

Users Connecting with the Design Process—Has the Paradigm Shifted?

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This paper has been written with the assumption that the IDSA Education Conference 2007 will follow the format established in 2006, of prior distribution of papers with short presentations followed by discussion. Accordingly, it is aimed at raising questions rather than providing answers.

Traditionally (and this particular tradition goes back all of 60 years maximum) industrial designers have seen themselves as advocates of the needs of users/consumers in the product development process. Earnest problem solvers in the service of humanity, selfless empathizers, and non ego-driven — essentially humble people committed to the good of all. We are not sure how Raymond Loewy, Philippe Starck, Ettore Sottsass, J Mays, and Karim Rashid would fit this mold, but even they would have to acknowledge that there is a user, customer, or client somewhere whose needs have to be adequately enough addressed so that they buy the product or pay the bill.

At the recent Midwest IDSA conference, John Barrett, CEO at Teague, expressed the view that industrial designers have tended to define themselves by their associations—originally with engineers as product development consultants, then with marketers as brand design consultants, and latterly with executives as innovation consultants. Now the time has come, he argued, to reidentify with product users as ... (name to be determined) consultants (Barrett, 2007). There are other specialists involved in the designing process who also have the needs of the user in mind—ergonomists, marketers, and sales people, but we have habitually considered that the ability of industrial designers to empathize, extrapolate, interpret, conceptualize, and create in response to those needs is a very particular contribution to the design process.

Widening the Definition of Users and Consumers

Over the last twenty years, there has been a welcome expansion in the definition of the users we were designing products for. No longer just the majority—able-bodied, reasonably well-off consumers—strangely, those who corresponded most closely to ourselves and whose needs we could intuit most easily by reflecting on our own. As the gender composition of ID programs has moved to 50:50, the old stereotype of male WASP designers designing for themselves is fast disappearing. Now, design considerations have to include the smallest and largest percentiles, people with cognitive, perceptual, and/or physical abilities different from the norm, minority communities, cultures, and subcultures, in a global context. The various approaches of inclusive, universal, barrier-free, or user-centered design are all now recognized as valid and important.

It has always been tricky to identify user needs. Whilst designers often distrust the outcome of the market research enquiry (“they only frame questions about existing products”), focus groups and other methods often serve to demonstrate (yet again) that people say one thing, do another, and possibly feel something different. In *Blink*, Malcolm Gladwell (2005) discusses the pitfalls of user enquiry processes, including the user studies that the Herman Miller Company conducted on the Aeron chair designed by Don Chadwick and the late, lamented Bill Stumpf. The designers intended to address the sweat management issues of office workers by providing a ventilated seating surface. In trials, users found the chairs spare, skeletal appearance unfamiliar and this perception translated into feelings of discomfort in use. The testers only elicited reliable and positive comfort feedback when they covered the chair with a dustsheet. To their credit, Herman Miller persisted anyway, people became accustomed to the aesthetics, and the rest is dot.com icon and MoMA history.

Design companies have developed means of determining user needs by observing what they did, rather than what they said. IDEO calls this *hitting the streets* and uses an approach derived from ethnography

and anthropology to better determine unanswered or inadequately answered user needs. Observing the daily experiences and behavior of individuals whilst carrying out tasks can provide significant insights that increase the designer's awareness of authentic user needs and reveal product design opportunities.

Bruce Nussbaum ignited the section of the blogosphere that designers occupy in March, when he posted his speech to design management students at Parsons, the New School, entitled "Are designers the enemy of design?" (Nussbaum, 2007) His fundamental question was *how we move from designing for, to designing with* as the next paradigm shift that has to happen. Is he right?

Empowered Consumers and Active Users

In *The Long Tail—Why the Future of Business Is Selling Less of More*, Chris Anderson (2006), editor of *Wired* magazine, explores how information technology has fundamentally changed the nature of retail. Changes in the way products are bought and sold inevitably have a significant effect on industrial design practice. The *long tail* refers to the right-hand side of a graph that records the sales totals of individual items. The left-hand side of the graph are the big volume hits, and the right-hand side is the record of the small sales of other products (Figure 1). So the graph runs from the mainstream on one side to niche items of reducing sales volumes on the other. Anderson's contention is that although the number of sales for each individual item in the tail is low, the graph stretches out so far to the right that the overall sales volume in the tail is not at all negligible.

