and light, and two other elements, line and color, remained the same. The principles of design were now unity, subordination, opposition, balance, and rhythm: symmetry in Dow's theory became balance in Boas's—in which asymmetrical balance was included—transition was omitted, and unity and rhythm replaced repetition. Considering the fact that unity and harmony tend to be used interchangeably, it is possible that Boas combined Ross's and Dow's principles to come up with his own.

There are three usages of the term "design": (1) design as composition or design fundamentals; (2) design as ornamentation, deriving from the industrial drawing system as mentioned earlier; and (3) design as planning and
executing handicraft and applied art items. All three kinds of design flourished in art education from 1900 to the 1930s. The last became prominent through the manual training that went in tandem with the American public’s craze for the Arts and Crafts Movement, and it continued to be part of the high school art curriculum thereafter.

*Design Theory in the Creative Expression Movement: Victor D’Amico and Viktor Lowenfeld*

In the middle of the twentieth century creative self-expression theory became the dominant trend in art education, heavily influenced by the earlier Progressive Movement in education and the development of modernism in the professional art world. The creative self-expression movement did not favor the teaching of design because rule-bound teaching was supposed to hinder the free expression of the child. It is interesting to trace how design was dealt with in the art education theories of Victor D’Amico and Viktor Lowenfeld. D’Amico’s book, *Creative Teaching in Art*, was influential in the 1940s and through the middle of the 1950s, and Lowenfeld’s *Creative and Mental Growth* was influential from the 1950s through the 1970s.

D’Amico criticized past and contemporary methods of teaching design as being opposed to creative expression. Among the criticized methods were the “popular method of producing designs such as trees, flowers, or geometric patterns by folding and cutting colored papers,” “making motif, borders, and surface decorations with prescribed strokes,” “the wide practice of conventionalizing plant and animal forms by a stereotyped process,” and “making plates which illustrate color harmonies, rules of balance, rhythm, or unity, and the like.” “These methods . . . have become great impediments to creative education,” he stated, and “the result is a quantity of stereotyped work which has no significance as art or child expression.”

However, D’Amico was far from neglecting the need for developing children’s aesthetic sensitivities to formal aspects of art: “The teacher should always emphasize art values as an integral part of the creative process; and line, form, and color as the means by which imagination and visual concepts are to be converted into aesthetic expression.” He thought that the sense of design is common to all to some degree, but it should be drawn out with proper guidance and encouragement. For D’Amico,

Beauty is not a mysterious and indefinable entity; it is the reaction of the elements of design upon awakened emotions. In other words, an object is beautiful from the aesthetic standpoint because it possesses fine proportion, form, color, texture, material, or workmanship. Design is the distinguishing character of a craft and the quality that raises it from mere skill to the level of fine art. Those courses that develop only manual skill are depriving the child of the most precious value in the art experience.
Here we can see how D’Amico, who can be described as a proponent of creative self-expression theory, embraced modernist formalism without much conflict. However, he always hastened to warn that the study of design should not be rule-bound but rather always be intuitively and emotionally achieved and integrated into art-making processes. D’Amico’s design theory, therefore, was not dealt with separately, as in Dow’s or Boas’s book, but was imbedded as compositional strategies in art making, appearing mostly in the chapter “The Child as Painter.” He gave advice on how format and compositional strategy depend on the major line direction. He listed five other principles of composition as well: proportion in lines and masses, center of interest through emphasis, subordination of related to parts, harmony or unity of the whole, and variety to give accent to the picture.

Compared with the design principles of Boas, in D’Amico’s principles proportion was revived, emphasis and variety entered as new members, and balance and rhythm were omitted. This generally reflects D’Amico’s expressionist bent, with its emphasis on picture making, through which, he believed, children can express themselves better than they can in pattern making. For example, center of interest is more important to picture making, and rhythm is more important to pattern making.

D’Amico did not discuss art elements in detail but mentioned them in passing. Along with line, form, and color, he sometimes included texture as another element. Indeed, texture is the main element explored in the chapter entitled “The Child as Inventor.” He introduced collage to the art curriculum for the first time, as well as three-dimensional constructions made of scraps of different materials. In “The Child as Inventor” D’Amico emphasized experience with materials and exploration of textures. He recommended these art-making activities based on the spontaneous, inventive, playful, and tactile aspects of Cubist collage and on the design exercises in the preliminary courses of the Bauhaus.

