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BIG PROBLEMS, BIG SOLUTIONS: DESIGN RESEARCH AND SOCIAL RELEVANCE

ABSTRACT

Research in design education, at least in America, has followed two well-worn paths. The first is a design version of the basic research model found in medical and scientific laboratories. The second is an academic version of corporate R&D, or more precisely, the corporate outsourcing of product discovery and innovation. Neither seems well-suited to the rapidly changing demands placed on today's designers.

What is often missing from both models is the broader role of the designer. This paper looks at a third, emerging model, termed "translational research," which couples the best of both legacy structures with a new dimension: social relevance.

Design is rapidly becoming the intellectual glue that binds disparate fields and unlocks the hidden ability of collaborators. Today's global problems are big and require thinking well beyond any one person or field of expertise. This paper will present case studies and argue that a designer's unique education and ability to unite previously insular disciplines will form the nucleus of tomorrow's breakthroughs regardless of scale, circumstance or location, and show why socially relevant research is economically, environmentally and culturally transformative.

1. INTRODUCTION

Research in design education, at least in America, has followed two well-worn paths. The first is a design version of the basic research model found in medical and scientific laboratories. The second is an academic version of corporate R&D, or more precisely, the corporate outsourcing of product discovery and innovation. Neither seems well-suited to the rapidly changing demands placed on today's designers.

What is often missing from both models is the broader role of the designer. Basic research and product development may serve both student and institution well by providing much-needed funding and real-world experience. But, both suffer from the constraints of the system, particularly endless grant writing to secure funding for investigations that may never benefit anyone outside the laboratory. Or perhaps worse, the end results are meaningless products meant to momentarily satiate the consumerist hunger for new—and ultimately disposable—products. However, there is a third model emerging from medical institutions that couples the best of both existing structures with a focus on social relevance. This model, known as translational research, gets pure research out of the lab and into the hands of consumers, and any resulting products are truly useful.

Design is rapidly becoming the intellectual glue that binds disparate fields and unlocks the hidden ability of collaborators. Today's global problems are big and require thinking well beyond any one person or field of expertise. Design education has always sought an integrating role in society, a trend which is only accelerating. Design is now poised to form the nucleus of tomorrow's breakthroughs regardless of scale, circumstance or location. And as we move toward socially relevant research, its impact is economically, environmentally and culturally transformative.

2. THE AMERICAN PIPELINE

The traditional research pipeline in medicine and science is long and meandering. It takes many steps, and many years, for discovery to touch individual lives. The apparatus of funding and grant writing establishes strict guidelines for so-called pure research. These scientists, particularly in the medical field, develop therapies that are not targeted at any particular problem but rather explore and document phenomena in the hope someone else will find a suitable application. Again in medicine, researchers trust that large, bio-medical and pharmaceutical companies will select for clinical trial the research projects that have the most promise of commercial success. It is for this reason alone that we see tremendous breakthroughs in addressing disease related to the developed world. Heart disease, hypertension, diabetes and many forms of cancer are related to our sedentary lives and often toxic environments. It is no wonder we see a disproportionate number of advances in treatments for diseases plaguing the developing world, when there is little financial incentive.

Pure research in the corporate sector highlights another shortcoming in the system. By necessity, profit-motivated agents have increasingly slashed their research budgets, funding only activities with a high likelihood of market success. Characterized by a very small 'r' and an enormous 'D', the corporate pipeline is exceedingly short and wide. Innovation must get from lab to showroom in the shortest time possible.

The high cost of hiring in-house researchers has led many companies to partner with sub-specialty firms and academic departments instead. The funding of a classroom or a laboratory by an outside company is offered with the stipulation that research and results fall within narrow guidelines. For a university, this brings much-needed capital, high visibility and prestige, and the prospect of royalties, patents and profit sharing. However, it invariably curtails breakthroughs by predetermining a set of marketable outcomes.