Fellow author and trend-spotter, Malcolm Gladwell, neatly summarizes Anderson's Long tail idea as follows:

Many of us see the same movies and read the same books because the bookstore can store only so many books and the movie theatre can play only so many movies. There isn't enough space to give us exactly what we want. But what happens when the digital age comes along, allowing the bookstore to store all the books in the world? Now it doesn't have to sell 1,000 copies of one book that we all kind of want; it sells one copy of 1,000 books each of us really wants. Five sentences to explain something that, if you think about Amazon and Netflix and iTunes, will make you see the world a different way. That's a Truly Big Idea. (Gladwell, 2006)

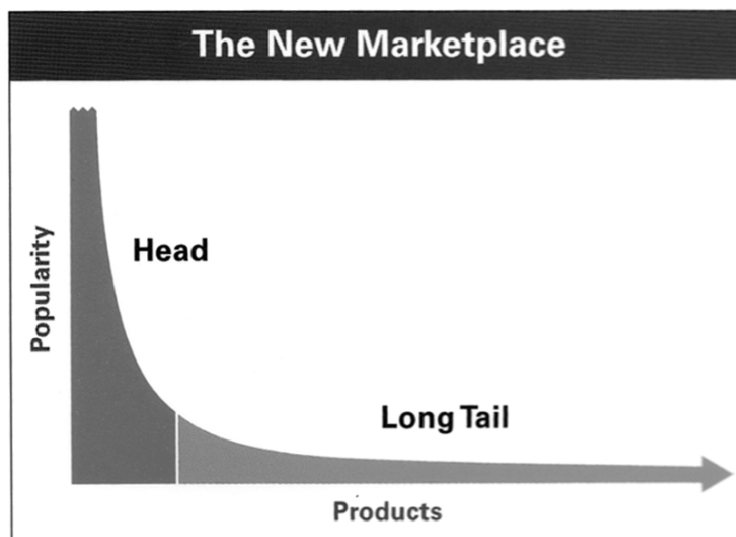


Figure 1. The long tail.

Music retailing used to depend on the sale of physical media in physical stores. This emphasizes the importance of hits because the best strategy for retailers is maximum sales of individual items and minimum number of stocked items. By contrast, a digital inventory of physical items can exist in many

locations, connected by the database. Choice can move towards the infinite, an outcome that becomes even more feasible when you move from physical media to digital files, ready for make-on-demand or downloading. On its own, infinite choice would be a nightmare but that is changed by the technology of search. We forget easily that the first effective search engine, AltaVista, was only invented thirteen years ago, so quickly have we become dependent on its successors in our everyday lives. In addition to search enabling us to find things—links, reviews, recommendations—*also bought this* connections enable us to find things we like, with instantaneous price and performance comparisons. Choice plus search plus information creates active and empowered consumers. Anderson contends that old markets in retail and media are about managing *scarcity* of shelf space, inventory, and choice, whereas the new digital markets are about managing *abundance* as choice becomes infinite and bandwidth and storage become free. Everybody has access to anything—but let's not forget that doesn't mean everybody can *have* everything!

In product retail, all the same scenarios apply, with the possible exception of downloading (so far). With diligent and resourceful search, it is possible to find any product produced anywhere in the world. For many products you can also find information about performance, reviews, recommendations, etc. The mediation of consumer choice, by manufacturers, retail buyers, and mail order catalogue stockists, is fast disappearing. Unmediated consumer choice can throw up some surprises, as in the case of KitchenAid food mixers.

In addition to the conventional black-and-white, KitchenAid makes mixers available to retailers in up to fifty colors. Conventionally retailers will choose 6 or 7 additional colors from the list. However, when the company made all colors available on its Website for direct order, customers often chose colors the retailers had not picked.

What's interesting is that when customers are allowed to pick from all of the fifty KitchenAid colors, they don't just stop at the half dozen available in traditional retail. Instead, a Long Tail emerges. Of course white and black remain the best-selling colors, along with most of the others available in regular stores. But all the others sell, too—every one. And each year, somewhere in the top ten, there is a color that nobody expected to be popular. (Anderson, 2006)

In addition to searching for what they want, customers can also use retail Websites as pre-edited lists of recommendations. Find a Website for people like you, and you'll find stuff you like. Expert Web retailers are careful to develop the experiential aspects of their sites. For the design digerati coolhunting.com, betterlivingthroughdesign.com, and kioskiosk.com are regular destinations. As long as you are prepared to pay shipping and handle customs forms, regional and national boundaries also dissolve. In a new hybrid form of retail, Nau, an environmentally orientated outdoor clothing company, is opening Web-front stores in several U.S. cities. These will have stock clothing samples but also Web kiosks. Customers will be offered discounts to order online and have their goods delivered, reducing the stock volume the store needs to hold.

