



COLUMNIST

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Don Norman claims his goals in life are to make a significant difference, but to have fun while doing so. He is both a businessperson (VP at Apple, Executive at HP and a startup) and an academic (Harvard, UC San Diego, Northwestern, KAIST). As co-founder of the Nielsen Norman Group he serves on company boards and helps companies make products more enjoyable, understandable, and profitable. He gives frequent keynotes and is known for his many books including "The Design of Everyday Things," "Emotional Design," and in October, "Living with Complexity," which argues against simplicity.

Why Design Education Must Change

Posted by [Don Norman](#) | 26 Nov 2010 | [Comments \(39\)](#)

Traditionally what designers lack in knowledge, they make up for in craft skills. Whether it be sketching, modeling, detailing or rendering, designers take an inordinate amount of pride in honing key techniques over many years. Unfortunately many of these very skills have limited use in the new design domains. ([Core 77 columnist Kevin McCullagh](#).)

I am forced to read a lot of crap. As a reviewer of submissions to design journals and conferences, as a juror of design contests, and as a mentor and advisor to design students and faculty, I read outrageous claims made by designers who have little understanding of the complexity of the problems they are attempting to solve or of the standards of evidence required to make claims. Oftentimes the crap comes from brilliant and talented people, with good ideas and wonderful instantiations of physical products, concepts, or simulations. The crap is in the claims.

In the early days of industrial design, the work was primarily focused upon physical products. Today, however, designers work on organizational structure and social problems, on interaction, service, and experience design. Many problems involve complex social and political issues. As a result, designers have become applied behavioral scientists, but they are woefully undereducated for the task. Designers often fail to understand the complexity of the issues and the depth of knowledge already known. They claim that fresh eyes can produce novel solutions, but then they wonder why these solutions are seldom implemented, or if implemented, why they fail. Fresh eyes can indeed produce insightful results, but the eyes must also be educated and knowledgeable. Designers often lack the requisite understanding. Design schools do not train students about these complex issues, about the interlocking complexities of human and social behavior, about the behavioral

sciences, technology, and business. There is little or no training in science, the scientific method, and experimental design.

Related problems occur with designers trained in engineering, for although they may understand hard-core science, they are often ignorant of the so-called soft areas of social and behavioral sciences. They do not understand human behavior, chiding people for not using technology properly, asking how they could be so illogical. (You may have all heard the refrain: "if only we didn't have people, our stuff would work just fine," forgetting that the point of the work was to help people.) Engineers are often ignorant of how people actually behave. And both engineers and designers are often ignorant of the biases that can be unwittingly introduced into experimental designs and the dangers of inappropriate generalization.

The social and behavioral sciences have their own problems, for they generally are disdainful of applied, practical work and their experimental methods are inappropriate: scientists seek "truth" whereas practitioners seek "good enough." Scientists look for small differences, whereas designers want large impact. People in human-computer interaction, cognitive engineering, and human factors or ergonomics are usually ignorant of design. All disciplines have their problems: everyone can share the blame.

Time to change design education

Where once industrial designers focused primarily upon form and function, materials and manufacturing, today's issues are far more complex and challenging. New skills are required, especially for such areas as interaction, experience, and service design. Classical industrial design is a form of applied art, requiring deep knowledge of forms and materials and skills in sketching, drawing, and rendering. The new areas are more like applied social and behavioral sciences and require understanding of human cognition and emotion, sensory and motor systems, and sufficient knowledge of the scientific method, statistics and experimental design so that designers can perform valid, legitimate tests of their ideas before deploying them.

Designers need to deploy microprocessors and displays, actuators and sensors. Communication modules are being added to more and more products, from the toaster to the wall switch, the toilet and books (now called e-books). Knowledge of security and privacy, social networks, and human interaction are critical. The old skills of drawing and sketching, forming and molding must be supplemented and in many cases, replaced, by skills in programming, interaction, and human cognition. Rapid prototyping and user testing are required, which also means some knowledge of the social and behavioral sciences, of statistics, and of experimental design.

In educational institutions, industrial design is usually housed in schools of art or architecture, usually taught as a practice with the terminal degree being a BA, MA, or MFA. It is rare for in design education to have course requirements in science, mathematics, technology, or the social sciences. As a result the skills of the designer are not well suited for modern times.

The Uninformed Are Training the Uninformed

My experience with some of the world's best design schools in Europe, the United States, and Asia indicate that the students are not well prepared in the behavioral sciences that are so essential for fields such as interaction and experience design.

They do not understand experimental rigor or the potential biases that show up when the designer evaluates their own products or even their own experimental results. Their professors also lack this understanding.

Designers often test their own designs, but with little understanding of statistics and behavioral variability. They do not know about unconscious biases that can cause them to see what they wish to see rather than what actually has occurred. Many are completely unaware of the necessity of control groups. The social and behavioral sciences (and medicine) long ago learned the importance of blind scoring where the person scoring the results does not know what condition is being observed, nor what is being tested.