Thus, the new status that texture gained as one of the art elements is directly related to modernism, and more specifically to the Bauhaus art curriculum, which embraced crafts and industrial design. In crafts and industrial design it is crucial for designers to know the physical characteristics and psychological or expressive potentials of different materials. The proponents of the Arts and Crafts Movement had already paved the way by insisting on an honest approach to materials as opposed to the insincerity of exaggerated and excessive Victorian design. From the beginning, therefore, exploration of the textures of materials was as important as “form study” in the preliminary courses in the Bauhaus, and three consecutive teachers of preliminary studies—Itten, Moholy-Nagy, and Albers—all dealt with it in their courses.

Viktor Lowenfeld shared D’Amico’s concern about the potential negative effects of teaching design on creative expression. His opposition was
much stronger than D’Amico’s, however, as shown in the following text through the use of words such as “detrimental,” “destroy,” or “the very death” of creative teaching:

A conscious approach in using “fundamentals of design” during this age period [schematic stage, seven to nine years], would not only be an artificial adult approach, but could, in the child, under certain circumstances, destroy the spontaneous act of creation. . . . [The child’s] main inclination is the use of art as a means of self-expression. This is why we expect that no teacher will ever use formal criticisms on products of children of these early ages. Such criticism would be the very death of any free creative teaching.21

Lowenfeld found in some children at this age level and the next—the dawning realism stage, nine to eleven years—an innate design sensitivity manifested in their use of repetition; in children at the latter level he also found an urge to decorate—for example, through dresses or suits—as a result of a growing awareness of differences in sex: “Only then, when the child herself indicates the desire for decoration, should we proceed with it in a more conscious way. Without disturbing the emotional approach to decoration, we would like to give it a sounder fundament. However, in the same way as we do not teach color theory in elementary grades by means of scientific helps, we will not introduce any formal teaching of balance, rhythm, or any other attributes of design.”22 However, Lowenfeld did not advise the teacher on how to “proceed with [decoration] in a more conscious way” or “give it a sounder fundament.” When he talked about design and craft projects for this age group, he emphasized only material and the intended function of the design, not how to guide children to be more sensitive to formal organization. Sometimes he talked as if choosing the right subject or material would suffice because “design grows out of the material” and the most important aspect in design is “the specific function of material.”23

By closely looking at D’Amico’s and Lowenfeld’s texts, we can discern that their positions toward design were in line with their philosophies of art education. For D’Amico, the model of children’s art was the artist, so aesthetic considerations and a thorough knowledge of techniques were very important, as they are to professional artists. (This is shown in his choice of chapter titles, such as “The Child as Creator,” “The Child as Painter,” “The Child as Sculptor,” “The Child as Potter,” etc.) Notwithstanding his conviction about art for children as creative self-expression, he seemed to use “expression” as a generic term for creation, not especially related to communication of emotion. Compared with D’Amico, Lowenfeld used “expression” in a way much more tinged with emotion and personality. For Lowenfeld, the aim of art education is the growth of the total child, and this is achieved only by free and creative self-expression. Therefore, whatever might hinder
self-expression should be prohibited from art teaching, and Lowenfeld saw the fundamentals of design in this light.

**Bauhaus Design Theory and Its American Version**

Ironically, during the time when design theory was being put aside and forgotten in the elementary art classroom under the influence of Lowenfeld, it became firmly entrenched in the art college through the institutionalization of foundation design courses. This was initiated by the Bauhaus teachers who had immigrated to the United States and was consolidated by the new aesthetics of International Style. Even though Arthur Eiland sees modernist scientific reductionism already present in Dow’s fundamentals, it was Bauhaus’s approach to design that was truly modernist, scientific, and reductionist in its intention. It was modernist in its tendency toward abstraction, scientific in that it embraced Gestalt psychology, and reductionist in its attempt to get rid of the vestiges of Victorian design taste and to build a new sensitivity based on the basic language of form.

Showing the tendency toward reductionism and abstraction, the Bauhaus art elements started from point. The teacher who first designed the preliminary course, Johannes Itten, used such elements as point, line, plane, volume, value (light-dark), color, and texture. Wassily Kandinsky, who taught at Bauhaus for eleven years, wrote a book called *Point and Line to Plane*. In the realm of design principles, the basis of Itten’s theory of composition was contrast. It was emphasized in the studies on value (“The Chiaroscuro”), color (“The Theories of Color”), form (“The Theory and Practice of Form”), and texture (“Materials and Texture Study”). In these studies Itten would present his students with pairs of opposites, such as large-small, smooth-rough, rest-motion, soft-hard, liquid-solid, and so on, and the students would translate these abstract concepts into contrasting formal elements such as lines or shapes. These exercises must have derived from a belief in a metaphoric or expressive meaning of visual elements, but they also would have served to encourage the students to form a habit of introducing contrasting visual elements in the actual artwork.

