

Problematizing New Technologies through Design

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Abstract

Visible signs of progress in science, engineering and technology, like the devices we tether to our bodies to communicate with each other, benefit the individual and society at large, but physical evidence of technological transformation can also be destabilizing and blur our grounding in both historical and temporal reality. Innovative art and design practices that rely on technology shifting frameworks and invisible realizations such as nanotechnology, design futures, strategic foresight and other new technology-infused paradigms leave product manufacturing and become new methodologies in themselves. Active problem seeking and cultural artifacts based on unforeseeable future applications and meanings simply require more depth to cope with the greyness of an unknowable and more rapidly changing future.

Successfully coping with such changes requires a giant shift that is not measurable through trending, malleable through branding or even close to being mediated through social networking as we are being led to believe. Design helps realize changes at a pace that humans can digest. Objects and interfaces mediate adaptation, disruptive or not. New design methodologies (research) and practices such visualizing quantitative data that is less than absolute begin to describe potential repercussions of technological change in bits that can be digested and managed, as well as explore the latent relationships between future risks and hopeful potentials through non-traditional means of representation. Nobody really enjoys bar graphs and pie charts, nor do we trust them as the neutral data that they are meant to represent. Fundamental questions about how we even can approach the cultural re-framing of the daunting problems facing society and the environment today are limited to using our limited and outdated tools and means of representation, which Thomas Kuhn would argue is a paradigm that needs to be overcome in itself.

Kuhn can be credited with explaining... "Within any scientific paradigm (the theories raised in his text, *The Structure of Scientific Revolutions*) necessarily looks like progress is being made, since the normal work of science is to gnaw away at puzzles one by one. Likewise, new paradigms always look like steps forward because that's why they've been accepted. That explains the appearance of progress within a paradigm, but how about across paradigms?" (Weinberger, B9) Kuhn goes on to propose that "There isn't only one possible endpoint or a final paradigm, and there isn't an overall design" (Ibid.). Kuhn's own ambiguity and self-doubt whether taken literally, existentially or even in relationship to objective reality infers a non-linearity and reflexivity that design thinking is founded upon. The question of which methodologies are at our disposal, regardless of disciplinary boundaries leads to a renewed sense of the fundamental need for new forms of problematization rather than the historical drive for pre-packaged solutions and results we can measure. This need for problematization runs entirely against every effort being made in education, business, industry and technology to fuse all of these enterprises together to solve the world's economic crises. For profit is no longer just a mantra, but a paradigm for how science, the humanities, research and the university is viewed.

This desire for new means of problematization denies problem solving as a functional paradigm and requires a leap of faith into new areas of ambiguity and outcome defeating research that scientific models and traditional research may find discomforting. “Scientific ideas...are subject to a kind of natural selection...But the selective forces that scrutinize scientific ideas are not arbitrary and capricious. They are exacting, well-honed rules, and they do not favor pointless self-serving behavior. They favor all the virtues laid out in textbooks of standard methodology, testability, evidential support, precision, quantifiability, consistency, inter-subjectivity, repeatability, universality, progressiveness, independent of cultural milieu, and so on” (Dawkins in Gere, 5).

By looking at other forms and types of research we will be able to achieve alternative outcomes as a first step. This is not groundbreaking thinking and mirrors many of the world’s core business plans in the tech and innovation sectors. Kuhn refers to scientific revolution, not as that which occurs “when an apple happens to find the head of a genius,” but rather when “new paradigms emerge to explain the accumulation of anomalies: findings that do not makesense within the current paradigm” (Weinberger, B8). This level of intellectual inquiry is what the humanities depend on as they create new deeper thinkers.

Exhibitions like *the Design for the Elastic Mind* show at the MOMA held several years ago, the aestheticized bioremediation installations of Mel Chin and the endless community-based DIY projects designed by non-designers from Gujarat to Brooklyn are helping to reframe numerous unsolvable wicked problems using interdisciplinary and creative forms of inquiry grounded humanities-rich practices. In an age when research funding, direct connections to industry and patent seeking is seen as the way to reshape our universities to make them efficacious these peripheral means of questioning represent an opportunity for deep and profound change, and more profit too potentially.

