

Design Research

Many a time I have found myself fielding the question “So, what is design research?” directed to me as the JMD Editor from not only folk outside the design community but also from within it. My usual answer is “Well, just read our articles in JMD and you’ll see.” Even though this is a legitimate escape route, one may argue it is also a bit lame. Can we be more direct?

Most readily found definitions of design research come from the industrial design or architectural community. For example, “Design research investigates the process of designing in all its many fields” is the definition given in Wikipedia in an article obviously written in association with the Design Research Society (http://en.wikipedia.org/wiki/Design_research). Fair enough. Engineers frequently distance themselves from design at large by referring to their interest as “Engineering Design.” In a similar Wikipedia search for the term “engineering design research” no real definition emerges, except perhaps by inference through the scope description of our cousin journal *Research in Engineering Design* that emphasizes design theory and methodology (<http://www.springer.com/engineering/mechanical+eng/journal/163>). Now certainly this is an active area within JMD and indeed the name of one of our ASME technical committees. But it is not the only area of research within JMD and for good reason.

The difficulty I have with “process” is that it tends to subjugate the product. Some years ago, I team-taught our senior capstone design course with a team of colleagues where we had all agreed that our students did not “get” the design process and we should really teach it to them. We put a lot of emphasis on the process for a couple of semesters, and then we realized that the students gave us exactly what we asked them: lots of process. However, their designs sucked—with apologies for the informality. The point is that a good process can give you bad products. Design research cannot be limited to process and ignore the products even if it claims otherwise. If it does, then it becomes “designology,” a term dear to a JMD colleague and highly creative design researcher.

The difficulty I have with research on just “analysis” of artifact behavior is that it gives up the existential reason for engineering: serving humans. If we take the humans out of consideration, we still have science but do we have engineering? Somehow, somewhere, there has to be a link with us the humans. Should every JMD paper on a bolt or robot or transmission or mechanism have a human dimension? No, but I believe it should have design intent.

This is why in several editorials over the years I have tried to emphasize that JMD’s unique role is to be an avenue for research and a forum for voices across the spectrum from process to artifacts and systems. As we say in our website asmejmd.org: *The connecting thread among all these topics is the emphasis on design, rather than just analysis. Design scholarship is based on careful analysis models, whether physical, computational, or behavioral, and has design intent: creating something in the*

physical world we live in, rather than just analyzing what is happening in it.

I was reminded of all this a few days ago when I stumbled across an essay entitled “The New Humanism” by the New York Times Op-Ed columnist David Brooks (<http://www.nytimes.com/2011/03/08/opinion/08brooks.html>). Reflecting on US policy failures over the past few decades, from politics to education, Brooks sets off by stating: “... These failures spring from a single failure: reliance on an overly simplistic view of human nature. We have a prevailing view in our society—not only in the policy world, but in many spheres—that we are divided creatures. Reason, which is trustworthy, is separate from the emotions, which are suspect.... This has created a distortion in our culture. We emphasize things that are rational and conscious and are inarticulate about the processes down below. We are really good at talking about material things but bad at talking about emotion.”

These statements caught my attention. Could this be true for today’s engineering? What about the hundreds of years we have invested to rid ourselves of our superstitions and thymotic impulses and replace them with a rational fact-based, indeed science-based, view of the world and of our decisions in it? Was Brooks talking of the American or more broadly of the so-called western viewpoint? If so, how convincing could this argument be given that the so-called eastern viewpoint has not produced any discernibly more spectacular policy successes?

So I read on: “Many of our public policies are proposed by experts who are comfortable only with correlations that can be measured, appropriated and quantified, and ignore everything else. ... A richer and deeper view is coming back into view. It is being brought to us by researchers across an array of diverse fields: neuroscience, psychology, sociology, behavioral economics ... Emotion is not opposed to reason; our emotions assign value to things and are the basis of reason” (op.cit.). This is hardly a new idea in philosophy and goes back to Plato’s tripartite division of the soul to thymos, reason, and desire. What’s new today is that science newly validates this multidimensional human nature, as eloquently described already, for example, by Steven Pinker in *The Blank Slate* (Penguin, New York, 2002).

What is the relevance of all this in the present discussion? In my opinion, uniquely among the engineering fields today, design research has started to assiduously pursue the creation of artifacts and systems from a perspective that honors both the physical and the human behavior sciences. This is a vast undertaking and not all design researchers will be able to work across this expanse. However, framing the specific problems we research within this context will allow us to chip away at the larger problems we face as a society and indeed to reaffirm our original roots as engineers bent to improve the human condition.

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