Bauhaus design theory became imbued with a more scientific and analytic flavor in the United States through György Kepes’s *Language of Vision*. It was first published in 1944, and by 1967 it underwent a twelfth printing (Dover published it again in 1995). Kepes was Moholy-Nagy’s friend and collaborator and was invited to teach at the New Bauhaus in Chicago, where Moholy-Nagy was the director. Kepes heavily incorporated research from Gestalt psychology into his book. Creation became “experiment” and “research,” and expression became “optical communication.” He used abundant diagrams, which gave the book “a sense of authority and explanatory power from science.”
With myriad new concepts borrowed or translated from Gestalt psychologists, Kepes for the first time introduced Gestalt principles to explain design principles: unity (which he called “the space span of plastic organization”) by approximation (“nearness”), repetition (“similarity or equality”), continuance, and closure. He also dealt with balance (“color balance” and “spatial tension; dynamic equilibrium”) and rhythm (“organization of optical sequence”). The second part of his book mainly dealt with devices for creating an illusion of space or movement (“Visual Representation”), and the third part touched on symbolic or surrealistic dimensions of elements and images (“Toward a New Iconography”). Because of its wide and comprehensive coverage of formal, representational, and symbolic aspects of visual arts and its assumed authority as a science of visual organization, the book had a lasting influence on other design books published after it.

Current Design Instruction in the DBAE Paradigm

After their long absence, design elements and principles were revived by DBAE as an important part of art-making content in the K–12 program. Since unlike other fields art making has scant conceptual apparatus by which the field can be understood and taught, these art fundamentals served as “a vocabulary of visual forms, like words and phrases” and easily and quickly became imbedded in art curriculum. Let us examine a representative textbook series from DBAE that has been broadly adapted in elementary art education programs during the past ten years.

The first representative DBAE textbook series was Discover Art, published in 1985 and authored by Laura Chapman. A much improved version by the same author was published in 1994 under the title Adventures in Art. Design elements and principles appear in three DBAE areas: aesthetics (“aesthetic perception”), studio (“creative expression”), and art criticism (“informed judgment”). The objective of the aesthetic perception category is to “identify and respond to: sensory qualities and design elements in the environment and artworks,” that of the creative expression category is to “acquire skills to: apply design elements and principles,” and that of the informed judgment category is to “be able to: describe sensory and design qualities in art works.”

One needs only to look at the tables of contents of the six books in the series to realize how much these design fundamentals are emphasized. Seven design elements appear in Adventures in Art: line, shape, color, texture, value (“light and dark”), form, and space. All the elements appear in the titles of lessons from the first-grade textbook on. Seven design principles are presented: balance, emphasis, movement, pattern, proportion, rhythm, and unity and variety. The first-grade level includes three principles: movement, pattern, and balance (contrast is mentioned in a title, too). In the second grade emphasis and unity and variety are added. In the
third grade rhythm and proportion are added, completing the whole list. Glancing at the lesson titles, we find that the lessons listing design fundamentals, such as “Textures You Can See and Touch: Crayon Rubbings” or “Unity and Variety: A Wall Hanging,” occupy a considerable proportion of the book. The proportion among sixty lessons in each level is first grade, 29/60; second grade, 33/60; third grade, 19/60; fourth grade, 19/60; fifth grade, 14/60; sixth grade, 11/60.

How is each element or principle presented in the textbook? The first lesson of the first unit of the first grade is Lines: Kinds of Lines. On the first page there are four photos from nature or one’s surroundings, such as palm trees or a garden hose, and on the second page two artworks, a Chinese painting and a line drawing by a Russian Constructivist. Under the four photos, the text reads: “Where do you see lines? Can you find these lines? Curved Straight Wavy Thick Thin.” Under the two artworks, there are two sentences. “What lines do you see in these artworks? What do the lines help you think about?”