The problem is compounded by a new insistence by top research universities that all design faculty have a PhD degree. But given the limited training of most design faculty, there is very little understanding of the kind of knowledge that constitutes a PhD. The uninformed are training the uninformed.

There are many reasons for these difficulties. I've already discussed the fact that most design is taught in schools of art or architecture. Many students take design because they dislike science, engineering, and mathematics. Unfortunately, the new demands upon designers do not allow us the luxury of such non-technical, non science-oriented training.

A different problem is that even were a design school to decide to teach more formal methods, we don't really have a curriculum that is appropriate for designers. Take my concern about the lack of experimental rigor. Suppose you were to agree with me - what courses would we teach? We don't really know. The experimental methods of the social and behavioral sciences are not well suited for the issues faced by designers.

Designers are practitioners, which means they are not trying to extend the knowledge base of science but instead, to apply the knowledge. The designer's goal is to have large, important impact. Scientists are interested in truth, often in the distinction between the predictions of two differing theories. The differences they look for are quite small: often statistically significant but in terms of applied impact, quite unimportant. Experiments that carefully control for numerous possible biases and that use large numbers of experimental observers are inappropriate for designers.

The designer needs results immediately, in hours or at possibly a few days. Quite often tests of 5 to 10 people are quite sufficient. Yes, attention must be paid to the possible biases (such as experimenter biases and the impact of order of presentation of tests), but if one is looking for large effect, it should be possible to do tests that are simpler and faster than are used by the scientific community will suffice. Designs don't have to be optimal or perfect: results that are not quite optimum or less than perfect are often completely satisfactory for everyday usage. No everyday product is perfect, nor need they be. We need experimental techniques that recognize these pragmatic, applied goals.

Design needs to develop its own experimental methods. They should be simple and quick, looking for large phenomena and conditions that are "good enough." But they must still be sensitive to statistical variability and experimental biases. These

methods do not exist: we need some sympathetic statisticians to work with designers to develop these new, appropriate methods.

When Designers Think They Know, But Don't

Designers fall prey to the two ailments of not knowing what they don't know and, worse, thinking they know things they don't. This last condition is especially true when it comes to human behavior: the cognitive sciences. Designers (and engineers) think that they understand human behavior: after all, they are human and they have observed people all their lives. Alas, they believe a "naive psychology": plausible explanations of behavior that have little or no basis in fact. They confuse the way they would prefer people to behave with how people actually behave. They are unaware of the large experimental and theoretical literature, and they are not well versed in statistical variability.

Real human behavior is very contextual. It is readily biased by multiple factors. Human behavior is driven by both emotional and cognitive processes, much of which is subconscious and not accessible to human conscious knowledge. Gaps and lapses in attention are to be expected. Human memory is subject to numerous biases and errors. Different memory systems have different characteristics. Most importantly, human memory is not a calling up of images of the past but rather a reconstruction of the remembered event. As a result, it often fits expectations more closely than it fits reality and it is easily modified by extraneous information.

Many designers are woefully ignorant of the deep complexity of social and organizational problems. I have seen designers propose simple solutions to complex problems in education, poverty, crime, and the environment. Sometimes these suggestions win design prizes (the uninformed judge the uninformed). Complex problems are complex systems: there is no simple solution. It is not enough to mean well: one must also have knowledge.

The same problems arise in doing experimental studies of new methods of interaction, new designs, or new experiences and services. When scientists (and designers) study people, they too are subject to these same human biases, and so cognitive scientists carefully design experiments so that the biases of the experimenter can have no impact on the results or their interpretation. All these factors are well understood by cognitive scientists, but seldom known or understood by designers and engineers. Here is a case of not knowing what is not known.

Why Designers Must Know Some Science

Over the years, the scientific method evolved to create order and evaluation to otherwise exaggerated claims. Science is not a body of facts, not the use of mathematics. Rather, the key to science is its procedures, or what is called the scientific method. The method does not involve white robes and complex mathematics. The scientific method requires public disclosure of the problem, the method of approach, the findings, and then the interpretation. This allows others to repeat the finding: replication is essential. Nothing is accepted in science until others have been able to repeat the work and come to the same conclusion. Moreover, scientists have learned to their dismay that conclusions are readily biased by prior belief, so experimental methods have been devised to minimize these unintentional biases.

Science is difficult when applied to the physical and biological world. But when applied to people, the domain of the social sciences, it is especially difficult. Now subtle biases abound, so careful statistical procedures have been devised to minimize them. Moreover, scientists have learned not to trust themselves, so in the social sciences it is sometimes critical to design tests so that neither the person being studied nor the person doing the study know what condition is involved - this is called "double blind."

Designers, on the whole, are quite ignorant of all this science stuff. They like to examine a problem, devise what seems to be a solution, and then announce the result for all to acclaim. Contests are held. Prizes are awarded. But wait-- has anyone examined the claims? Tested them to see if they perform as claimed? Tested them against alternatives (what science calls control groups), tested them often enough to minimize the impact of statistical variability? Huh? say the designers: Why, it is obvious - just look - What is all this statistical crap?