These shortcomings, plus the long pipeline of open-ended pure research and the short pipeline for quick-to-market product research, have increasingly led to an emerging practice called 'translational' research.

3. THE EMERGING PIPELINE

In late 2006, the National Institutes of Health (NIH), one of the world's foremost medical centers and America's federal focal point for medical research, launched the Clinical and Translational Science Awards (CTSA) Consortium. After extensive investigation, the NIH recognized the need to catalyze a new discipline that seeks to quickly translate scientific discovery into practical application. Typically, discoveries begin at "the bench" with basic research, in which scientists study disease at a molecular or cellular level, then progress to the clinical level, eventually ending up at the patient's "bedside."

Scientists have increasingly come to understand that this bench-to-bedside approach could be a bi-directional flow of information. That is, the lessons learned at the patient's bedside may have implications in the laboratory. Scientists provide clinicians with new tools for use with patients, and clinical researchers make unique observations about the nature and progression of disease that in turn animates basic scientific investigation. (NIH 2007)

A similar trend is seen in multinational engineering and manufacturing. For example, it used to take General Motors sixty months to design, engineer and manufacture a car (five years from sketch to showroom). With Toyota's vehicle development process (VDP) taking little over twelve months, it's no wonder GM often missed the mark on design trends. Now that GM has slashed its VDP to less than

eighteen months, it is finding wider appeal for its products. One way it did this was to analyze the constraints in its system, the most glaring being when engineers cannot accommodate designer's concepts. The solution: Put the designer next to the engineer. Now, multidisciplinary teams analyze market data, develop concepts and engineer solutions simultaneously, thus eliminating bottlenecks before they form. GM also reinvigorated its advanced concept lab in Southern California, home to many of the world's newest trends. Now the concept designers and engineers are directly observing market shifts.

Examples like this abound in nearly every design-related discipline. It seems commonplace that traditional categories of design and engineering are breaking down. In reviewing the triennial design exhibit at the Cooper-Hewitt Museum in New York City several years ago, the weekly magazine *The Economist* wrote:

"More than 80 designers have taken part in the show and their mantra, if there is one, is convergence. In short, what once were fiercely guarded, independent disciplines now overlap, often taking their inspiration from each other. Thus, architects design shoes, artists make furniture and car designs reappear in chairs and toothbrushes. " (*The Economist* 2000)

Design and medicine, to name but a few disciplines, are finding novel approaches to overcoming disciplinary barriers. This trend, however, is in spite of the growing barriers between basic and applied research. Ever increasing sub-specialization, computational complexity, material science, and patents and copyrights are making it more difficult to translate new knowledge to those in need and back again—from bedside to bench, to use the medical example. These challenges are limiting professional interest in allied fields and are hampering innovation at a time when it should be expanding.

4. THE GLOBAL PICTURE: CONVERGENCE AND DIVERGENCE

While there is an evident movement toward convergence among disciplines, it is just as important to consider the ways in which the world is moving apart and how the designer is uniquely poised to bridge the gaps that exist between societies and industries.

