Is it possible that we overcomplicate the industrial design profession for our students? We address issues that are far more complex than what students can comprehend at the undergraduate level. Of course we must make them understand that designers have responsibilities—they have to know the nature of materials and understand manufacturing processes to satisfy the needs of the client, but I see the lack of beauty versus the technical functionality in this way of thinking.

When students get their first assignment, no matter how simple its intent, they generally want to invent the next greatest thing, not even touching on the idea of making their concept just remotely aesthetic. They focus almost completely on the function and the utilitarian nature of the task in hand. This attitude is predictable, taking into consideration that a significant number of students grew up in a utilitarian environment with products that possibly either neutrally or negatively affected their development of taste and style.

Similar to the music we listen to, we know that our visual environment is also a major influence on one’s personality. These factors are important, and in order to educate students to be good designers, we have to bring back the balance between form and function.

In the professional world, designers more often than not have to convince clients that they should trust the designer’s taste in order to improve the appearance of the product. But what makes the designer the authority figure to decide on aesthetic issues for someone else? Products that are accepted by the market all possess one thing—they are desirable to a wide group of people at any given time. They are desirable because they look attractive. They look attractive because they are proportional and they are proportional because there is logic in their construction. They were built using a system, like the Fibonacci sequence, which corresponds to the divine proportion and golden mean.

We all have different tastes, but there are certain things we all think of as pleasing. A pretty face is a pretty face. Even though we all have two eyes, ears, a mouth, and a nose in the middle, and all are of relatively similar construction, we are all recognizably different from each other. We see something that makes some of us aesthetically pleasing and others not. Where are the differences? In the details—in minor differences in shape and proportion! We see these details because we care to see them. In fact, we are genetically wired to see them.

We are living in an image-conscious society that thrives on entertainment values, and satisfying the need for new experiences is increasingly intensive. For thousands of years, people have been making efforts to style and garnish their surroundings, to underline their cultural and social status. There is a natural, visual intelligence in all of us that determines our relationship to other species and objects. Some of these senses are used only on the subconscious level, but others we coordinate in conjunction with outside influences. Understanding visual means will ensure senses are used consciously. In other words we will consciously recognize shapes that are functional to us.

Teaching design must start with an awareness of aesthetic values, because that is the natural way of our human existence. In the biological world, cuteness, beauty, ugliness, or scariness are all natural, genetically engineered means of survival. In other words, beauty is functional. Design thinking and research is a higher subject level of our business that can be presented to students at a later stage of their development. Students should first conduct research that enhances their visual motivation and understanding of aesthetic relationships. The importance of emphasizing aesthetics is to offset a student’s urge to craft their utilitarian design ideas.
Ability to See

We often wonder about what another person sees. Do they see symmetry or do they recognize the proportion the same way I do? Do their brains process information the same way mine does? This leads to a more appropriate question; whether we all have the same “ability to recognize” what we see? Sometimes, people look at an object but don’t fully comprehend what they see. If we do see and recognize things why can’t we repeat them in a drawing, like we can repeat a phrase verbally or hum a tune? Is it because of a lack of responsiveness or caring? In general we don’t even recognizing the condition of our surroundings however greatly it affects us emotionally. This scenario is similar when listening to music. Music is noise, but the result is the same in the brain. Whether we are aware or not of our environment, the environment exists and subconsciously affects us, the same us music does. Images, just like sounds, can relax us or agitate us. Our ability to consciously recognize our environment is often poor. We cannot turn off the environment like we can turn off music. (Of course, absolute silence is also agitating.) We are constantly interacting with our surroundings, whether we want to or not. We simply accept its existence as it is. For excitement we need the “wow effect” that offers something shocking. These are the conditions designers have to work with and teach students to perceive so that they can translate information into organized meaningful shapes.