As DBAE proponents emphasize, there is “a sequentially organized and articulated content” increasing in complexity as the textbook age level goes up. With each grade level, more concepts are introduced, more connections are made, and above all concepts are repeated. The lesson on kinds of lines, therefore, continues to include zigzag (second grade); jagged, dashed or dotted, thick-thin, thin-thick (third grade); and geometric and organic (fourth grade). The lesson on how “line can show movement” is repeated each grade from the first to the fourth. Further, connections are made throughout grade levels, such as “line and shape,” “line and texture,” “line and space,” etc. Balance is treated as a design principle in the following way: In the first grade symmetrical designs are shown and described as “balanced.” In the second and third grades symmetrical designs are described as “symmetrical.” In the fourth grade insect pictures are shown as shapes having “symmetry” (top view) or “asymmetry” (side view). In the fifth and sixth grades “symmetrical balance” and “asymmetrical balance” are used. In all grades definitions are included.

In the fifth and sixth grades all elements and principles are introduced at once, as shown in the following text for the fifth grade: “When artists plan their work, they must see and think about the elements and principles of design. The elements of design are: line, shape, color, texture, space, and value (light and dark). Artists also use ideas known as principles of design to plan their work. A principle of design is a guide for relating the visual elements. Some principles of design are: balance, rhythm, proportion, pattern, unity and variety.”

The formats of the four content areas, each providing fifteen lessons, are not very different from each other. There are always exemplary artworks and photos and accompanying texts to explain or ask about the pictures.
Usually at the end of the text, children are encouraged to make an artwork that is conceptually similar or technically related to the content.

The above observations indicate several distinctive characteristics of the design instruction presented in *Adventures in Art*. First, design fundamentals are promoted from the very early grades on: all the elements are presented starting from the first grade level, and all the principles are introduced by the third grade. Second, children's art making is secondary and subordinate to the concepts, even in the lessons under "creative expression." My impression is that design fundamentals are taught mainly as concepts to describe and analyze artworks. Third, the language used in the text is behaviorist, scientific, and analytic, such as seeing, finding, recognizing, identifying, and cataloging elements. Finally, related to the third point, it is extremely hard to find in *Adventures in Art* any value-laden or emotional word that would express our normal aesthetic experience, such as beautiful, wonderful, interesting, funny, or even good or fine.

**The Question of Universality**

This survey of design theory informs us that the list of design fundamentals is not universal or fixed. It changes over time, reflecting different art types and styles. In pattern making, rhythm, repetition, and symmetry are more evident. In picture making, emphasis and unity seem to be more pertinent than other elements because of the semantic function of picture making: these principles make the viewer focus on what the picture conveys. In the course of history, symmetry became only one type of balance, the other being asymmetrical balance, initially influenced by Japanese composition. Texture and contrast mainly became important through Bauhaus. In a recently published textbook for college art appreciation courses, we find motion, time, and light added as elements, reflecting modern art forms such as happening, installation, video, and film.

Design concepts have not always been well defined or constant either. Some terms are so old and authoritative that they tend to be easily picked up and mingled with new terms. As a result, a set of design principles can have two principles that overlap in content, or one can include another. Harmony and rhythm are such terms. They derive from music and were adapted to visual forms in ancient Greece. In many cases harmony and unity have been used interchangeably, even though harmony—suggesting aesthetic goodness—seems to be more value-laden than unity, which is more neutral. In another example, rhythm is a compound and value-laden concept composed of repetition, variety, and movement. Therefore, it is not sensible for a set of design principles to include both rhythm and repetition.

Are there any universal characteristics in design principles, notwithstanding their variability through time and culture? My answer is that there
probably are. In any set of design principles, there are dichotomous but complementary design characteristics embedded throughout different members, and this corresponds to our more basic strategy as organisms of dealing with the outside world. I suggest that almost all the principles can be divided into two groups: the “unity” group and the “variety/contrast” group. The unity group principles can be conceived as compositional strategies that make parts or principles hang together to make a whole through visual relatedness. Repetition (or similarity), approximation, and continuation can be included in this category. Symmetry can be included in this category because it is one kind of repetition. The second category, the variety/contrast group, consists of strategies that break the unity by difference, unevenness, individuality, or novelty, manifested in variety, contrast, and asymmetrical balance.  

It is helpful to think of these two categories as being located at the opposite ends of a continuum. The principles at the two extremes would not produce a harmonious composition: extreme unity makes a composition boring, and extreme variety makes it a chaotic, unintelligible jumble. In between these two extremes, however, there is a vast range of possibilities for making a good design by mixing these two opposite aspects of form organization. The aesthetic effect of a composition located near unity in the continuum would more likely be described as “beautiful,” “pretty,” or “harmonious,” and the effect of a composition located near the variety/contrast end would be described as “interesting,” “exciting,” and “unique,” even though these words are not exclusive to any one category.