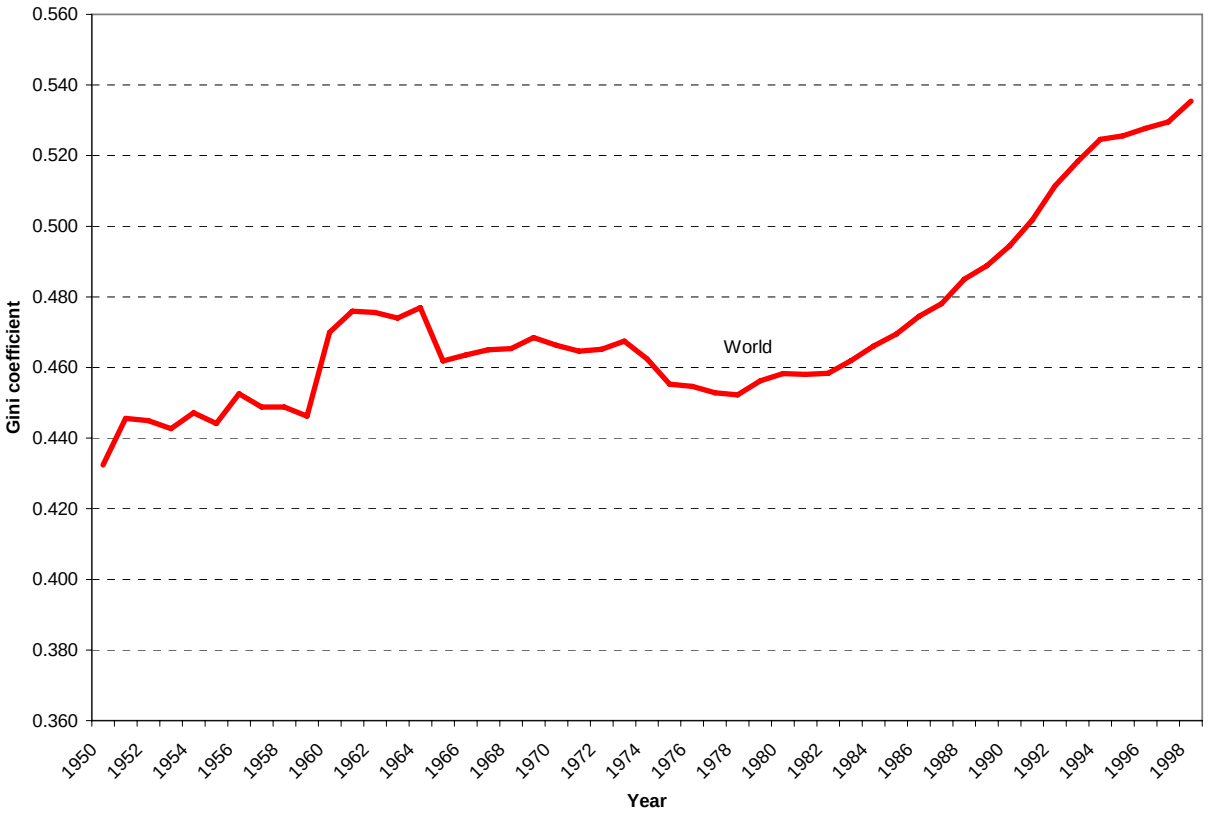
One could easily agree that the following statement well represents the current state of globalization:

"The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his doorstep; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages; or he could decide to couple the security of his fortunes with the good faith of the townspeople of any substantial municipality in any continent that fancy or information might recommend." (Keynes 1919)

This statement was published in 1919, written by the great English economist John Maynard Keynes as a comment on the state of the world economy *before* World War I. From the viewpoint of the 21st century, Keynes' observation is shockingly modern. We have come to view globalization as an inexorable force, perfectly at home in the world. But history tells a far different story. By most accounts, globalization or, more precisely, economic integration, has been in full force for well over a century. Little did he know at the time, but the level of economic integration Keynes observed in 1914 would not return for well over sixty years. Wars, both hot and cold, and political isolationism crimped the ability for the world to trade with itself. Since the 1980s however, relative global peace and stability, coupled with enormous advances in computerization, networking, bandwidth and the generally rapid rise of productivity has moved globalization into high gear. But this has not been without cost, for as rapidly as the world is integrating it is equally rapidly dividing.