In design assignments, students are more aesthetically inclined simply go with their instinct, developing shapes that are pleasing to the eye, but often don’t have much to do with function or ergonomics. Other students, however, have difficulty distinguishing between good and bad shapes, and struggle to develop a proportioned piece, but try to address other criteria to make up for their aesthetic shortcomings. There are many successful designers who never went to design school, yet became famous because “they had what it takes”. They had the ability to see, absorb and synthesize. There were design movements like the Jugendsile and the Bauhaus that highlighted the importance of the proportional development of forms. The successful “Streamlining” style in U.S. design was also more related to shape than function, helping to define the American style of design for decades. These schools and movements placed emphasis on the teaching and the search for visual values in design, much the same way people searched for these values in the renaissance or in the medieval Japanese culture where there were no distinctions between fine arts and applied arts but, rather, a general conception of what is “beautiful.” But, do we see “beauty” or do we see “repulsive”? What determines these distinctions and how do we translate that distinction to an education value?

We use the word “design” because it has a complex meaning for representing what we do. We designers also have a different understanding what design is from the general public, (i.e., our students). The German expression for our profession was “form gestaltung”. This term means styling (figure shaping or form development). Gestalt is a term in psychology that means “unified whole.” It refers to theories of visual perception developed by German psychologists in the 1920s. These theories attempt to describe how people tend to organize visual elements into groups or unified wholes when certain principles are applied. This is styling in terms of the most positive expression of the meaning. The idea is that a form should not fall apart, but stand as a unified whole.

We can easy relate the essence of styling to car design or any other form of design that does not contribute any functional value to the product other than aesthetical. Along with the idea of kitsch and the extensively used terms, “emotional design,” “experience design,” and “product semantics,” we must recognize the need to turn our, and our students’ attention, to the subject of shapes. The Gestalt is a general description for the concepts that make unity and variety possible in
design. The Gestalt theory is concerned with visual perception and the psychology of art among other things. It searches for the relationship between the parts and the whole of a composition.

How do we see or recognize hidden clues and most of all, how can we teach students to see and recognize these clues? We want all of our students to succeed, but they can not all join the big league, (or even sometimes the little league) if they are lacking the ability to see and discern the logic, attractiveness, elegance and the beauty of shapes.

Understanding Shapes

Never was an object described as kitsch purely because of its nonproportional nature. That would be just pure ugly, but not kitsch. We may love kitsch even if it appears tacky. But on what logical basis can we explain the concept of kitsch and tackiness to a design student? The first impression we get from an object is a visual one. The object is communicating information through its aesthetic appearance, which tells us if it is going to be suitable for our needs or if we will like it in an emotional sense. The significance of this communication can be planned by the development of the shape of the object. Certain shapes represent, or identify, certain personalities. Students must understand the rules of developing shapes and systems of shapes in order to successfully apply this knowledge later in their design assignments.

People may look at objects and find them visually attractive, elegant or beautiful. Often the activity of perceiving an object is pleasurable in itself, regardless of other value judgments that might be made. Positive aesthetic impression has interested design researchers for decades and philosophers for centuries before. Although the subject of beauty has been studied for centuries, there is still no unanimous consensus on what is beautiful or what makes a beautiful artifact. Also, there has been little progress in the formulation of a coherent theory with respect to the aesthetic aspect of design.

Baxter describes the inherent attractiveness of a visual form as “that most illusive and intangible quality.” In spite of this, there are aesthetic principles and theories that can provide a useful conceptual foundation for the study of the perception of attractiveness as comprising objective and subjective components, and as a balance. (Baxter, 1995) So here we are again at the 200-year-old issue.

Form and Function

The “form follows function” theory was declared by the sculptor Horatio Greenough, then repeated by Louis H. Sullivan 100 years later, then adopted by Frank Lloyd Wright as “form and function is one.” The issue became controversial among designers ever since. The “form follows precedent” seems at first more like a flexible solution to what the future will offer. Although the slogan is catchy there is not too much substance in it anymore. What function are we supposed to think of? Does it mean that function and form are inseparable? (Or are they?) Let’s ask what are the rules of defining the shape of a specific function? What shape should a door handle be? (Or should it be a knob or a lever?) The form has to allow the function to work in its physiological sense. The English toilets and French toilets do not resemble each other, yet their function is evidently the same.