This does not mean that the two extremes are not artistically valuable. Here, it is helpful to conceptually separate art from design, art having more various purposes than design. In the professional art world, these two strategies of formal organization are not rare. They either serve as a metaphor for content—as does the extreme repetition of commercial images in Andy Warhol’s artworks—or they overwhelm the viewer’s sensory capacity in order to stir the viewer’s emotion.

Gestalt psychologists are credited with finding a perceptual foundation for the unity principle. However, Gestalt psychology cannot serve as a comprehensive scientific theory for design because it cannot explain the variety/contrast group of principles. Here, Daniel E. Berlyne’s psychobiological aesthetics, based on Information Theory, is helpful. Information Theory, developed during the 1950s and 1960s, deals with the workings of external signals or stimuli transmitted to a machine or to an organism. The way Information Theory helps aesthetics is that in this perspective, the elements in a work of art can be regarded as stimuli and their relationship with the artist or with the viewer can be treated as communication. Through this approach Berlyne could characterize various types of aesthetic experiences (“aesthetic information” is his term). The formal or structural aspect of a work of art is
named "collative properties" in that it involves comparison, and the aesthetic information it gives is termed "syntactic." The syntactic is one of four major kinds of aesthetic information that a work of art can transmit, the other three being "semantic," "expressive," and "cultural" information.

About syntactic information, composed of formal aspects, Berlyne holds that "the appeal of a work of art depends on the interplay of two sets of factors, one tending to drive arousal upwards and the other tending to reduce arousal or to keep it within bounds." He points out that similar theories have repeatedly cropped up over the centuries, such as Hutcheson's "uniformity" and "variety," Birkhoff's "order" and "complexity," and Kaplan's "coherence" and "mystery."38

The arousal-driving (meaning emotion-producing or -stirring) factor is related to high information content, complexity, ambiguity, tension, and variability with high uncertainty, and the arousal-reducing factor is associated with redundancy of information, such as a degree of structure, order, or unity. It is obvious that the arousal-driving factors correspond to the variety/contrast group of principles mentioned above, and arousal-reducing factors to the unity group of principles. In this light, the principles of art can be viewed as organizational principles of visual properties that correspond to the broader biological mechanisms by which the human as an organism copes with external biological stimuli.

Implications for Art Education

The goal of learning design should be an aesthetic appreciation of form and its application to art making regardless of a specific method. Therefore, it is a great mistake to treat the DBAE model of design instruction shown in Adventures in Art or similar approaches as given or universal. As art educators reincorporated design theory into the art curriculum under the influence of DBAE, there was no consistently developed design theory for primary art education. After getting through the long era of Creative Expressionism, the little gained from the first development of design instruction based on Dow seems to be totally forgotten. In this vacuum, it is natural that DBAE proponents adapted the prevalent approach in professional art instruction. I consider the scientific, analytic tendency of their teaching method to have been inherited from the Bauhaus, especially the American version.

As discussed above, for the Bauhaus artists, these concepts were basic and elementary. However, there is doubt whether they are also elementary for children—meaning easy for them to approach and understand. As for design elements, is line more elementary than shape or than (three-dimensional) form? Interestingly, the founder of the first kindergarten, Froebel, developmentally sequenced his educational toys ("Gifts" and "Occupations") from form to shape and finally to line. Young children are accustomed to
handling three-dimensional objects, and shape and line are abstractions a step or two removed from concrete reality. Considering that many Bauhaus teachers were influenced by Froebel’s kindergarten experience, it is ironic that they inadvertently reversed the order of design elements and we inherited this reversal.39

Research on aesthetic development may shed light on the issue of whether it is desirable to introduce design principles at an early age. As seen previously, all seven principles of design are introduced by the third grade in the DBAE textbook. For children and unsophisticated adults, attention to the formal aspect does not come naturally. According to Michael Parsons, this stage of “Form and Style” comes after the “Favoritism,” “Beauty and Realism,” and “Expression” stages, and even though these stages are developmentally bounding, most elementary students belong to the second stage, “Beauty and Realism.”40

Similarly, Abigail Housen found that attention to these aspects is characteristic of the “Interpretative” viewer of the fourth stage, which is more developmentally advanced than the “Accountive,” “Constructive,” and “Classifying” stages.41 In the elementary grades, children’s attention and delight are drawn to narrative content, realistic style, and the beauty of the subject matter. Even though developmental study cannot be a basis for the prescription of a certain teaching method, and education means helping students to advance in this developmental trajectory, the fact that a DBAE textbook is heavily loaded with design elements and principles with seemingly total disregard for the student’s natural aesthetic development is cause for concern.