Journals do not help, for most designers are practitioners and seldom publish. And when they do, I find that the reviewers in many of our design journals and conferences are themselves ignorant of appropriate experimental procedures and controls, so even the published work is often of low quality. Design conferences are particularly bad: I have yet to find a design conference where the rigor of the peer review process is satisfactory. The only exceptions are those run by societies from the engineering and sciences, such as the Computer-Human Interaction and graphics conferences run by the Institute of Electronic and Electrical Engineers or the Computer Science society (IEEE, ACM and the CHI and SIGGRAPH conferences). These conferences, however, favor the researcher, so although they are favorite publication vehicles for design researchers and workers in interaction design, practitioners often find their papers rejected. The practice of design lacks a high quality venue for its efforts.

Design Education Must Change

Service design, interaction design, and experience design are not about the design of physical objects: they require minimal skills in drawing, knowledge of materials, or manufacturing. In their place, they require knowledge of the social sciences, of story construction, of back-stage operations, and of interaction. We still need classically trained industrial designers: the need for styling, for forms, for the intelligent use of materials will never go away.

In today's world of ubiquitous sensors, controllers, motors, and displays, where the emphasis is on interaction, experience, and service, where designers work on organizational structure and services as much as on physical products, we need a new breed of designers. This new breed must know about science and technology, about people and society, about appropriate methods of validation of concepts and proposals. They must incorporate knowledge of political issues and business methods, operations, and marketing. Design education has to move away from schools of art and architecture and move into the schools of science and engineering. We need new kinds of designers, people who can work across disciplines, who understand human beings, business, and technology and the appropriate means of validating claims.

Today's designers are poorly trained to meet the today's demands: We need a new form of design education, one with more rigor, more science, and more attention to the social and behavioral sciences, to modern technology, and to business. But we cannot copy the existing courses from those disciplines: we need to establish new ones that are appropriate to the unique requirements of the applied requirements of design.

But beware: We must not lose the wonderful, delightful components of design. The artistic side of design is critical: to provide objects, interactions and services that delight as well as inform, that are joyful. Designers do need to know more about science and engineering, but without becoming scientists or engineers. We must not lose the special talents of designers to make our lives more pleasurable.

It is time for a change. We, the design community, must lead this change.

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1. **Comments**

Jason Mesut November 27, 2010 3:27 PM

Thanks Don. I am glad that someone of such high standing and respect in the field has picked up on this huge risk to the design industry as it broadens its scope.

I believe that the emerging discipline of Service Design in particular needs a lot of support from better design education and industry expertise.

Teaching some of the basics across behavioural sciences and technology will help, but a design education cannot deliver enough depth for a graduate to actually apply in the real world. In large parts, like with other design disciplines, I believe the education system needs to stress the importance of collaboration with other non-design disciplines.

We need to educate designers of the benefits of working with others. How they need to sell in their services. How to change their language and personal styles to better collaborate with those of a different species.

You're right that we mustn't lose the delightful components of design. We need designers' optimism. But we have to shift graduates away from being naive and thinking they can solve world hunger or obesity with a bit of observation, a few brainstorms and beautiful sketching of tomorrow's nirvana.

It would be good to teach systems design and a little bit of consulting basics as well, but where do you stop?

I was lucky enough to study an Industrial Design degree at Brunel, just outside London. It was a Bachelor of Science degree and was heavily affiliated with engineering practices. It was incredibly multi-disciplinary and gave high level exposure to lots of different fields (microprocessor programming, marker rendering, ergonomics, HTML coding, 3D modelling, design strategy). Many of the people on my course went into Interaction Design, Front-end web development or into companies like Dyson where the blend of design and engineering was paramount.

However, as a design course, it didn't teach enough of the conceptual thinking that other arts-based Design courses invested so much time in. Getting the balance right is critically important for giving student their best opportunities when they graduate.

I am keen to support this shift, but displacing the uninformed educators or judges is not that straightforward, especially in the UK.

Let's hope others can weigh in and help make the necessary changes.

tcp November 27, 2010 3:42 PM

Don,

Are there any design schools that currently even get close to teaching as you're advocating here?

dongzo November 27, 2010 8:06 PM

Notably absent from this essay is any mention of sustainability! This should be fundamental stuff for all fields in this day and age, but it is particularly important for designers.

A lot of the time (most of the time) those sensors and microcontrollers and LEDs and radio transceivers are a really bad idea, (this coming from a robotics guy) which is another reason why a physical science grounding is important. Most designers probably don't think that it takes kilograms of raw materials to produce a single fractional gram microchip. That dematerialized, lightweight, 'eco friendly' widget with the software interface to promote social collaboration leaves a massive footprint. Maybe we need board games instead of touch screen tables.

