QUARTERLY OF THE INDUSTRIAL DESIGNERS SOCIETY OF AMERICA **SPRING 2011**

INNOVATION

Material Witness

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QUARTERLY OF THE INDUSTRIAL DESIGNERS SOCIETY OF AMERICA **SPRING 2011**

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Advertisers' Index

By Chris Lefteri, I/IDSA

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Chris Lefteri is a leading authority on materials and their application in design. He has published eight books on design and material innovation, which have been instrumental in changing the way designers view and use materials. He is currently a Smart Materials Theme Champion at the Creative Industries Knowledge Transfer Network in the UK.

Things You Can't Draw on a Computer

TANGIBLE VS INTANGIBLE

Can the design industry lead in the development of new materials? This is a question I am addressing as part of a project organized by the UK government. It's a line of inquiry that requires me to work like a dating agency—helping designers to find materials partners and helping materials-based organizations to find designers—with the ultimate aim to form relationships that will lead to innovation and knowledge sharing.

Sharing knowledge about materials is often about bridging gaps—geographical gaps, the gaps between the physical and virtual, and the gap between communities who use different languages. I'm referring to technical information about supplied materials by scientists or engineers that describe tangible properties that often need to be translated into intangible, emotive applications in a product. For example, understanding the term "thermal conductivity" and being able to translate that into the tactile sensation of how warm or cold something feels to the touch is crucial in communicating and branding a product to consumers.

I have always been passionate about finding ways to bridge these gaps, how to refocus the information given by an engineer into something that would have meaning for a designer. Using images, text and stories, my work brings out the curious boy in me who wants to take apart his toys and tell all his friends what he found—except sometimes what you find is not that easy to see unless you really look hard. And sometimes these discoveries seem odd or irrelevant to engineers and scientists, weary of designers peering into their world and prodding them with strange questions. This is not surprising—we as designers *do* ask strange things of these materials; it's in our nature to be curious and to ask, What happens if …?

Bridging gaps is not easy partly because materials and the role they have in industrial design continue to rapidly evolve. To define the role into a tangible form becomes increasingly difficult—as Ezio Manzini wrote in his book *The Material of Invention*: "It's like trying to capture a family photograph when the whole family is in constant motion." Combine that with the challenge of having information available about the hundreds of ways materials can be converted and the complexity of global production, supply chain and procurement. In terms of plastics alone, the sheer sophistication of mold design or grades of biopolymers, which grow in numbers seemingly with each season, makes you realize the huge amount of knowledge it requires to enable designers to utilize, manipulate and express the changing relationships we have with materials, processing and products, summarizing Manzini's analogy of a blurry family photograph.

100% Materials, 2010

Teaching Materials

One of the areas that needs to be addressed is how industrial design students begin the process of understanding these complexities. As a growing sector within the profession—which grew out of the auto industry—the color, material and finish (or CMF) department of design studios has evolved into a significant part of most design organizations, from consumer electronics to sports shoes. CMF experts are increasingly important in finding manufacturing solutions and addressing environmental issues, consumer trends and strategic growth. But even with the rapid growth of the CMF area, there is little evidence of a corresponding trend in industrial design education. How can the design curriculum be advanced to enable the designers of tomorrow to evolve with this growing area and enable them to lead future material developments?

The teaching of materials has remained the same for at least the last 30 years. It is a subject with a strong ability to motivate and inspire through the captivating theater of mass-production machinery and the design empowerment brought by a basic understanding of material properties. The Web is filled with stories about how things are made, which is increasingly important in a world where consumers are becoming more concerned about the origins and production methods of their products. Just look at the way Apple communicates its hardware in its stories—look wider on the Web and you'll find entire blogs dedicated to showing disassembled Apple products, offering valuable lessons about production and assembly. The need to find out how things are made goes far beyond design; so how does teaching evolve to tackle this area?