The final impact of these technologies is on business models for retail and manufacture, affecting all levels from the one-person second-hand specialty motorcycle dealer trading from her garden shed, on up to the biggest of the Big Box retailers. Between them, E-bay, Amazon, Google, FedEx, and Paypal have created a business structure in which niche retail and manufacturing businesses can flourish. Ebay and Amazon marketplace (the network of connected retailers) provide location, Google deals with advertising and access to customers, Paypal handles the financials and FedEx the shipping. In addition to new forms for microbusinesses, this also creates new forms of relationship between those businesses and their customers, altogether closer and more intimate, with the possibility of more direct consumer involvement in devising the products that these businesses sell. It also opens up possibilities for designers to get involved in manufacture and retail themselves. This is well exemplified by Scott Wilson's iBelieve, a simple lanyard that turns an iPod shuffle into a wholly different icon, advertised on the Devoted1 Website, distributed from the Wilson kitchen table, a product now sadly extinct.



Figure 2. iBelieve

Customization—This Time It's Personal

Before the Industrial revolution, manufacture tended to be local. Seen in the rosy glow of hindsight and overgeneralization, the stuff you needed you made yourself or your friendly local craftsman made it to your specification. Increasingly, the production of stuff became specialized and centralized, with the economics of scale in mass production being the dominant paradigm. The practice of adapting existing products to better suit your individual needs is an activity common to most of us. Customizing, hot-rodding in the vernacular, or pimping in the most current vernacular, is an activity redolent with outsider creativity as so-called nondesigners set to work on the designers' pride and joy, looking upon the product as supplied as a promising start.

In the car and motorbike field, accessible CAD/CAM, CNC, and rapid prototyping (RP) technology has transformed what street pimps can do. The custom car shop Five Axis in southern California (SoCal) gets its name from its five-axis CAM machine that is used to make custom body parts and molds from CAD files and scans, to convert compact Japanese imported cars into so-called SoCal Rice Rockets. The impact of this technology on the custom car business has been transformative—in a recent episode of the TV program *Rides*, master customizer Chip Foote described making a press tool from Cadillac-supplied CAD files to press a single stainless steel roof panel for a modified Cadillac. For those of us brought up on the notion of amortizing tooling costs over a production run, this is a bit of a stretch. It is, however, the wonderful world of television, where the normal rules of economics and physics do not apply.

The custom subculture now feeds back into the mainstream. A Toyota sub-brand, Scion, has three models intended to establish the company in the youth market. The most interesting is the XB—the car best described as looking like the box it came in. The XB can be specified with a variety of options and is celebrated in promotional materials by ultrapimped exemplars. It sells to college kids who value its practicality, trick it out with performance parts, audio systems, and candy-colored tangerine-flake, streamlined paint jobs, rendering it uber-cool. It also sells to their parents/grandparents who value its practicality and enjoy the fact that their children/grandchildren think it is cool. As boomers like to think they invented cool, continued attribution is very welcome. Chrome spinner rims, turbocharger, nitrous oxide cylinders, or ADA grab rails—it's your choice of optional extras.

Not rigorous market research, but a conversation with the local Toyota/Scion dealer confirmed the split demographic of XB purchasers—under 25 and over 55. Recently the company stated that the 2008 XB would only be advertised on the Web, to maximize its appeal to its target (young) audience. Toyota is to be congratulated on making this dual appeal work, something that eluded Honda with the Element and Chrysler with the PT Cruiser, with sales of these models mainly confined to the older demographic rather than the young market the cars were originally aimed at.

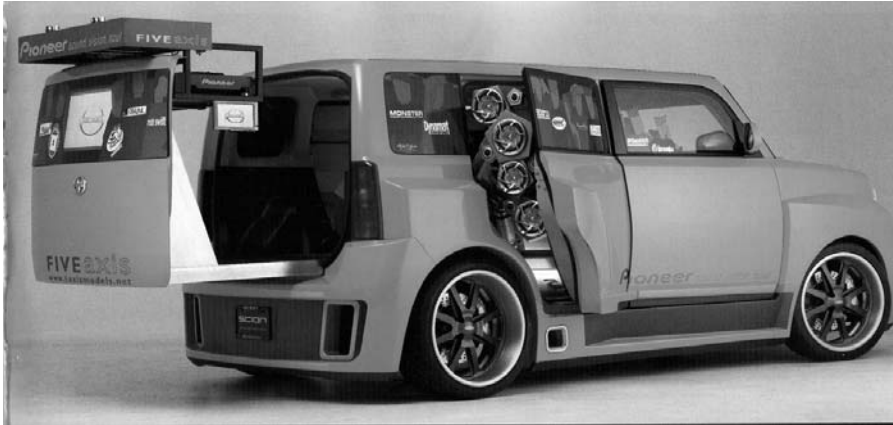


Figure 3. Scion XB, modified by Five-Axis.