In the 1930s and 1940s, Raymond Loewy, Norman Bel Geddes, and Henry Dreyfuss revolutionized American design. Tackling the inherent contradictions of “form follows function,” they redesigned everything they could put their hands on. Loewy formulated his MAYA (most advanced yet acceptable) principle to express that product designs are bounded by functional constraints of mathematics, materials, and logic, but their acceptance is constrained by social standards.
By honesty applying ‘form follows function,’ industrial designers had the potential to advance their clients right out of business. It is not a surprise that very few products from the early constructivist Bauhaus movement made it to production. The culture has to be ready for change in order to accept a design. Designers on the other hand must know what the cultural needs are at any given time and how to combine theory with practice to develop successful products. That is the secret and Deter Rams knew it!

Students have to understand that shapes without physical function still carry or possess emotional, cultural, aesthetic, or semantic functions that are communicated through the visual appearance of an object.

Objective and Subjective Attractiveness

Most early scholars of beauty held the viewpoint that attractive features resided in the object itself. Beauty was considered to be an objective property of the stimuli under consideration. John Ruskin stated that “a horse is inherently beautiful while a locomotive is inherently ugly.” Certain lines, proportions, shapes, and colors were believed to be naturally attractive. This approach suggests that each object will have an ideal form, which once attained, will tend to be considered attractive by everyone.

A great deal of historical art, design, and architecture is based on the notion of inherently pleasing proportions (such as the golden section), and the adherence to strict geometric rules. The Bauhaus school pioneered the application of this approach to product design in the 1920s and 1930s. Products from the Bauhaus school were highly rational and reflected the work of the Gestalt psychologists, who identified the tendency to perceive or construct symmetry, regularity, and harmony. This innate desire for order in visual stimuli resulted in a number of aesthetic principles that were developed to aid the production of pleasing designs. These principles are commonly referred to as the Gestalt rules. There are a large number of these rules, which include an emphasis on symmetry, proximity, similarity, continuance, repetition, and closure.

The presence of verifiable differences between people’s judgments makes it difficult to believe in universal aesthetic principles. It is also inevitable that the visual appeal of objects is also influenced by socio-cultural, socioeconomic, historical, and technological factors. As such, the ideals and standards to which one culture aspires may not be appreciated by other cultures. This issue of cultural taste indicates that the objective properties of a design are insufficient, by themselves, to make clear judgments as to the attractiveness of an object. People’s subjective experiences are also important and contribute to aesthetic impressions. These prior experiences will influence a person’s perception of shape.

Functionless Shapes

In order to be able to appreciate beauty and harmony in design it is inevitable that students conduct form-study exercises and experiment with developing functionless shapes. This practice allows them to have fun with this subject and gain confidence and explore possible topological solutions for various surface-structural issues. Later on, they will be able to apply this knowledge to their design projects. Because there are no functional or technological conditions involved in these early exercises, they can freely concentrate on fine detailing, developing variations, and experimenting with different materials.

These exercises should not indicate, or otherwise suggest, any functional criteria at the beginning level classes, but rather, concentrate on perfecting form and proportion. At the intermediate level, exercises could connect to nature, requiring students to replicate a biological function in a clear conceptual form.
This requires a study and interpretation of a natural mechanism. Advanced-level students can work with
different material connections and contrasts.

The goal of these exercises is to teach students the rules of forms so that they will be able to rely on their
knowledge when designing instead of borrowing from someone else's design. We know that universal
aesthetic principals are not easily acceptable, but most western cultures accept a general order of
proportion. If I compare this logic to music we are able to recognize the same diversity.

Intuitive design

Students must appreciate and experiment with shapes before they are given the task of designing
something meaningful. Function can only be introduced gradually, otherwise students will not focus on
appearance. Part of design comes from within, intuitively, like music does. Students must understand that
the nature of design is to develop shapes for a specific purpose with a specific meaning by fulfilling a
magnitude of other requirements in the process. In essence, learning to design is learning to see (and
listen). Students must first develop the ability to see and be sensitive to topological solutions. Designing
intuitively means that students are left alone with a simple assignment that does not involve complex
mechanisms or market research. They can only rely on their instincts and sensitivities. By connecting with
one “simple” problem, students can come up with many visual solutions. This exercise helps to target the
development of shapes to assure harmony, balance, and logic.