Teaching materials and production is a tricky business because it can be difficult for students to get a first-hand experience of complex manufacturing processes. **Design education in the area of materials and processes tends to deal only with written descriptions and diagrams, not affording that all-important dialogue with suppliers and factories.** Part of a new curriculum should involve providing students with the tools to apply and discover new research methods (learning how to look), defining a strategy and applying this within a design process (learning how to think) and finally communicating the results (learning how to tell the story). Essentially these are three areas that can be viewed as the core of industrial design teaching, but also as having a high level of relevance to materials and production. Interaction design has been given prominence in many colleges, but why are there no design-based materials courses anywhere? I don't mean in the craft context, but in the realm of mass production. If companies want to hire designers in this area, where do they look? At the moment one of the main feeds seems to come from textile design, possibly the only design discipline where the undertaking of making materials exists for its own sake. Textile design is also a discipline that traditionally has been more about hands-on making than CAD; although textile designers design textiles, not products.

Below: Sandwich, Musashino University, Tokyo

Designers talk about users' emotive and sensory experiences with products, but how does this information feed into the design process? Combining these aspects with core design skills and exploiting new converging technologies will produce students who are experimental, creative, socially engaged and able to develop an independent point of view. I believe there is also room to address the balance between the US-based approach—taught content, achieving a high level of professional skills and facilitating a deep understanding of materials, production and sustainability—with the European approach—more experimental, self-directed study. This is not just an important area for education but for the profession as a whole.

Experimentation

Ten years ago industrial design entered a new phase in its application of materials, a trend that was all about "new materials." Before that, material libraries barely existed, and if you wanted information on materials it was like reading a school textbook combined with stock photos of very dull components or, if you were lucky, actual design products. Then came along information sources with some amazing new materials crying out to be used in innovative ways. It was great for a while, and this explosion in materials helped to reposition material specification as a significant part of the creative process. But since then, companies have begun to realize that these new materials are very difficult to commercialize. They may be groundbreaking in their performance, but they are often made by one small supplier who can't deliver the quantities needed by global brands or meet the demands of key players in the supply chain, or they are just too expensive. You could do what Apple did with the small, research-oriented but potentially game-changing supplier Liquid Metal and simply buy the company, but not everyone invests in design like Apple.

Design is entering a new phase in its relationship with materials, one that does not focus on the new materials that make the headlines, but on acquiring new knowledge in order to make the best use of traditional materials. Fundamentally, working with materials is entwined with converting something from one state to another and the geometry of components; it's not always about finding the strongest, the lightest or the most energy-efficient material. More often than not, the answer may lie in a more traditional, supposedly well-known, material.

I have started to run a project based around this premise that allows students to experiment with materials in a simple way. It's called "Sandwiches," and it started with a group of design students at La Salle College of Art in Singapore. My only instruction was to start with a selection of simple, affordable materials, like paper drinking straws, glue, paper and rubber bands, and stack them together like a sandwich to see what new material properties arise. Essentially, the central question is to find out what new properties can be coaxed out of very basic, traditional materials in order for the students to try a hands-on approach to materials. But this project is also relevant to design professionals in terms of really exploring what's possible to achieve with existing materials.

In hindsight, it's clear that over the last 10 years designers have become more important in specifying materials. For example, just look at the Innovation Lab from Eastman Chemical championed by Gaylon White, Affiliate IDSA, recently acknowledged by IDSA for his contribution to design, is an initiative that realizes the importance of designers as key customers for material suppliers.

Beyond being key in specifying materials, designers are also leading in the development of new materials. *Time* magazine's list of 50 Best New Inventions from 2010 included three materials: Sugru, a hand-moldable, air-curing dough that allows users to modify and "hack" products to their own wishes; Fabrican, or fabric in a can, which is an aerosol that sprays fabrics; and BioCouture, a new type of nonwoven textile made from cellulose and bacteria. But what's really significant about these materials is that scientists did not invent them—designers did.

No longer are new materials being developed exclusively by chemists and engineers. Finally, the creative industry is muscling in and assuming a leading role in the development of new materials. ■


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