Economists, policymakers and activists hotly debate globalization's benefits. Without taking sides, this next section shall tease out a trend specifically meaningful to the designer. The first point regards world inequality. Since the 1950s, but accelerating during the last twenty years, world incomes have tended to accrue in a decreasing percentage of the population. In other words, fewer people are making and

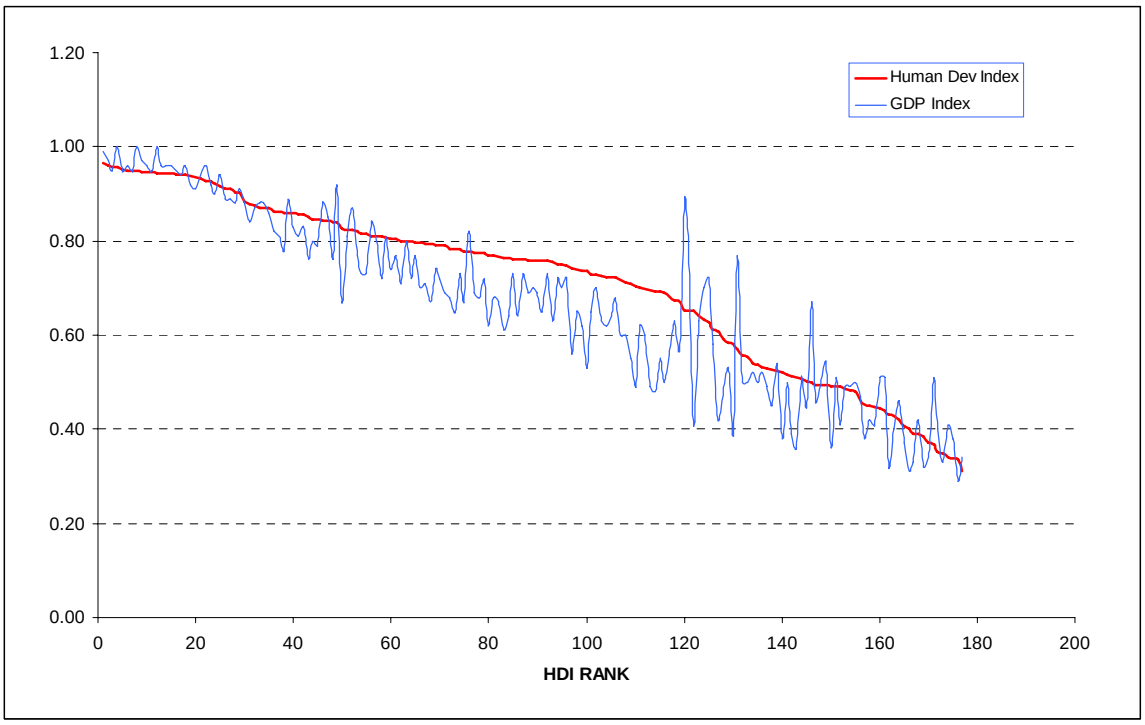
retaining more of the world's wealth.[1] The chart below (Figure 1) illustrates this trend. (Milanovic 2005) The horizontal axis plots time in consecutive years from 1950 to 1999. The vertical axis correlates the Gini coefficient, which measures the inequality of income distribution. Here, 0 corresponds to perfect income equality (i.e., everyone has the same income) and 1 corresponds to perfect income inequality (i.e., one person has all the income, while everyone else has none). Hence, the higher the Gini coefficient, the fewer number of people who hold more of that country's wealth. The upward sloping red line clearly shows the rising trend of income inequality averaged over 170 countries.



(Figure 1, Unweighted international inequality, 1950 to 1998)

[1] Explaining theories include: globalizations tendency to hurt more than it helps, indebtedness of developing economies and their high interest rates, implementation of neoliberal policies, and because some countries have chosen to exclude themselves from globalization.