Technology and design-based research is one means to problematize our most profound questions and to reframe scientific thought as it is now shaped in every way by technological innovation and adaptation. As the catalyst that can force change through the creation of new paradigms the humanities are now more valuable than ever before. Even our ability to write has changed through the use of communication technologies, but this ability is now even more important. In an oddly placed essay discovered in a law journal to I discovered a very profound question posed by a group of law students who had undoubtedly come to law school from a broad liberal arts background, as so many young lawyers do. The student authors raised a call for the need for the legal profession in Canada to look towards the humanities to solve the most significant unanswerable questions we face today as a critique of the enterprise of how we study, teach and consequently practice law in North America in an essay titled, “Points of Convergence: Law, Mystery, and the Humanities.” The “mystery” of the “unresolvable” questions that can generate speculative thought and how and these questions relate to law as a discipline with a focus on interdisciplinarity and the humanities in particular was used by these student authors to seek the unanswerable questions that were once the foundation of law in the form of the rules of societal engagement. Their argument was nuanced by the shaping of legal practice and theory through culture, rather than precedent.

The essay was a call to arms for ambiguity and uncertainty as a new way for the profession to adapt to its postmodern reality. As design historian, Charles Jencks, states, “To understand the post-modern condition is to grasp such contrasts. This mental act is hard because there is no one principal. How does one decode a kaleidoscope, or comprehend city traffic? Not by focusing down, but by panning up to see the general pattern. The post-modern condition shows a series of simultaneous slides form one situation to another; none of them are complete, all of them are hybrid” (Jencks, 223).

Problematization by Design

Mapping trends, raising public awareness and affecting change raises the need to forecast potential outcomes, risks and potentials. Problematization is most significant intellectual outcome of any humanities-rich education. In an age when research funding, direct connections to industry and patent seeking is seen to undermine the role of the traditionally construed arts and humanities across all of our university and college campuses the need for problematizing also has a profoundly pragmatic affect as well.

The opening question in the essay, *Points of Convergence: Law, Mystery, and the Humanities*, is misleadingly simple, “The chicken or the egg, which came first” (Atkinson and Majury, 1)? It is now understood to be the egg. We know this because of the hard science of evolutionary genetics.

Mystery solved. Now that it is solved we are left with nothing to ponder. Maybe we do not need to solve everything? Or maybe we do not like questions that we can solve? Knowing the answer and solving this problem presents a problem for us as a species. We need alternative ways of maintaining such dilemmas and these hypotheses lie in the practices, theories and methodologies we may find in the humanities, arts and social sciences.

The Need for a Quest

In the legal world, statutory construction and the crafting of policy is both an art and a science, where every outcome has hopefully been constructed to foresee the interjection of human behaviors, associative values and cultural histories. Legal scholars and statesmen of note are often gifted orators, lyrical writers and voracious pursuers of knowledge in many fields and this range makes them well rounded scholars of the human condition and occasionally great leaders. Law, when isolated on a university campus, is a profession bound by methodological skills that has as its key driver a seeking of rational causality and this discipline paradigmatically has a fundamental distaste for all forms of speculation and the arrival at “false absolutes.” Law possesses and preaches a mythic “unshakable rationality” and builds its processes on a “pragmatic” drive towards “certainty” built upon precedent with the assumption that progress is always built on precedent. This would seem to counter my argument for the breadth that the humanities, as a specific example, afford (Atkinson and Majury).

The humanities, and even humanity itself, is constructed around an ideology or paradigm that “man’s unrestricted desire to know” is realistically always going to be thwarted by man’s “limited capacity to attain knowledge” and this becomes the space for innovation and disruption of the faith in precedent and generates a need for education though academic means or though experience. We are all flawed, but “the persistence of mystery binds us together as a species” (Journal, cc) and creates a framework for new forms of innovation and definitions of progress.

Stanford University released, in January 2012, a study of its undergraduate education, which was at odds with Leland Stanford’s original claim to create “usefulness in life” as an “object” of a Stanford education. The report stated that, “The long term-value of an education is to be found not merely in the accumulation of knowledge or skills but in the capacity to forge fresh connections between them, to integrate different elements from one education and experience and bring them to bear on new challenges and problems... Yet we were struck by how little attention most departments and programs have given to cultivating this essential capacity, we were also surprised, and somewhat chagrined, to discover how infrequently some of our students exercise it. For all their extraordinary energy and range, many of the students we encountered lead curiously compartmentalized lives, with little integration between the different spheres of their experience” (Auletta, 14-17).

