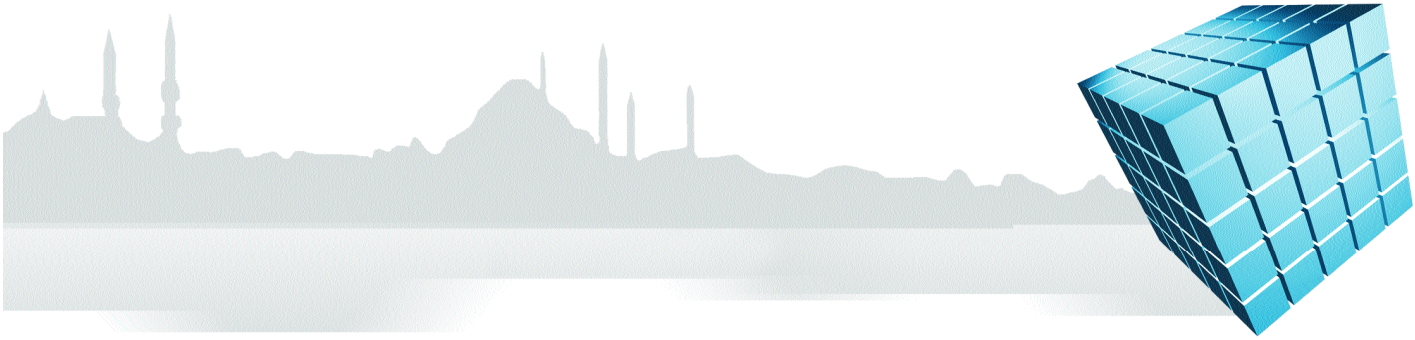


THE CONTRIBUTION OF VISUAL ARTS EDUCATION TO SCIENCE AND TECHNOLOGY

Gül Gürer
Interior Architect, M.A.
Instructor, Yeditepe University, Istanbul, Turkey

Although art and science coexist peacefully, it is rarely recognized that the two disciplines are actually complementary. The general belief that the attitude, personality, and temperament required of one of the disciplines make it impossible to have the ability to become involved in the other has led society to ignore the possibility that each way of understanding can enliven the other with points of view and concepts that go unconsidered in their respective formats.

A dialogue between art and science will not be possible until the threads of these basic disciplines are interwoven in the fabric of education. Scientific and aesthetic perceptions must be unified in the learning process. The education system must foster a climate in which these two most vital aspects of our culture can converge. A synthesis of the two fields will only be possible when the rediscovery of procedures common to both disciplines are learned and applied.

Educators must be reminded that comprehension and experience in science and art involve similar visual response-- as does the very process of creativity in both fields. Although they produce different outcomes, the perception of both art and science of rhythm, pattern, proportion and form rely on the same principles of unity and organization. They both deal frequently with phenomena that defy verbal classification, and in both, curiosity and visual stimulation lead to discovery, understanding and advancement. Creativity in both fields suffers with reliance upon inductive-analytical procedures and strictly quantitative values. Advances in art and science require a balance between conscious intent and subconscious will. Science does not rely so much on analytical procedures and quantitative values as much as we think, nor does art depend wholly on intuition. New directions in education to encourage creative minds can break down the imagined barriers between the two disciplines.

Throughout human history, the prevailing features in art and science have developed in a consistently more parallel than divergent way. The evolution of scientific thought has frequently been expressed in artistic terms. Concepts, theories and practices have emerged almost simultaneously: psychoanalysis and the Surrealist movement, for example; or the theory of relativity and Cubism; or scientific research into color perception and the emergence of neo-impressionism. History provides ample evidence of the simple fact that science and art reinforce each other: it is a paradox of our time that they have not been synthesized in the process of education.

The history of technology offers compelling reasons for relating art and the applied sciences. Although today aesthetic experience is absent from the instruction of technical skills, it was an essential part of the origin of technology. The technological capabilities of man first emerged with his first attempts to create visual forms. The tools and techniques developed by ancient cultures were as much the result of a desire to satisfy perceptual needs as practical ones. For example, some of the most important metallurgical processes--which remain major industries today-- were the results of craftsmen seeking ways to transform raw materials in the production of artifacts.

If the past helps us to understand the present and gives clues to the future, there is reason to assume that theoretical and conceptual links exist between the accelerating developments in each area. The dramatic scientific discoveries and spectacular achievements of recent times will no doubt prove to be significant in the evolution of visual expression.

Taking this historical perspective into consideration, it would seem that relating art to science and technology should be a concern of the field of education. Study and research (interrelating both disciplines) would reveal that the concepts, tools, and

media of the physical and applied sciences may have profound implications in the innovation of visual form. The possibility that such innovation will affect the scale, structure, form and vocabulary in the art of the future is a compelling reason for this new educational direction.

In the world of the visual arts, rejection of the established criteria and the pursuit of scientific and technological media have become entrenched, mainly caused by the growing awareness that concepts, media, idioms, form, and content that evolved during the last century of the now waning machine age are no longer relevant. A redefinition and reorientation of the visual arts with references to these changes is needed to perpetuate art as an outlet for human expression and communication. Utilizing scientific and technological advancements in this task requires new modes of performance. It is clear that a wider spectrum of knowledge and skills than generally has been identified with art is needed if a successful synthesis is to occur.

Despite this challenge of relevance, credibility loses out to novelty in the market place and in museums.