Mass customization is the way mass production has adapted to provide more choices to consumers. Products, systems, and components are modularized, with the customer specifying the combination of components that suit their needs, with the products being assembled to individual orders. Dell computers have always been built this way. In Germany, you can custom order a new VW, fly to Wolfsburg, and drive it off the end of the production line. User participation in this way can be immensely satisfying for the user. It encourages and develops user-product bonding prior to purchase and helps to establish tribes of users. User involvement within the designing process impinges on the role of the designer but also supports the proposition that design is about generating experience rather than just creating passive objects.

Democratizing Innovation and the Lure of Open Source

Hacking, hot-rodding, and pimping are all common activities outside the world of SoCal car modifiers. In *Democratizing Innovation*, Eric von Hippel (2006) examines the practice of user modification and how the lessons to be learnt from this affect what manufacturers (and by implication, designers) can and should do. Von Hippel states that only 26% of consumer products and 27% of industrial products are a success. He cites the failure to understand user needs as a reason for this. Many examples are given of lead users modifying products to suit their purposes, showing innovations from extreme sports, surgical equipment, software systems and industrial fabrication equipment. His view is that manufacturers should proactively embrace, facilitate and benefit from establishing relationships with these active lead users as a way of improving their product success rate (and at 26%, it can only go up!).

Issuing software in beta versions to be tested, evaluated, and debugged by favorably disposed users is now a common practice. The creation of an innovation community of lead users has many benefits. Slim Devices is a company that makes extensive use of lead-user feedback in developing their domestic wireless music servers. The Slim community of users, modifiers, and reviewers have helped the company to optimize existing products and provide input to the design of new systems. The new Transporter model, aimed at the audiophile market, relied heavily on the input from the Slim user community for all aspects of the design from casework to controls and operating software (Slim.devices.com, 2007).

Open Source originated in the field of computer software and is a practice of allowing innovations to circulate freely without return to the innovator. Von Hippel cites historical examples of the benefits of freely revealing intellectual property in the nineteenth-century iron industry and the disbenefits and innovation inhibition created by *patent thickets* in the pharmaceutical industry. Open source grew from the academic origins of computing research when sharing ideas freely was the prevalent convention. When the chance to profit from innovation is low, due to the cost of patent protection or investment, freely revealing ideas can have direct benefits in building reputation. Von Hippel describes the various alternatives to patents and copyright in the form of creative commons agreements, which exist to protect the interests of disclosers by determining how their ideas can be used. The combination of competition

and mutual support in the open source software community may well be one worthy of emulation in other fields.

The notion of open source is a particular challenge to the design profession, whose collective expertise lies in the generation of ideas, embodied in products or experiences, invested in, and sold by their clients to the ultimate end-users. Confidentiality has traditionally been seen as essential, as the competitive advantage of consultants and manufacturers alike has depended on this. But the speed at which information now circulates changes all that. Preview photos, rumors, speculation, and gossip are available widely and instantaneously. A recent edition of *Wired* devoted its cover story to *radical transparency*, the growing practice of companies to publish plans, details of future products, and create forums for user input.

Some of this isn't about business; it's a cultural shift, a redrawing of the lines between what's private and what's public. A generation has grown up blogging, posting a daily phone cam picture on Flickr, and listing its geographic position in real time on Google maps. For them authenticity comes from online exposure. It's hard to trust anyone who *doesn't* list their dreams and fears on Facebook (Thompson, 2007).

Do-It-Yourself Design

In the field of graphic design, there are several technological innovations that were originally hailed as heralding the death of the discipline—photocopying, Letraset, and desktop publishing. All are technologies that enable ordinary people to produce things of a higher production standard than hitherto, obviating the need for a professional. Ellen Lupton's recent book *Design It Yourself*, has provoked a nervous controversy about the democratization of design that it advocates. In spite of these threats, graphic design as a profession continues to flourish (Lupton, 2006).

There is a general resurgence of interest in the activity of making things yourself. Going way beyond the popular interest in Home Depot, Project Runway, or the home-makeover shows, the new making movement has its roots in hacking and the generation of user-created content on YouTube. The best examples are contained in the O'Reilly magazines *Make* and *Craft*. *Make* is maker hard-core, describing ways of turning an obsolete VCR into a timed cat feeder and hacking into your houseplant's DNA. But there is an undercurrent of serious science and a serious message—making stuff is fun. It also connects to the network of Websites and forums in the Geekosphere that show you things like how to hack your iPod with a 300 GB external hard drive.