Creative interpretations of words and language in both law and the humanities may be met with methodological problem solving in any legal argument. The tools of rhetoric and psychological projections of understanding of perception and expectations craft any good legal argument, no matter how banal the subject matter. The focus on language as the place where the art of law appears may appear in the use of Noam Chomsky’s linguistic theories in their analyses of policies or though post-structuralist critiques of power structures evident in the limitations of written language. As an example to ponder, would Chomskian deconstruction dismantle the Western legal system? It would most likely. Would this also potentially allow us to reconceive legal precedent when faced with daunting new technologies that do not obey by the rules of precedent? Contemporary debates about historical patent law and intellectual property rights in the digital age and other new technologically bound “objects” are creating problems because we lack the capacity to problematize the situations these new technologies are creating. Ask any librarian about copyright law and hold on for more questions rather than answers. Kuhn’s work could be the scaffolding to answer this question were legal scholarship not so bound by precedent and history. There is a need for postmodern law. That is a problem.

Speculation can be rational, can have precise methodologies and can produce tangible products such as “fresh metaphors” and “moral interpretations.” However, “the idea that law is a purely rational, disinterested observer of history, transcendent of the machinations of political actions, necessarily independent of the idea of morality still permeates the discipline ideologically” (Atkinson and Majury, 11). As Atkinson and Majury explain, Arguments based on Constitutional law could benefit from a philosophical analysis or other interdisciplinary sharing of methodologies for more deeply understanding texts.

This idea may be used to explore the “best” outcomes even if speculative rather than to be weighed down by “the dogmatically correct one” leading to a form of “soft rationalism” in the near legal future (Ibid, 1-38).

Joseph Campbell’s career was spent unpacking and looking for unified truths in the myths and religions of mankind also spoke of an impossible quest that defied any form of absolute truth as a desire for an “absolute mystery.” “And so, my friends, we don’t know a thing, and not even our science can tell us sooth; for it is no more than, so to say, an eagerness for truths, no matter where the allure may lead. And so it seems to me that here again we have a still greater, more alive, revelation than anything our old religions ever gave to us or suggested” (Campbell 16-17).

Byproducts of the Communication Revolution

Adam Bly created the online magazine, *Seed*, as well as other websites and innovative means of exchanging information under the umbrella of the Seed Media Group to help foster an emerging “twenty-first century scientific renaissance” that is intimately tied to the communication revolution, globalization and technological innovation. Bly’s reputation and background are built upon his online magazine, *Seed*, which represents a new type of science magazine intent upon raising and modernizing scientific literacy and exploring new means of communicating ideas that is deliberately positioned as something that is not a traditional scientific journal. *Seed* has been described as potentially doing for scientific thought what *Rolling Stone* did for popular music. Under Bly’s leadership, *Seed* has earned acclaim for bridging ideological and cultural divides between science and society.

Bly’s text, *Science is Culture: Conversations at the New Intersection of Science + Society* is a record of some of the key conversations held as part of the *Seed*/MoMA Salon, a monthly gathering of scientists, architects, and designers that helped lay the foundation for *Design and the Elastic Mind*, the ground-breaking exhibition about science and design at The Museum of Modern Art curated by Paola Antonelli. Bly uses traditional conversations between pairings of architects, artists, dancers, designers and other creative industry pioneers with influential academics and thinkers located in theoretical physics, biology, mathematics and other traditional hard sciences as a way to ponder life’s largest unanswerable questions in the quest for a new way of looking at the world that may “blur the lines between scientific disciplines and the borders between the arts and humanities” (Antonelli in Bly). In one of the most endearing discussions Bly pairs Paola Antonelli, the senior curator of architecture and design at the MOMA in Manhattan and curator of the groundbreaking *Design and the Elastic Mind* show mentioned earlier, with Benoit Mandelbrot, the “father” of fractal geometry and Sterling Professor Emeritus at Yale University. The conversation Bly records, while focused on fractal architecture and the death of Euclidian geometry, veers towards a more humanistic thesis by way of a casual conversation that serves as a successful model for how these conversations have been structured and turn out.

In the conversation between Antonelli and Mandelbrot, Antonelli’s admission that she wrote her architectural thesis in Milan on Mandelbrot’s work over eighteen years ago but has never before met him in the flesh becomes the entry point into a more profound conversation. In her architectural thesis Antonelli analyzed key deconstructivist architectural practices like that of Coop Himmelblau in Austria that went beyond the limitations of conventional Euclidian representation and conventional construction to describe innovative and challenging structures that could only be realized through three dimensional modeling, drawing parallels with Mandelbrot’s fractal geometry and its need for modeling three dimensionally that which Euclidian geometry could not describe. Both fractal geometry and the architecture of Coop Himmelblau required an altogether new scientific means of representing, describing and defining structures that could only be described by using Mandlebrot’s work, if not literally at least metaphorically. The intersection between science and art in this example becomes quite clear (Ibid).