The visual world is so complex that the mind has developed strategies for coping with this confusion. It
tries to simplify complex visual information. One of the ways the brain
does this simplification by forming groups of items that have certain
characteristics in common. Most of what Gestalt is concerned with is
how these groups are formed and what effect they have on one’s
perception. The stronger the grouping, the stronger the Gestalt is. It is
this grouping that contributes to unity in a design. Gestalt is one of the
most powerful tools available to a designer for creating unity and
unified shapes. The same concepts that form groups can be reversed
to ungroup items—to make them look unique and stand apart. That is
the basis for creating variety, which adds dynamics to a design.

The goal here is to strike a balance between unity and variety. Too
much unity can make the design look boring and repetitive; too much
variety and the design can look chaotic and disconnected.
Understanding Gestalt concepts can help students control unity and
variety. A complex object is really a group of many simple items that the mind puts together as a single
entity. A face is a collection of eyes, ears, nose, mouth, etc. We can recognize a familiar face even if part
of it is hidden (for example with a hat or sunglasses). The mind supplies the missing parts if enough of the
significant features are visible. Thus the brain uses intuition to fill in the missing components.

Aesthetic Balance

Some cultures are more aesthetically conscious than others. In this way, they are able to communicate to
the world that they have organized themselves to a healthy pattern of life. Italians are proud of their
ancient Roman heritage and the accomplishments of the renaissance. Their design today may not as
comprehensive as the German or Japanese, but none-the-less pleasurable. Italians are also proud of
their musical sophistication. I lived and worked in Italy for several months and am familiar with their
culture. Their language is music to them and the grammatical rules often change to accommodate this
harmony. This attitude places aesthetics as a cultural value that existed long before capitalism and mass
production began. Some cultures are more concerned with utilitarian “profit hungry” manufacturing -
others are not. The aesthetic balance comes from within—with the culture and with the appreciation of
one’s heritage.
Michael Thonet’s furniture designs were accepted around the world. They have become “must have” items like the Citroen DS (Flaminio Bertoni) and other such products because they were shaped well. Products communicate to a user through their forms just as a computer program communicates through its interface. Shapes make sense to users, allowing them to formulate an emotional bond with the product at first sight. This act is a factor of cultural, social and demographic conditions.

When considering aesthetic impressions, Ernst Gombrich proposed that “delight lies somewhere between boredom and confusion.” For stimuli to be considered attractive, the extent to which they make sense to the viewer must be balanced by the extent to which they present something of interest. Daniel Berlyne suggests that the hedonic value (pleasure) associated with perception of a stimulus will peak when there is an optimum level of psychological arousal. Too little arousal will cause indifference, while too much will result in displeasure. This is the “wow effect” (as we currently refer to this phenomenon).

**Design for Aesthetic Impression**

Designers use their skill, training, and experience to produce products that cause a positive aesthetic impression. Our unspoken understanding of perception and visual composition often guides our intuitive judgments. Indeed, there are those who feel that intuitive creativity is all that is required for the production of visually attractive products and that a scientific approach is not relevant to an understanding of the problem.

This view may be reinforced by the discovery that very few scientific studies have led to generalizations that are useful for students or practitioners of design. When composing music for example, composers can follow rules, but the music will not necessarily turn out to everybody’s liking. In music there is structure, rhythm, order, harmony and tone, which define emotion. Good design posses these same attributes!

However, designers and consumers often interpret products differently and express different aesthetic preferences. Thus, although styling is the artistic part of a product, design directed towards opportunities and held within constraints. Measuring consumer response to products and correlating perceptions with product features may offer the opportunity to modify designs and more closely align them with consumers’ aesthetic preferences.

