



Communicating Design Intent with Form

VISUAL INTELLIGENCE

Developing visual intelligence is essential for the designer and, perhaps, for other professionals, such as artists, surgeons, architects, engineers, astronomers, nurses, teachers and writers, whose work requires perceptual reasoning. Visual intelligence is a sophisticated tool. It is seeing and understanding the underlying organizational pattern—or lack of—in a given situation and envisioning what framework might be created to solve the problem.

Visual intelligence enables the designer to make primal sense of the world by understanding the structure of relationships and responding with useable context and content. This sensory skill makes it possible for the designer to create order, form, function, beauty, meaning and expression through structured relationships. It is what enables a designer to visualize profound connections that go unnoticed by many others.

In the Industrial Design Department at the Pratt Institute, the foundational ideas of the Alexander Kostellow/Rowena Reed pedagogy are used to teach the core principles of seeing and understanding the profound basis of visual relationships and abstraction. I have come to appreciate this pedagogy as a practicing professional and as a teacher of three-dimensional design.

This methodology can be a life-changing experience and often amazes students. It cultivates the cerebral cortex and produces a meaningful perceptual experience of the world that supports advanced abstract thinking and language. “I now see the world differently” is an exclamation made by many students after they experience a course in 3D abstraction.



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“It's not what you look at that matters,
it's what you see.”

— Henry David Thoreau

It is a complex pedagogy that must be taught as a continuum over the course of three to four years. This teaching process cultivates in the student a progressive methodology for engaging two- and three-dimensional abstraction as a means of breaking through the barriers of predictable design outcomes. The educational experience provokes and subsequently provides the student with the basic tenets of harnessing abstract structural relationships, whether applied directly to form making for design or to the bigger issues of how elements fit together in the scheme of global relationships in areas of design, architecture, medicine, digital content, music, corporate management and whatever else matters for making the world a better place to live in.

It is not just for making things look good or even beautiful. It is a matter of understanding and penetrating the very principles of structure, organization and relationships that can be applied to many disciplines, within and outside the design profession. For the young designers who choose to work in the classic physical form world, or the virtual digital world, this education in visual intelligence will provide a profound reference for understanding essential matters as basic as good proportions, visual organization, contrast and complementary relationships.

Child's Play

Abstraction and the sensory world of visual relationships embody more than the obvious connections that we intuitively relate to the creative fields of art and design. There is, in fact, a deep theoretical study that lies at the center of developmental cognitive science regarding visual relationships and abstraction. We are learning from the research of cognitive scientists that children as young as infants have



abstract structured representations of the world. They have intuitive theories, grammars, conceptual hierarchies and phonological maps. And by using them, children learn and create working structures for their cognitive development, piecing together the world in front of them one element at a time. They create abstract representations, based on concrete experiences, from the contingent evidences of their senses. This sounds a lot like a freshman or junior 3D studio class at Pratt.

How can children induce abstract structure from contingencies? There are many pathways by which this is done. Cognitive scientists have shown that even four-year-olds going about their day discover new abstract variables, experiment to resolve observed causes and weigh their daily incoming perceived evidence against prior knowledge while using experimentation and play to make sense of the world. In other words, this process is written into our genetic code where it once enabled us to survive on a primitive level and now, thousands of years later, it enables us to grow, thrive and enrich in a technological world. And

to think that over the years we have been taught to grow up and move on from experimental child's play!

The hands-on experimentation process is an important tool for success, often leading to the proverbial aha moment when something is discovered that becomes an entirely new idea. Any profession would be well served by this tool.

Many masters in art, design, architecture, medicine, science and music—Picasso, Einstein, Phillip Glass, Paul Rand, Charles and Ray Eames, Martha Graham and Igor Stravinsky, to name a few—have had direct experience learning the basic tenants of abstract relationships. In their learning environment they were introduced to the intellectual, abstract and technical components of their disciplines, which later served as lifelong tools for seeing what others do not see. The masters took their educational experience and changed a part of the world. They possessed the innate tools for long-term intellectual growth and vision. Not only did they learn the tenants of abstract visualization, they were able to harness it in their work. This is completely different from a skill-acquisition or knowledge-driven educational experience.

One of the interesting educational aspects concerning Albert Einstein is that he attended an elementary school that followed the teaching method of the Swiss educator Johann Pestalozzi. It was a perfect school for Einstein. Pestalozzi believed in encouraging all students to visualize images, declaring, "Visual understanding is the essential and only means of teaching how to judge things correctly." Given his early educational upbringing, Einstein believed in the sensory visual world. Actually, the visual understanding

of concepts became a significant aspect of Einstein's genius. At the early age of 16, Einstein used visualization when he postulated that the speed of light was always constant. By his early 20s, Einstein had visualized the con-