The real value of the capital 'D' Designer is the ability to keep some perspective on the whole process, and in that sense the more generally literate a designer is, the better. I think that loss of perspective and accountability is responsible for most of the ills of our modern world, and the stream of ill-designed toxic overproduction we're pumping out hard and fast is the clearest of examples.

marcin November 27, 2010 8:30 PM

the last paragraph especially offers good inside. the challenges our profession is facing demands the new, but without losing the old.

this is a chance to differentiate the field. as education in design in most places has a huge focus on the craft of visual and spatial representation techniques, the ones with talents in these areas outsmart the others - the ones with high empathy and interpersonal communication ability, but no feeling to sketch cars and so on. these talents should be much better integrated in the profession as they are today.

it boils down to the point, that there is not only the need to channel the right knowledge into the mind of students. it is also our set of values as an profession we should question. and in respect to the call for more scientific methodology - are we as a profession ready to take the level of responsibility that comes with this approach?

and maybe the most crucial aspect for most who come in touch with design on a monetary level : will there be acceptance for the resulting costs from greater responsibility? both in business and education?

lastly, this questions shouldn't be put, as it is done a lot, solely in the context "design for a better world". the world works somehow and smart people other than designers can have an impact as well. it is more the question of how much are we willing to change in order to still get our piece of the pie in the future.

Tony Yates November 27, 2010 8:39 PM

Great, great article. If only the industry (educational and professional included in this) en mass would adopt this ideology at a much faster rate.

Ricardo Elizondo November 27, 2010 11:16 PM

I agree with this.. We designers must be able to understand the complex systems of the problems we intend to solve. However i am not completely sure we should move away from schools of art and architecture, we work heavily with our intuition, we need to be inherently creative, and art school helps to harness those abilities, however it's important for a shift to occur where we can continue to trust our intuition and creative problem solving, but be able to test it correctly. It sounds hard, considering the varied knowledge we need to have, i don't think just adding a couple of social sciences classes to a curriculum is going to cut it, the typical studio/project classes need to be restructured, teachers need to be educated aswell and everyone involved have to be aware that the benefits of working like this are substantially better.

This is like changing that hippie motto of "trust your intuition" to a better "test your intuition".

Great article btw. Congratulations.

Eric Strebel November 28, 2010 12:54 AM

Don, the article makes some good points.

But, are designers really going to design school because they dislike science, engineering, and mathematics..... seriously?! or is it because they have a creative passion burning inside them? something many engineers lack. Designers are often the misfits, cast-a-ways, it's what makes us as "Designers" unique.

Most of my students can't spell (and they will never learn) let alone formulate a good paragraph in English about the projects they are working on and present it well to a group. They often don't master basic perspective drawing until their senior year. Almost none of them can pick out the right colors for the products they are designing. This stuff takes years and years of practice.

Teaching them to do studies using the scientific method would be a daunting task.

What would this curriculum look like?

Could you create a rough four year outline and post it?

Thanks

Eric

Ben M November 28, 2010 3:16 AM

Absolutely agree, while studying I've seen the scientific methods described abused plenty, and am guilty myself of the same thing.

But is it possible to educate designers who are capable in all the the areas you describe? Or will we just end up as jacks-of-all-trades but masters of none?

Hans Gerwitz November 28, 2010 3:19 AM

I couldn't agree more. Although I built a career in engineering (computer science), my education and continued academic interest has been in psychology and the cognitive sciences. Years after entering this industry, I have not quite gotten over the shock of learning how design professionals tout their understanding of human behavior (and perception) with so little rigor to back up their claims.

Though my own firm may be less guilty than most, we need more structure to our pursuit of knowledge, and all of us must bring some formality to the advancement of "design thinking" as a legitimate science.

When do we start the Journal of Applied Design?

Marcin November 28, 2010 7:29 AM

Thanks Don. That was needed in the field! Hope it will have refreshing impact on the community (especially at Universities). World has changed. Design has changed. Education stands still.

We also need different approach to the design process. More paper prototyping and testing with users on the early stages should be wide spread all across the world.

That's why we've created UXPin paper prototyping kit, hoping that more people will be tempted to work on paper with their new idea, bringing more mature project to the next design stages.

And last words: recently I've made paper prototyping workshopes for 50 people - developers, designers and PMs. They were astonshined by the possiblities of co-working session with paper prototyping and usability test of their paper prototypes made them seriously thrilled.

Hope more and more people will visit www.UXPIn.com and the idea will be spread all over the world. Cheers!

C Daisy November 28, 2010 10:38 AM

Design Scientist seems like it could be a new occupation entirely. Since design is most often a collaborative process, I would argue that the role of the traditional IDer could be augmented by working with a design scientist. Asking the designer to be all things at all times is a bit unfair. Creativity can be hard to spark when you are bogged down in stats and test groups, and sometimes it takes a small amount of ignorance to come up with an idea that hasn't been tried before, otherwise the problem would have been solved already by someone knowledgeable in the field.(an outsider's approach, so to speak) However if someone specializes in taking all this data and translating it to a design language that could be picked up and used by a talented traditional IDer I think it could foster very positive results.

I don't like arguing against expanding one's knowledge by any means, but in my opinion, asking designers to be more like scientists is a bit like asking an accountant

to design a running shoe. Those two sides of the brain do not always play well together.