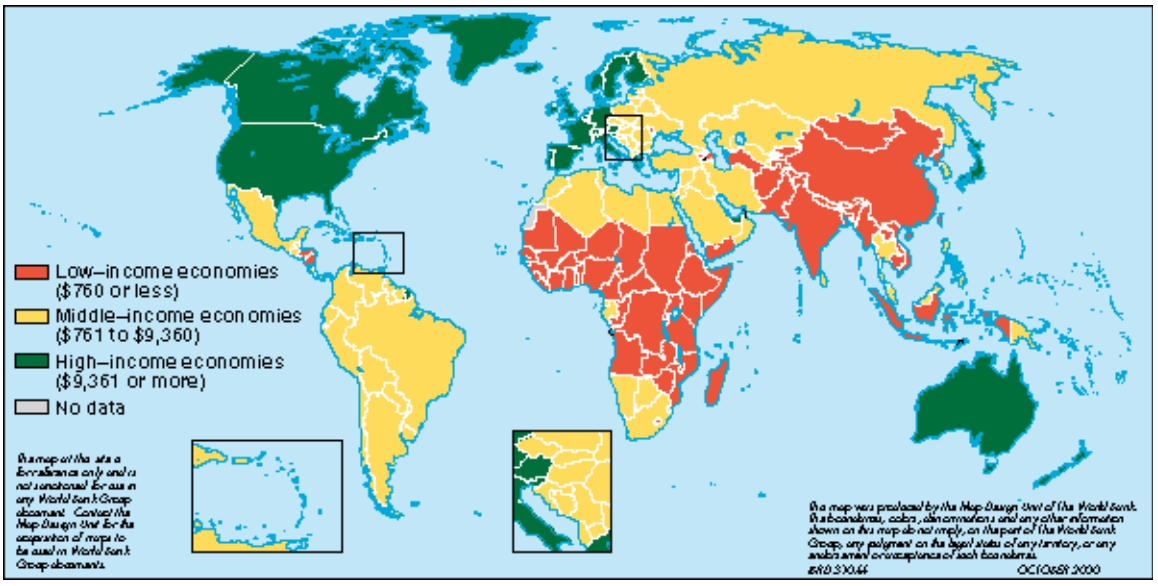
The next chart (Figure 2), produced by the United Nations Development Program, compiles data from 177 countries. It correlates, unsurprisingly, the relationship between the Human Development Index (the red line), a measure of national health and life expectancy, and that country's Gross Domestic Product Index (the blue line). Simply put, more wealth (higher GDP) exactly matches a better and longer quality of life. This comes as no surprise to anyone. What is shocking is how much of our world unequally experiences these statistics.



(Figure 2)

This map (Figure 3), prepared by the World Bank, paints a dire picture. Of the world's 6 billion people, more than 1.2 billion live on less than a $1 a day (areas in red and yellow). Two billion are only marginally better off (areas in yellow). Roughly 60 percent of the people living on less than $1 a day live in South Asia and Sub-Saharan Africa. (World Bank 2007). As for the rest of the world, more than 50 percent of the world's wealth is held by only 13 percent of the world's population in just twenty countries. Some of

the wealthiest areas include the United States, Japan and Western Europe. Particularly important to global designers is the fact that developing countries pay 25 percent of the money industrial countries earn from exports. Or, put another way, globalization is benefiting industrialized countries because poor countries are buying their goods. However, to be fair, there are many other statistics that point toward the convergence of global income, a decrease in extreme poverty and the benefits of globalization.



(Figure 3)

The point here is not to extol or vilify globalization or even debate the statistics. Globalization is a force whose time is now. As Keynes points out, not necessarily for all time, to be sure, but certainly for the near future. Certainly for our time. This global picture is now the 21st-century-designer's client.

The space created through the collision and separation of global economics is quickly becoming the designer's new studio for several reasons. First, we are slowly running out of consumption addicts. High transportation costs and a growing "green" movement are already damping revenues. Product differentiation will not be through style, or price or perhaps even performance alone; it must address all of these with an added dimension: relevance. The solutions must matter to client and consumer. Solutions must fill a niche and transform the systems they touch.

Second, globalization demands the increasingly free flow of capital, goods, services and knowledge across borders. Until recently, this has meant cheap labor in developing economies fueling back-office functions and manufacturing. But, this too is changing. These locales are quickly becoming the originators of innovation in search of markets for their ideas. We need integrators; people comfortable at the intersection of multidisciplinary teams, tracking ideas across the globe.