The most common feature of art in the last few decades has been a bombardment of ideologies reflecting contradictory opinions about its function and destiny. Most of the style that characterizes art today shares a separation of the visual elements from their customary backgrounds and interrelationships. This denial of established criteria has produced compositions justified solely by their appearance. This assigning of independent optical functions to individual elements has afforded perceptual responses to visual phenomena unprecedented in the history of art. Fixed ideas about art have been shattered, making it doubtful that conventionally categorized idioms will remain autonomous or that the visual elements will ever fit together again in a manner conforming to the traditional vocabulary and structure of art.

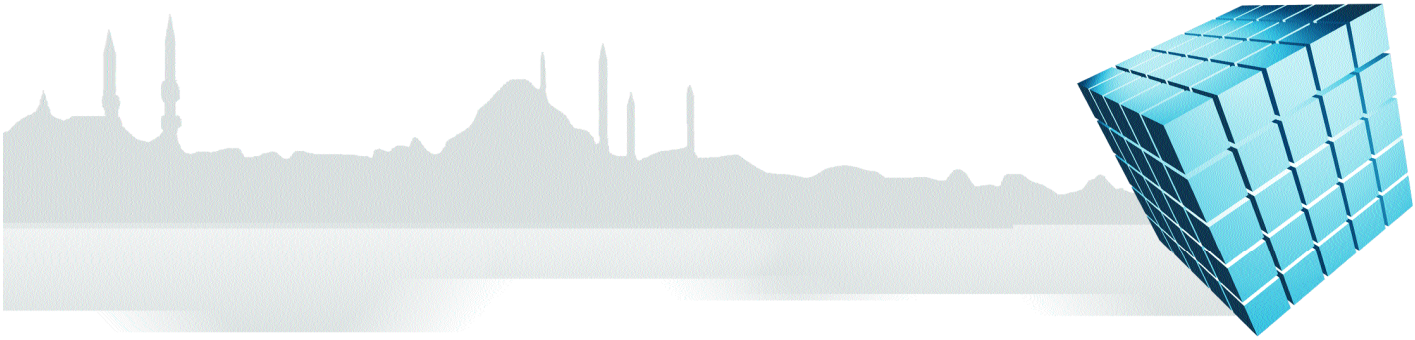
Simultaneous with this denial of established criteria has been the artist's flirtation with scientific and technological media. Inevitable in this age of science, this development predicts a no less drastic evolution in the field of art. However, most departures from traditional media have produced more gimmicks than new avenues of visual research.

The artist's failure to engage scientists and engineers at the conceptual level of innovating visual form has deterred an imaginative and systematic investigation of the visual potentials inherent in the disciplines in the field of science. Scientists have been equally remiss in recognizing the challenge. Their education, confined to compartmentalized learning, has perpetuated the myth that science and art do not mix. Most specialists are unaware that their expertise could contribute significantly to innovations in the visual arts. Their creative participation in the art process will be necessary to release the full range of aesthetic potential that exists in the physical and applied sciences. Not until this occurs will artists fully comprehend the profound implications of the search which they initiated.

The promise that advancing technology holds for enriching our visual environment will not be realized until there is sustained, in-depth inquiry among artists, scientists, and engineers. A soul-searching reappraisal of their crucial roles is imperative. Only then can we hope for the interdisciplinary understanding and collaborative action that is necessary to prevent the dehumanization of man's visual and physical world. This threat from the opposite side of the technological coin makes the bridging of diverse disciplines urgent.

The preoccupation with identifying and measuring explicit in scientific learning tends to anesthetize the capacity to see directly. The creation of visual forms reanimates this innate ability by training the eye to perceive relationships of parts to the whole. When science and technology are allied with the goal of achieving visual coherency, their dimensions are extended to include man's eternal effort to structure visual form with the process of fulfilling emotional, psychological, and physiological needs.

With focus upon subjective-qualitative values, the art experience serves as a counterbalance to seductive-qualitative learning upon which scientific and engineering education is based in it formative years. Unlike these disciplines, in which a through



knowledge of their fundamentals and methods of verification is a prerequisite to discovery and invention, the practice of art permits creative application of its principles while learning about them. At the same time, it demands a shift from reliance upon the outer world of fact to the inner world of feeling, thus leading to greater dependence upon the internal powers from which creativity springs.

The goal is not to make artists out of scientists. The development of imaginative thinking and inventive procedures are as important as the resulting forms. Implied is that creative processes in art and science are similar and that participation in the former can, in turn, heighten performance in the latter. This speculation has led to the conjecture that performance in the visual arts can shed light on the psychology of scientific discovery and technological invention.

Clearly, the task is to engage scientific minds without diluting the essence of the art experience or encouraging dilettantism. Also recognized in this challenge is the fact that thinking, seeing and performing in visual terms must be divorced from professional goals in the fine and applied arts. A departure from vocational concerns is necessary to assure an experience of lasting value for students with no previous scholarly or participatory experience and no intention of becoming artists. Those for whom Picasso is less known than Einstein and who have working knowledge of scientific instruments and engineering tools are inclined to resist getting involved in art. Drawing, painting, and sculpture imply a competence considered alien by those oriented to physics, chemistry, and mathematics. It is necessary to minimize “artistic talent” and “ability to draw” as prerequisites for participation in the art process.

A revision of teaching methods and objectives is needed. Rather than requiring practice in techniques traditional to art, students are encouraged to utilize skills in which they are competent. Manipulation of media, processes, and phenomena of the physical sciences and the materials, tools, and techniques of the applied sciences serve as means for visual design experiments. This procedure accomplishes three objectives: It makes comprehending the artist’s thought process without emulation of his product possible, it extends the boundaries of scientific and engineering disciplines into the realm of art, and each student’s creative potential is addressed within the context of his chosen profession.