The disappearance of emotionally and aesthetically value-laden vocabulary is also a by-product of historical changes in the professional art world and aesthetics. By the time DBAE restored the study of artworks to the elementary art curriculum, the humanistic or Romantic notion of aesthetic experience called “beauty” had been totally shattered by the series of modern art movements and the two world wars. Its demise has been so total that the utterance of the word “beautiful” became something of an embarrassment. Therefore, it is no wonder we cannot find such a value- and emotion-laden word in the DBAE textbook. However, for children and average adults in everyday life, those words are what they utter to express their aesthetic experiences most appropriately.

It may be that DBAE’s atomic and conceptual treatment of design came from the influence of one of DBAE’s other disciplines—art criticism. In this realm design fundamentals are treated as the two lowest rungs of art criticism activities. If we follow the widely accepted formula of description, analysis, interpretation, and judgment stages of art criticism in DBAE, design elements are basic vocabulary for description, and design principles for analysis.
What this scientific, analytic, conceptual, and atomic handling of design fundamentals misses or distorts is not trivial: It misses the fundamental nature of art making, such as ambiguity, uncertainty, mystery, and the perceptual nature of in-process judgment, which is highly relational and experiential and cannot be translated into concepts. It distorts the image of the artist, who is the model professional for children's art making in DBAE. In Adventures in Art artists are portrayed as persons who "see, and think about" elements of design and "use the idea" of principles of design to "plan" their artworks. This transmits an image of the artist as highly cerebral and art making as solely intellectual.

Because design principles are indeed concepts and represent a generalization, there is always a danger of teaching them conceptually. When design theory first came into art instruction, there was a concern that it might become rule-bound. Therefore, Dow said, "Fine art . . . implies fine relations. . . . As fine relations (that is, harmony, beauty) can be understood only through the appreciation, the whole fabric of art education should be based upon a training in appreciation. This power cannot be imparted like information. Artistic skill cannot be given by dictation or acquired by reading. . . . The power is within—the question is how to reach it and use it." D'Amico objected that design education had indeed become rule-bound and mechanical in his time. For D'Amico, artists not only recognize the use of design elements but "feel them" because "good composition requires intellect and emotion." At least these first design educators could see the nature of art in a more balanced way.

These reflections and theorizing lead to the issue of how to teach design. Because of their experiential and relational qualities, it is indeed difficult to teach these art elements and principles well. If principles are taught separately, students will learn the concepts and recognize them in artworks but hardly learn to synthesize them in their art making. The need for synthesizing derives from the dichotomous and complementary nature of design principles already discussed. A single design principle rarely makes any satisfactory design at all. Synthesizing requires a constant perceptual judging of relationships and qualities, and this is a cognitive task that is fundamentally different from conceptual categorization and recognition. Therefore, teachers of design should construct their curricula creatively so as not to neglect the ultimate goal of teaching design.

In doing so, it would be empowering for the teachers to know that the importance and contents of design theory have fluctuated in the history of art education, and that the currently circulated method is not necessarily the best for them to conform to. I do not expect that design elements and principles will disappear as aspects of art education in the foreseeable future, or that their disappearance would be desirable. As Tom Anderson points out, "it is these very elements that draw our attention to artful artifacts and
performances, that cause us to focus, that engage our emotions and attention, that make artworks special enough to point us to their contextual and extrinsic value.”

NOTES

16. Ibid., 15.
17. Ibid., 216.
21. Lowenfeld, Creative and Mental Growth, 159.
22. Ibid., 193.
23. Ibid., 193.
31 Ibid., Level 1, pp. 6-7.
33 Chapman, Adventures in Art, Level 5, p. 7.
35 “Emphasis” and the other similar principle, “Dominance,” seem to be categorized in the unity group. These can be viewed as helping the viewer focus and stay in the picture by giving a visual anchor point.
37 Berlyne, Studies in the New Experimental Aesthetics, 9.
42 Dow, Composition, 21.
43 D’Amico, Creative Teaching in Art, 36.