Paul McCollam November 28, 2010 11:21 AM

YES! It can be particularly difficult for students who want to do appropriately rigorous work but are not supported by their uninformed professors, or the courses do not make rigorous work a possibility. Of course the opposite is true as well. The statistical chances of an informed and driven student randomly pairing up with an informed and supportive professor is minimal, so it is important for the informed to seek each other out. For this kind of idea to stick (it needs to for the professions' sake), think Darwinian evolution translated to ideas. The utility of this kind of thinking is first and foremost- sell it to the clients/public/profession that we are informed. Small improvements to the professions' body of knowledge will make big improvements over time and scale. Finally, the informed need to stick together and grow faster than the uninformed for success in the long run. On the basis of mere survival of the idea, those that are informed mustn't cave to and settle for uninformed work.

Kley November 28, 2010 2:38 PM

One of the most concise pieces referencing how I feel about my own design education that I have JUST started. As I draw the list for design schools that will receive my application-the points in this essay resonate with how I want to perpetually learn and design. And I am concerned? Is there a school whose program will prepare me with these considerations in mind? If not I hope that there is one that is close enough where I won't find myself needing to take courses somewhere else to fill in gaps.

c3 November 28, 2010 2:52 PM

Where to begin...

Its a 20 year call (rejected by the old ID magazine world) that has been ignored by most "designers" of the last 20 years for one overriding reason.

They believed the myth that "computers" were just "tools".

So today the educated designer is no more than the product of either the Apple, Autodesk, or Adobe brand. With some smattering of Dessault or another smaller brand of the minute (zbrush- unity3d)

Hand eye skills were to promote not the making of artifact, BUT the making of MINDS.

But that idea has been all but eradicated by 20 years of what creative people can do.. manipulate others... and in this case, themselves.

I remember the birth of Core77 and the defacto death of ID magazine. I saw the end of "the educated designer of thoughts" toward the mass produced designer of a "functionary skill" That was the worst aspect of confusing the disciplines of science and art with technology and its own mechinations.

And the second overriding truth of todays designed world, is that as creators/designers we no longer can even "own" our tools. (Adobe - Rome) and the

overall direction for the last 20 years to make, whatever it is we do- the property of another, just for the "usage" of the tools to exercise the actions.

Do "professional" designers really understand the "cloud"? probably as much as they understood that the MAC "just wasn't a "DTP tool". And btw- stats are not truth, but tools as well.

So design education must change, yes. but it also must remember its failings - before- the age of the computer- er adobe apple autodesk... AAA. and see that the entire concept of "industrial" and "digital" mechanations are now at another time and place-- as they were in 1970, and again in 1990, and again in 2010... to be examined by those who claim to care and build a new A, B, Cs for those who "design" for humans.:)

the class of 2020 awaits. ... will those designers be humans owning their efforts?, or just the first iDesigner app carried by the needy teen of a stock broker in a gated community?

David PowerNovember 28, 2010 5:40 PM

Very well written article. As someone who has fallen from industrial design into the digital domain I can firmly echo these sentiments. For ten years I've attempted to apply all aspects of my education with mixed results. On the plus side we understand design thinking- how to approach a problem from a unique angle. We're good at usability, after all HCI practitioners have borrowed heavily from Industrial Design. I was lucky enough to have a marketing component to my course (something my classmates loathed at the time) and in hindsight I can see just how important this has been to my career.

On the downside I always feel like I'm playing catchup- like I'm missing something. I read everything I can on the social aspects of the job (Clay Shirky, Kevin Kelly et al) but definitely lack the formal, holistic framework of formal training in these disciplines.

It's a dangerous time for designers. We risk becoming an anomaly in the corporate world. It's hard for companies to figure out where we belong. Marketing? Operations? We have intangible, but somehow valuable skills. Worse, from a career perspective we risk becoming low value practitioners in the digital domain. Pixel pushers. You don't need to be able to draw or to model to create the next facebook.

We need to own the thought leadership and can't do that without the relevant skill sets. Once upon a time that was a thorough knowledge of the manufacturing/systems design combined with design thinking. Now we need to combine social interactions with design thinking.

tim RowledgeNovember 28, 2010 6:46 PM

Hear Hear!

I was fortunate enough to do a post-grad IDE at the RCA (thirty years ago, gulp), after getting a couple of engineering degrees. I was astonished at the way the students with a straight arts background not only didn't know how things worked but mostly didn't care. It just got in the way of pretty drawings. As a nice contrast, *some*

- I'm vaguely remembering Napier college grads I think - had a very good grasp of manufacturing needs and processes.

Designing modern products is a complex job and all sorts of people are needed to make effective teams, so there is room for very nuts-and-bolts people like me, and artsy-fartsy people, and good organisers and good critics and on and on. But everyone ought to have at least a working grasp of what the whole process requires so that they can at least appreciate the contributions of their colleagues.

Michael Jeter November 28, 2010 7:02 PM

do you have a suggestion of books that one might start reading to further understand the theories and practice behind behavioral science especially for the application of design?