The collaboration of ideas and merging of points of view becomes a model for the broadly humanistic approach to the biggest problems and questions facing us today that the text and *Seed* are suggesting is needed for a scientific renaissance to be fully realized. We similar alternative ways of maintaining such dilemmas and these hypotheses lie in the practices, theories and methodologies we may find in the humanities, arts and social sciences at the point of convergence of science and culture.

Humanity, Itself may be the Method

In a recent article in *Scientific American* (September 2011), Harvard Economics Professor, Edward Glaser, defends the massive urban centers of the world as “Engines of Innovation” citing evidence that defends the denser, greener, more efficient modern metropolis as a an ideal model for collaboration, idea generation and resource sharing, but his conclusion offers that “the face-to-face contact that is made possible by the physical proximity afforded by cities” is how cities have been where and how we have been solving our most essential problems “for millennia” (Glaeser, 50-55).

The quest for a recipe for generating global sustainable development-friendly legislation and policies is mired in the particularities of oblique terms such as culture, tradition and even innovation. The language we use in discussing sustainability is largely a byproduct of earlier initiatives that are steeped in the goals of universal capitalism, growth measurements determined by GDP’s and other purely monetary metrics that have not created an open framework that combines both the art and the science of law tempered by a broad shroud of humanities-based qualitative understanding tools.

- A. Interdisciplinarity would seem to require an embracing of the humanities for scope, breadth and less traditionally confined practices and methodologies. The possibilities for interdisciplinarity may lie in methodologies for problem solving and problem seeking as well as non-technologically mediated communication.
- B. Engineering’s focus on seeking the outer limits of failure as a paradigm is one concrete way of foreseeing the technical limitations that are often the drivers of goals and quantifiable outcomes. Seeking failure rather than solutions may be worth pursuing.
- C. Policy makers, academics and others need to be teamed with social scientists, anthropologists and even artists in teams to create meaningful policies and practices that will be sustained through cultural practices. The user is more powerful than ever. The user is more than the consumer or the client.
- D. Results covering all aspects of human and social development need to be debated and critiques for practical successes and failures measured and compared within the particularly socio-cultural contexts they were staged. A universal answer is counter-productive. Local variations will demonstrate great adaptation and even evolutionary prowess and elegance of execution under duress. The world is a collection of case studies.
- E. A humanities-rich method of deconstructing and reconstructing case studies that balances the qualitative and quantitative would be one clear method. We need to be cautious when selecting case studies, however. Case studies drawing from progressive cities in Europe like Freiburg, Germany or American college towns like Davis, California abound, but considering the small, progressive populations in these examples that share common values, education levels and market driven desires to retain property values through quality of life factors “...this environmentally-conscious sanctuary need not build high walls to shut out a cruel world” (Ashman, 37).
- F. Cultural appreciation, open discourse and public opinion are essential for any sustainability-based transition to be effective. Socio-technical transitions (to sustainability) are a special research topic, because they are about relatively rare, long-term macro-changes. It is difficult to construct large databases that can be analyzed statistically for relationships between variables. Other types of theories and methodologies are therefore needed. These theories must be multi-dimensional, because it is unlikely that only one kind of causal factor or mechanism can explain the entire transition process (Geels, 38).
- G. Reflexivity is another key component housed in contemporary artistic methodologies coming from the shared worlds of practice and reflexive practice as research. Artist, Gordana Nokavic, describes her own positioning as a creative artist, designer and scientist when she states, “Questioning my artistic method unravels the interplay between artistic, philosophical or scientific components and technological forms (be they algorithms, software architectures, or different output tools) that have inspired me, and the methods of applying different technologies, crafts and materials” (Novakovic, 115). Novakovic furthers her discussion and recreates her early days with first generation IBM computers in the nineteen eighties and “playing” with algorithms and “computational processes” led to great innovation shaped by nothing more than the “pure excitement of experimenting with new tools” (Ibid, 118). More profound “questions of discourse and historiography” (Ibid) came later when her work required an audience.