**Semantic interpretations**

Designed objects are often functional devices that operate in some way to perform the task for which they are intended. Consequently, a significant portion of the value assigned to products may be attributed to their utility. This may comprise practical qualities such as function, performance, efficiency and ergonomics. These aspects of utility can be conveyed to some extent by the visual form of a product. This evaluation of a design’s apparent utility and perceived qualities is a semantic interpretation.

The characterization of product semantics appropriate to this interpretation is limited to what the product appears to communicate about itself. The extent to which products are seen to reflect the identity of their owners is also a factor to consider as a symbolic association. A distinction is made here between what the product is seen to indicate about itself and what it is seen to symbolize about its owner.
While it is true that the design profession is getting ever more complex, we must not dismiss the fact that as designers, we are first and foremost about designing forms. Using shapes for visual communication is our primary job. Consequently, understanding form and its special relationship to the object is a key for students to understand in order for them to successfully fulfill the psychological function of a design. The form of an object could carry fundamental information that must communicate the intended message. Students must be taught to fully understand the fundamental elements of developing shapes with diverse objectivity and to what extent details of the basic essential elements are contributing to the harmony of the design.

The design process starts with sketching. The ability to sketch is imperative for a designer. The more detailed the sketch, the more transparent a concept becomes. A knowledge of drawing gives students the ability to visually explore various concepts in minutes. We draw what we know and not what we see, therefore, students have to be taught geometry and anatomy to be able to connect their ideas with reality.

Cognitive Design

We must allow a healthy transition from intuitive design to cognitive design and address this progression as a design process in the classroom. To achieve this goal, we must first teach students to see, observe and understand the world around them. Once students gain an awareness of aesthetic values, they can be slowly introduced to the concept of design.

Cultural and social backgrounds as well as other personal experiences are influential in determining people’s responses to objects. Designers and consumers are often (but not always) separated by time, place, or social group. As such, the context of consumption within which the consumer operates is an important consideration. The cognitive response phase in the design communication framework has been presented as comprising aesthetic, semantic, and symbolic elements.

Form Study

Design programs often focus on research but do not allow time for detailed development work with respect to product aesthetics. The first idea has to work and be finalized. Sufficient time has to be spent on research synthesis and aesthetic development of topology.

Learning from all that has been said about how many ways form influences the way people perceive a product, it is important to conclude that our job is fundamentally to deliver an experience in the form of a shape. The magic of creating this experience is what we have to teach to our students—if we do this successfully, the rest of the process will fall into place. Students are also dependent on their culture, background, knowledge, and lifestyle that will influence them when they experiment with forms. For this reason, assignments have to be carefully planned so they remain neutral, preventing their association to other objects they may want to copy. In pursuing this approach, it is key that we teach students to develop forms with intellect and logic and prohibit them from using aesthetic clichés, which could result in the fabrication of kitsch.

The rational behind form study is to enable students to truly value the difference between forms and proportion, just as they do between a variety of faces. If they can meaningfully address the logic behind forms they developed, we have achieved our goal and can move on to implementing their form study into the design process.

In our classrooms, we plan our own design process and that process has to be carried throughout the course of the program. In the first and second years when most students are not even clear on what industrial design really means, the practice of understanding a problem through research and experiment is more important than the technical and
functional elements of a design. At this time, form development, at its most involved level, is the key to students' progress, which later will allow them to focus their efforts on other design issues.

Conclusion

The importance of separating form study from design can be compared to practicing music. Music can sometimes sound like noise that we cannot tolerate. Thus, we do not have to be musicians to recognize dissonance. Forms are the same except people are less able to recognize false pretense with form. Thus, before musicians can play a part, they must practice notes—design students have to study shapes before they design parts. If students are struggling with developing the shape and proportion of the part no matter how good the idea is the design will fail. The opposite is also true, but that is for another discussion. Students must be confident and comfortable with sketching up shapes easily and freely.

Although the subject of beauty has been studied for centuries, there is still no unanimous consensus on what is beautiful or what beautiful artifacts are. Also, there has been little progress in the formulation of a coherent theory with respect to the aesthetic aspect of design. I suggest until that time, let’s just keep trying our best.

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