Max Sims November 28, 2010 9:26 PM

Excellent article. Mr. Norman. I am currently in grad school and yes it is in an art school. When I spoke to research universities where I wanted to take the engineering, anthropology, and cognitive behavior. I felt I was discounted for having experience and not coming from the sciences.

Victor Margolin has written in Design Issues on the lack of consistency in PhD programs. He speaks about esoteric, paleoteric and neoteric research. Designers (at least this one) want to discover new things and be on an equal footing with the sciences. At Stanford their approach to design research is the study of designers and engineers and how they manage creativity or processes. It is very interesting stuff for people who want to teach design but not what I would define as design research.

Here at CCA our design research is more in the mold of IDEO where subjects are interviewed and observed. After living in your subject's world you collect your findings and then propose a solution. I consider the teachers at the top of their game. One had a design research firm. Another has a wealth of experience far beyond design. Two of the other teachers come from practicing design and leaning more towards research at their respective firms. I have learned a great deal from them as well as my other courses. Hopefully this article will trigger a new curriculum or program for others to take. If I were to go on to a PhD this article would guide my studies. Right now I am overjoyed with my choice for a grad school since it has a good balance of theory as well as application.

Dr Ron Suarez November 28, 2010 10:19 PM

Do you have any recommendations for resources, in particular classroom exercises to address the issues you have raised here. I'm looking to apply my Ph.D. in cognitive psychology and teach a course in "User Experience Design." I've just begun to search for materials. Is anyone doing a Wiki for this sort of thing?

Angela Wang November 29, 2010 2:57 AM

Dear Norman

As a designer and PhD student I am agree with you. Different areas of professional designs require different of design courses. Anyway, as I understanding the PhD education are moving "the new kinds of designers" . And some of younger PhD

students are arrangements to Europe, United States and Japan to learning.(for I knowing)

But in school education, we ignore the fun of learning and a better life on the human imagination. As their are not easy to learning from our Asia education's cultural background. Therefore, I am thinking the PhD education to the presence of both rational and emotional that would be great.

Inaki Amate November 29, 2010 3:49 AM

Hi Don,

Really nice article. I agree with you. I have started a small movement to educate design to business students and engineers, for isntace at IE (Instituto de Empresa in Madrid). This is my way of spreading the concept of design thinking to new disciplines. What I like about your article is that pushes to consider that design as such needs to evolve, be more scientific and deeper in the understanding of the fields it works with.

What are in your view the most advanced institutions in this field?

Thanks

Inaki

Jaap November 29, 2010 6:28 AM

The faculty of Industrial Design, at the Eindhoven University of Technology in the Netherlands, meets your description of the 'next' design education quite well. Maybe it is interesting for you to take a look at their work!

Dutch Design Week website (<http://www.id09.id.tue.nl/exhibition.php>)

Education guide

(http://stuvo.tue.nl/fileadmin/stuvo/ID/onderwijs/ID_Education_Guide_2008-2009_02.pdf)

Sivam Krish November 29, 2010 6:38 AM

Don, I cannot agree more. The creative ID stuff coming out of most university students is of depressing quality if you assess their feasibility. It seems that is of no concern.

The academic activity is as you point out equally uninteresting as the frames works used for discussions are often ancient and self referencial.

Not sure where ID is going. Things are happening differently in Aisa, where similar mindless teaching is happing in unimaginable scale. Skills once thought to be the preserved of the skilled are being mastered very fast. So there is a glut and such skills will no longer command value.

ID as we know it has hit a dead end.

peyton rowe November 29, 2010 9:05 AM

I absolutely agree with Mr. Norman's insights about the siloing of design education, be it industrial, graphic or any other design field. However, while I have spent my entire education and career floating between disciplines - painting, design, multi-media exhibitions, advertising - and began with a Liberal Arts degree, I wonder if adding MORE to a design education is the right answer. Wouldn't collaborative approaches at the upper levels be more effective?

If I am a designer at the core, I am better at applying form to solve problems and looking at those problems innovatively than I am at crunching numbers. The same can be said for social sciences. Yes, each needs to understand the language of the other. But I want a team of people who are REALLY good at what they do rather than a collection of people who know a little bit about everything.

Yes, design education must change. Rather than infuse design with science or science with design, they need to work together. The hardest part of university education is breaking the silos but that is what needs to happen to create a stronger future of problem-solvers.

Rafael Morgan November 29, 2010 9:11 AM

Well done, Don! Amazing article!

Ps: The last paragraph was a nice addition.

Faloon November 29, 2010 9:23 AM

you just described my whole experience with my education and what I'm learning in the 'real' working world. All in all it makes my education feel inadequate, kind of like I'm missing something and it's just for a junior job.

jeff November 29, 2010 10:00 AM

While I understood the importance of testing ideas, I often found that I didn't have time too. As a college student things like homework, part time jobs, and other activities deserved attention and I couldn't devote 100% of my time to testing out designs. Especially if it was just a two or three week project. However now that I'm a professional, I find that because my time is fully dedicated to design and I now have the luxury of applying the scientific method to my work.