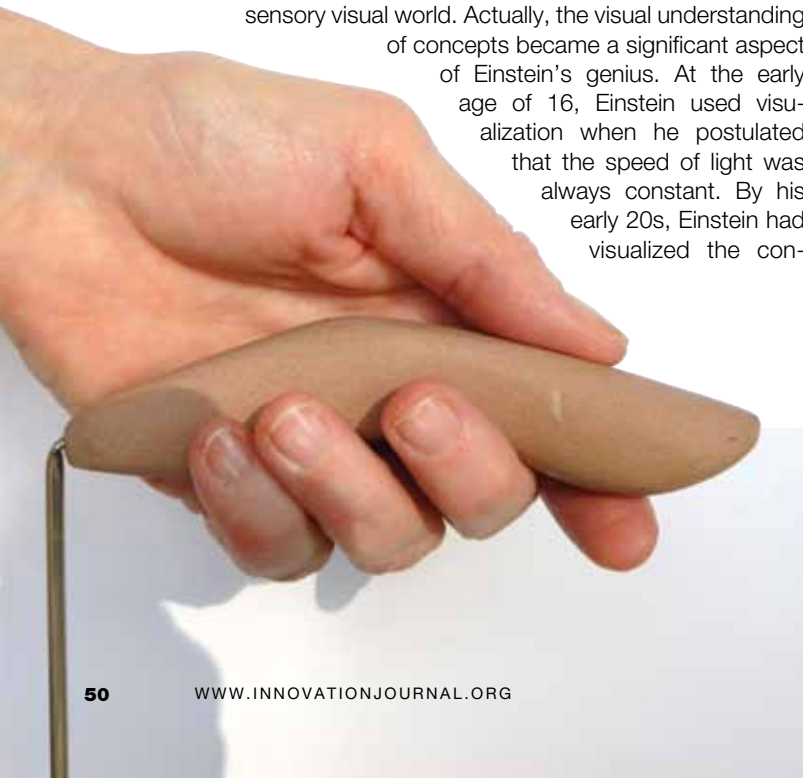
cept of time travel and the theory of relativity, long before he ever proved it mathematically. Later in life he would write, "I am enough of an artist to draw freely upon my imagination. Imagination is more important than knowledge. Knowledge is limited. Imagination circles the earth."

I spent five years in independent study with Rowena Reed Kostellow in her fabled Saturday class. That studio experience, coupled with four years of studying industrial design at Pratt, changed my life forever. In the Saturday class we spent hours in the studio analyzing and applying the principles of visual design relationships to our assigned projects. Thereafter, we often spent the remainder of the day going to museums or architectural spaces or attending concerts to see and understand how these principles were applied by the masters. Before this experience, I would look at a Picasso, Matisse, Saarinen or Eames design and experience just the surface, like a dry art history lecture. Or if I listened to Aaron Copland or Duke Ellington, I would only hear sound. But after that learning experience, I started to reach below the surface where the structural relationships were waiting to help me decipher, see and hear. I also learned that this educational experience takes time to absorb and internalize. It cannot fully take root and bloom in one or two classes. It cannot be taught like a technical studio class. It is akin to studying music composition and theory. You must apply it over and over, question, experiment, fail many times and eventually internalize it before it becomes a lifetime tool. It is then a part of your cognitive DNA. Once students gain the power of the perceptual and analytical tools, they can go out and challenge the rules with confidence and insight.

A Universal Language

In our design office we have applied the principles of abstract relationships for every type of problem, as for example, a user interface design to assist dermatologists navigating complex medical diagnostic protocols—a virtual world indeed. We recently developed one such system for body mapping multiple potential cancerous skin lesions on the patient. Physicians love the system because it took a very complex organization and navigation problem and simplified it into a set of visual hierarchies in which the architecture and visual language is clear, simple and understandable. The client has patented the system.

In the course of my 35 years in professional practice, I have relied heavily on the educational experience gained from studying abstraction and three-dimensional design





to objectively present design problems and frame viable solutions for clients. Much like mathematics, the basic principles of abstraction can be a powerful and universal language for bridging the intellectual gap between all disciplines of thought.

Our office is steeped in the realistic demands of technical execution in advanced medical technology as evidenced by the projects that we work on. We have to evaluate, choose and make recommendations for materials that will be implanted into the human body—and therefore subjected to FDA scrutiny and approval. We have to justify every design decision, on both form and function, that we make in our design development concepts, design inputs and design outputs. And these must be documented and recognized by the FDA as part of its new design directive standards. The choices that we must make are neither arbitrary nor subjective. They are very serious and have deep consequences. And because of that, we harness this visual language of abstraction every day for communicating design intent with form. What is so compelling is that when we utilize visual language, carefully expressed to convey design intent, our clients get it every time. Moreover, they respect us because we communicate grounded and logical outcomes.

I have always been inspired by the work and teaching of Paul Rand, who once attended and later taught at Pratt. His work illustrates the best of what a designer can offer to a client whether in two-dimensional, three-dimensional

or other formats. Rand would always produce a functional, beautiful, clearly thought out solution for each and every design problem. When I look at his work, I see a designer who has cultivated visual intelligence.

Rand believed in cultivating the process, the importance of understanding the abstract problem, “getting an idea, sketching, investigating all the aspects” and using the eyes and the hands to work out the “revelation or illumination.” This is exactly when the ideal solution emerges. This process cannot evolve without hands-on experimentation. For Rand, the hands were part of the pathway to the higher workings in the brain, the cognitive linkage.

Students would ask Rand, “What is design?” fully expecting some complex outline of issues, but he had a simple answer: “Everything is design. Design is relationships. Design is a relationship between form and content.” He also stressed that design is a system of proportions, which means organizing the relationship of sizes. “Design is the manipulation of form and content. ... Content is the idea, or subject matter. Form is what you do with this idea. How do I deal with it? This is part of the manipulative aspect of design. ... It is important to use your hands to solve problems; this is what distinguishes you from a cow or a computer operator.”

Perhaps that is why, upon seeing an exceptionally elegant design solution that Rand had developed for him, Steve Jobs spontaneously asked, “Paul, can I hug you?” How often have we had that response from demanding clients? ■