Some *Make* projects use personal fabrication technology (PFT) as espoused by Neil Gershenfeld of MIT MediaLab. In *FAB—The Coming Revolution on Your Desktop—from PCs to Personal Fabrication*, he states

My hope is that Fab will inspire more people to start creating their own technological futures. We've had a digital revolution, but we don't need to keep having it. Personal fabrication will bring the programmability of the digital worlds we've invented to the physical world we inhabit. While armies of entrepreneurs, engineers, and pundits search for the next killer computer application, the biggest thing of all coming in computing lies quite literally out of the box, in making the box (Gershenfeld, 2005).

The book cites the examples of music/media production and desktop publishing as precursors of the widespread adoption of PFT. The technology is familiar to designers in practice. Plastic deposition, laser cutting, and CNC milling are used in the FabLabs that Gershenfeld installs around the world. Particularly interesting is the way the Fablab in India enabled rural Indian entrepreneur/inventors to exploit the greater dimensional control afforded by this technology, essentially leapfrogging one stage in industrial development.

The author makes a persuasive case and there is no doubt of the future importance of PFT. The vision of a machine the size of a refrigerator in your basement that spews out appliances to your own specification is a way away in the future but PFT equipment is getting cheaper. The Desktop Factory 3D printer

designed by Idealab produces plastic components up to 5 inches cube, sits on a desk, and is planned to cost \$5,000, with prices projected to fall to \$1,000 in four years.

“You could go to mattel.com, download Barbie, scan your mom’s head, slap the head on Barbie, and print it out,” suggests Joe Schenberger, director of sales for Desktop Factory. “You could have a true custom one-off toy.” (Hansell, 2007)

However, relatively simple products can involve many different materials assembled into mechanisms with motors and electronic control devices. Although some mechanisms and assemblies can be designed for direct 3D printing not requiring assembly, this is only currently possible if the same plastic material is used throughout. Assembly of components made in different materials is problematic. It may be that localized RP/assembly facilities rather than domestic ones will be the way this develops. There is no doubt that eventually PFT will enable consumers, to participate directly in personalizing, specifying, customizing, or designing products.

It used to be hard to get stuff made. You made it yourself or it was mass-produced. There wasn’t a lot in between. But now, the Internet and what Thomas Friedman calls *the flat world* are making it easier to have not just a workshop but a factory at your beck and call....This news from the future affects not just makers who are starting to think about becoming entrepreneurs, but also consumers. As factories and supply chains become smarter, we’re seeing a future of mass customization. And entrepreneurs are harnessing all the power of the Internet to approach manufacturing in new creative ways (O’Reilly, 2007).

And from the Website of DUX, an annual conference on Designing user experiences:

Everyone designs, users are becoming cocreators with us. From the up to the minute self-expression of Twitter to the network of me on Justin.tv, users are becoming more responsible for the final deliverable. We think designers must adapt a new flexibility, react, and adjust to unexpected user behaviors. We think designers will need to credit their audiences when attributing the success of new products. (dux2007.org)

Implications for Design Education

The issues for design education go back to Bruce Nussbaum’s question about *moving from designing for to designing with*. The paradigm shift is likely to be harder for educators than students, all of whom are active consumers in the Facebook generation. We will need to lead curriculum development, but we can also expect future students to be more informed, active, and participatory in that process than previous ones. We suggest the following questions, as a prompt for discussion.

1. How do we develop our students’ ability to manage access to the proliferation of information about users and consumers from retail Websites and elsewhere, plus the means of generating information themselves by online methods?
2. As connections between designers and users become more direct, how do we develop our students’ awareness of the new business models?
3. How do we develop our students’ abilities to work with users and consumers in an academic setting? How does this fit in with the university human-subjects research policy? How do we develop facilitation and collaborative skills?

Conclusion

The relationship between designers and the users of the products and experiences they create has experienced a fundamental shift that is set to continue in ways we can only imagine. Users are becoming active and informed, ready to get involved in the generation of product content in cocreative arrangements yet to be developed. The design profession will need to embrace this and design education

will evolve accordingly. But should it feel threatened? Letraset and desktop publishing have not killed off the graphic design profession and the meteoric rise of YouTube still does not mean that Martin Scorsese has had to look for a new line of work. Insight, innovation, imagination, and informed intervention, the stock in trade of creative designers, will be much needed as the relationship with the customer, user, and manufacturers is re-invented in the new business structures that the changes in retail and production technology enable....maybe designers can become more active and empowered as well?

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