Jonathan Brill November 29, 2010 10:05 AM

On the subject of designers spewing smoke, this seems like a variation of the classic 'designers should be engineers' argument. Here are some other favorites: other favorites:

- Designers should get MBAs
- Designers should be patent attorneys

I'm really tired of these arguments. It's not that there is a lack of need for these sorts of cross-disciplinarians or that the fall of US manufacturing doesn't demand a redefinition of ID.

I've gone down the road Norman recommends. I am happy and 10 years later it is becoming very lucrative.

My issue is that what Norman suggests is much like providing engineers or MBAs a class in 'design thinking' or reading Norman's books. It's fun and insightful, but it doesn't qualify the trainee as a designer.

I have worked with Harvard and MIT PhD.s with this training and the results, from a design viewpoint, are laughable.

Real learning takes real time and effort. The reality is that for most people, getting a high-quality base degree and topping it off with a degree in design is financially and temporally prohibitive.

The reality is that designers with the secondary skillsets that Norman describes generally have a base degree, say in cognitive psychology or business or engineering and then an advanced degree in design.

Even if most designers had the aptitude for these fields, it's simply not possible for this sort of training to happen in 4 years or 6 years. It typically requires substantial professional experience in one's first field before entering design...and then a pay cut.

Oddly, researchers, engineers and business people who are in demand typically don't choose pay cuts and time out of the workforce over their current trajectory. Funny that.

Scott Klinker November 29, 2010 12:18 PM

This calls to mind some ideas posted here by Kevin McCullagh:
http://www.core77.com/blog/columns/is_it_time_to_rethink_the_t-shaped_designer_17426.asp

As the scope of design expands, we can begin to think of design undergrad programs as a 'foundation' program for the field, where in addition to learning the craft skills of design and the basics of form giving, students are introduced to important fundamentals in a variety of relevant disciplines: interaction, business, engineering, etc. Deeper specialization could be mastered at the graduate level, but only after the design student has been exposed to the multiple languages that inform design. How to make undergrad programs more trans-disciplinary?

Razvan November 29, 2010 12:23 PM

Hi Don,

I have enjoyed your articles and their in-depth look. This particular one made me curious in reading your book "Emotional Design", which I'll probably do any time soon.

I'd like to know your opinion about the ethics and morality in designing things. (and here I have in mind thousands of designers and engineers working for military institutions, automotive, or else, where a lot of useless if not harmful objects are designed).

Shouldn't this be an important course in your opinion (along with your other suggestions), since ethics is also add more responsibility and awareness for a better world?

Thank you,

Razvan

c3 November 29, 2010 1:04 PM

"I read everything I can on the social aspects of the job (Clay Shirky, Kevin Kelly et al) but definitely lack the formal, holistic framework of formal training in these disciplines"

they evangelize faith, not a learnable system. be very skeptical of what you read from those with their agenda.

Rogov November 29, 2010 8:08 PM

Don, You still have a delightfully abrasive way of trying to create a job for yourself. Describing designers simply as sketchers and renderers is like describing scientists and mathematicians as just long-winded formula scribblers. That's the way it looks when you don't know what they know. Society changes so fast, that you have to find a new measuring stick every time you approach it. You need to open up to deeper insight -- some more of those people skills you preach - people sensitivity, "sensitivity to each others' contribution" would be a good start on a team. Many of those skills you mentioned are learned "when/if you get a job." People will give you a job if they like you. and you show enthusiasm for their cause. Practice being likable. Hey! I'm willing to hear you out and give you a chance to hang with a better class of designers, but you'll have to learn to take direction...

marcin November 29, 2010 8:53 PM

@c3

very true. there is little separation between facts, methods and opinion. very much an essayistic style embraced by TED and so on. thought provoking? yes, but not a systematic approach.

Daniel Erwin November 29, 2010 11:19 PM

What is the standard of evidence in design?

It's good to look at the sciences - though don't forget that even Einstein's theories don't quite hold up for the Galileo probe.

But what about management? Shouldn't we experience and interaction designers feel relieved and vindicated that we have a more reality-based practice than the profession where a case-study or two will support a theory even in the most

prominent journals?

Or how about economics? This area of study is so closely intertwined with politics that it's hard to make a statement about what evidence is, much less about what the reality it's supposed to represent is.

I think a better model for design is pure, abstract mathematics. Sometimes called the queen of the sciences, mathematics is a sort of midwife of the greatest accomplishments of physics, engineering, and even business (to the extent it depends on finance). By exploring and codifying new ways to analyze, decode, and organize things (often before the reality represented was identified) people like Hilbert, Mandelbrot, Cantor, and even Godel provided new viewpoints, new tools, and new possibilities to scientists.

While we must keep working to build up the ability of design to take advantage of the enormous value of rigorous testing against reality, we must also keep in mind that there is a fuzzy boundary between reality and perception - and that this is at least as important an opportunity space for design.