The Design Part

Referring to any way of approaching a methodology or process as “design thinking” is now a highly sensationalized, fashionable and clever way of describing how a creative, usually design-based, process can be grafted onto a traditional discipline that is based on accepted standard processes determined by linearity, based on precedent and accepted and time tested norms. As both a term, and generally an ideology, design thinking has been championed by CEO’s, academics and others to advocate for a robust inclusion of entrepreneurship, branding and using visual and design strategies to unleash the creative potential we all have lurking within ourselves for economic gain most often. We use design thinking to identify and sometimes create new markets. We use design thinking to juggle expectations to reach beyond form, function and other traditional expectations. Scholars such as Glenn Adamson have advocated thinking about contemporary craft as “the world’s most fascinating hobby” to question the role of craft within today’s technocentric and production focused society using styles like “funk” and others to recall a sense of purposeful uselessness as an objective. If craft is about making mundane functionality somehow slower and more beautiful than design shining requires function to be entirely removed. The wonderful uselessness of a water pitcher that cannot hold water, like a house that has no roof become weighty koans to riddle precedent and mock conventions, as well as create new markets. Craft as fine art sells for much more in the gallery and craftspeople know this (Adamson, 139-63).

Similar trends in design thinking, when interpreted as the free form interplay and morphing of interdisciplinary methods of creation, can be seen across a myriad of professions and fields striving to stay current and relevant. The ghosts of “consumer engineering” as defined by Earnest Elmo Calkins in 1932 in terms of design adhering itself to the market as the primary driver of innovation dependent upon designed obsolescence and consumer fickleness may be the driver to this day, but now we are much more critical of our weaknesses in this regard and the entire sustainable design retro movement fueled by Al Gore’s naïve but useful advocacy seems to be quite anti-Calkinsesque despite how we still behave as consumers (Calkins, 129-32).

In a lecture at Cornell University in 2011 to kick off a gallery show celebrating the Tata Nano automobile, Arjun Appadurai celebrated the vehicle and its Cornell architecture alumnus CEO as creating a vehicle that would serve as the metaphorical vehicle for technological deliverance of the global South through “mass auto-mobility.” The portion of his lecture, as well as the television advertisements that have run in India on television, propose that “things (like cars) could function analogous to beings, and that the divide between the universe of objects and the universe of beings was not absolute but contingent in Professor Arjun’s groundbreaking collection of essays, *The Social Life of Things*, as Kent Kleinman stated in the opening introduction to Arjun’s keynote speech. Arjun went on to speak about the Nano as a “tool for imaging the future” for a family no longer bound to its place in the universe. Arjun went on to extol the smallness of the Nano as an appropriate form for traversing the landscape in India that is densely populated, capable of adaptation and able to conceive of an object as a means of social mobility. In both Kleinman’s rhetoric as well as Arjun’s thesis, both men readily apply design thinking methods to discuss a car as something other than a car in a way that is poetic, but ultimately emerges as just another marketing strategy (Appadurai).

My Conclusion

In a paper whose thesis is that answering questions needs to be replaced by problematization the intent to even have a conclusion seems at odds with my approach. I teach a number of courses in design history and theory that include courses in design thinking and sustainable design theories and practices. My goals have changed from providing information and expertise to giving students the historical and theoretical grounding to be well-informed cynics who can one day kill their masters as the samurai would require of their mentors when it comes to naively accepting tired and true theories, methods and even intentions in their future design practices. I therefore stopped teaching years ago and now instruct the fine art of problematization.

As Paolo Antonelli has written, “Because of their role as intermediaries between research and production, (designers) often act as the main interpreters in interdisciplinary teams, called upon to not only conceive objects, but also to devise scenarios and strategies. To cope with this responsibility, designers should set the foundations for a strong theory of design – something that today is still missing – and become astute generalists. At that point, they will be in a unique position to become the repositories of contemporary culture’s need for analysis and synthesis, societies new pragmatic intellectuals...” (Antonelli, 125).

An even more challenging point of view for pursuing problematization can be seen in the entire life's work of intellectuals like Walter Benjamin whose understanding of material culture, dialectics and even his conception of history and time are a complex problematization of the forces of modernity and the fundamental structures of how we experience the world as a series of subjectively constructed artifacts and narratives.

Coda

As a coda to this paper I will offer another point of view. On the closing "Point of View" back page editorial in *the Chronicle of Higher Education* published May 11, 2012, Paul M. Krebs, Dean of the College of Humanities and the Social Sciences at Bridgewater State University, pines over his humanities students' inability to embrace failure or even go beyond first drafts of incomplete ideas, while his computer science teaching colleagues instruct their students to embrace failure as a means to analyze data and encourage progress towards a more perfect end with draft upon draft being seen as a part of the scientific process. Without belaboring Professor Krebs' thesis, it is fitting to recall that each discipline does not have the tools to problematize our current condition and this may be a good thing (Krebs, A60).

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