Ann-Marie Conrado November 30, 2010 4:49 PM

As noted above thank you for your thoughts and insights. As a professor at the University of Notre Dame, we tend to struggle with the opposite problem. Students in our Industrial Design program have to contend with a heavy load of university, college and departmental requirements that doesn't provide them the same amount of studio time that their art school counterparts receive. In addition to the general requirements of most universities, they have to take a year of philosophy, a year of theology, a year of social sciences, upper level history and english and an oral college seminar.

This broad based, well rounded liberal arts education doesn't always translate effectively in a portfolio. What we have seen is that while our students can come up short against their peers in core ID skills sets at the start of their career, in the long run, they pick those up quickly and rise faster into strategy and management positions. Our collaborative courses with the business and engineering schools may play a role in helping to turn out the designer who can contribute to and harness collective intelligence. We are working to always balance these concerns, and ensure that our students can do both and do both well. Our recent successes have shown that it is possible.

Dan Berg November 30, 2010 8:02 PM

As a person trained as an industrial designer, working as a creative director at an architectural firm and getting a masters in evidence based design I say there is a lot of truth in what Don says. Architects and industrial designers have a cultural arrogance that is often their downfall. While a very few have an innate ability to naturally understand the user and the skills needed to produce great products most do not. The arrogance is a defense against those viewed as the doubting heathens who lack faith in their skilled saviors.

We need designers of all skill sets and abilities, somebody has to design the toys that you get out of gumball machines for a quarter. What we need less of is the smoke and mirrors designers use to pretend they have more insight than they really do.

Eventually there will be a deeper divide between the stylists and designers. Those interested in taking a shot and hoping their singular viewpoint will be a success, as temporary or fashion driven as it might be, and those who accept their true level of knowledge. The ones that can admit their limits will, on average, have longer and more meaningful successes.

Victor December 2, 2010 2:35 AM

Coming from an Architectural formation, and having been trained as an Interaction Design by an Italian culture that believed in the power of the cognitive sciences as much as the influence of technology, my vision (however biased it might be) is that most of the referred directions you mention can be ported from how architecture is taught, adding the necessary instruction for such a fast-paced and fast-evolving medium Design is in itself.

I also think that the more rigorous, robust teaching methodologies will also help in the understanding and de-mythification of Design (within the realm of partnering and related specialities) as a pure subjective process as it is often perceived, thus gaining respect and understanding.

Excellent article, for both the reasoning of the current ideas about design teaching, as much as an analysis of the reasons for the current perception and impact of design in our everyday professional lives.

Christopher Ireland December 2, 2010 1:16 PM

Thanks, Don. Your essay captures much of what the MFA program at CCA is striving to achieve. For proof, everyone is invited to stop by the SF campus (Timken Hall) on Mon. Dec. 6 at 6pm to see our 1st year students present on their design research projects.

During the past 3 months, our students learned the role of quantitative analysis, the impact of bias, the value of tight project management, the use and abuse of different methodological approaches, the incorporation of information design, the art of brainstorming without disregarding your research findings, and the value of refinement testing. All this within the context of a highly realistic process (every team worked on a fictional RFP from a real company) that emphasized collaboration and measured risktaking.

I'm astounded at how well the students have done. With very little money and extremely tight schedules, they found insights and opportunities I expect from much more seasoned design researchers with much larger budgets. My assessment is the capacity is there - the students just need guidance and encouragement.

Kathryn Hautanen December 2, 2010 2:41 PM

Don,

What a great service design problem!

As recent graduates of the CCA MBA in Design Strategy, a program that has

attempted to redefine design education by integrating business and sustainability, we hear your call and agree with many of your premises (especially about rigor and peer review). Our DMBA program set out to train us to "understand human beings, business, and technology and the appropriate means of validating claims"

Unfortunately, like most recent graduates, our more pressing concern is:

Who will hire these newly educated designers?

Where are the job descriptions calling for designers with an understanding of the scientific process? Or for scientists that understand the design process?

As two designers with training in engineering, social science and a respect for the value of experimentation, we are also concerned by a couple of additional questions: We can agree that more rigorous testing would be valuable; however, where will the funding come from for this? Do we need a parallel organization to the NSF and NIH to support this inevitably expensive, long-term design research?

Do design problems really justify the rigor necessary in materials science or drug trials? The development of new materials like graphene or antiretroviral drugs have much larger impacts both in terms of society and finances that they warrant large-scale investment.

This isn't to say that your points aren't valid. We are true believers in the sway of design thinking (and have the student debt to prove it), but we would like more than a manifesto.

Let's figure out who the stakeholders are that need to be involved--let's secure the right internship programs, develop research programs to validate the promises of design thinking and begin the discussion of the right PhD programs. And lastly, let's start building the demand for these right-left brain thinkers in the marketplace.

We're ready.

Beth Berrean MBA, MLIS

<http://berreanb.blogspot.com>

Kathryn Hautanen MBA, MS Materials Science, SM Nuclear Engineering

<http://www.linkedin.com/in/khautanen>