If the income divergence theory is correct, than before too long we in the rich countries will run short of clients willing to continuously pay hefty sums for product innovation because the customer base can no longer afford it. As a friend at Black & Decker recently put it: "We're in the landfill business; we make things people use for a while until the latest and greatest thing comes along." Of course, the world will always need continuously improved products, but the trends seem clear: less landfill, less energy, less consumption, broader impact. Translational research is designed for maximum impact—getting innovation quickly from the laboratory to those in need.

5. CASE STUDIES AND LESSONS LEARNED

One question looms large above any translational research project: Whom are we serving? In the drive to connect pure research to practical application, it is easy to get caught among competing interests, lose focus and potentially harm those we are trying most to help. This next section examines specific translational research projects, their objectives, stakeholders, successes and failures.

Our first foray into translational research was perhaps our most ambitious project and subsequently our most spectacular failure. The project, titled "The Urban Studio" followed the Rural Studio model pioneered by Samuel Mockbee at Auburn University in Alabama. Professor Mockbee's graduate students of architecture selected for their senior thesis a project in a low-income community of rural Alabama. Working in teams, the students designed and constructed an architectural solution. Our goal was much the same but in an urban context. Relevant stakeholders from throughout the community formed a steering committee to oversee the project. Present were college provosts, deans, department chairs, and

faculty; a museum president; development staff; public policy professionals; and public health researchers. The "client," a halfway house in impoverished East Baltimore for former drug addicts and ex-convicts, provided the project's site, program and lengthy list of needs. In translational terms, we had sitting at the same table brilliant researchers and desperate social workers. The task seemed easy: our institution could facilitate the translation of pure research to alleviate serious social/medical problems and conversely help the researchers better target their studies.

However, a major city like Baltimore is not rural Alabama. We have strict building codes, stringent code enforcement and precise requirements for licensed professional architects and engineers. All the key players were present except an employee of the City of Baltimore who could maneuver these constraints and thus enable our project. Without a building permit, our efforts were greatly restricted to site-art and cosmetic building repair.

This Baltimore neighborhood is frighteningly in need. Addicts lay in streets with needles hanging from their arms; children have little access to nutrition, and gun violence looms at every corner. Our partners needed real solutions with the broadest impact possible. What we delivered not only fell far short of their needs and what the public health researchers knew would help save lives, but our efforts added mistrust to an already disenfranchised population. We learned several valuable lessons.

First, know the obstacles. Though a physical solution was sought, it was not the time or place. In America, too many litigious obstacles prevent architecturally humanitarian solutions. This can also be true of product design. Often, the biggest impact is simply translating the need into awareness. It is much easier for graphic designers, storytellers and filmmakers to leverage change through a compelling, straight-forward presentation of needs then actually building the solution.

Second, get comfortable in the middle. This should have been no surprise as translational research seeks exactly this role. However, we were not capable of adjudicating competing interests. Having the stakeholders speak to each other is not enough. Because the goals range from broad (pure research) to specific (practical application), each constituent will seek his or her own agenda. This is especially true on

the ground as resources are exceedingly scarce and local community organizations will often fight each other over small grants. Clear goals and demonstrable results must supersede individual desires.

Third, the traditional classroom is ill-suited for translational research. Translational projects take unexpected turns; the tight curriculum, specific meeting times, and protected confines of a campus prevent the rapid response often required. If possible, the class should have little hierarchy and assume a semi-autonomous posture from the home institution. Being in the middle, translating competing interests means belonging to no single institution.

Lastly, the price of incompetence is too high to pay. An organization must not only be confident in delivering translational research, it must know it can. These projects are not for the faint of heart. Often there is no clear road ahead, as you will be the first to unite disparate, often antagonistic groups. Everyone will look to you to deliver. Those in lab coats want insights to help focus their research and they want access to research subjects. Those on the ground want their time, effort and particularly their extension of trust to be well-spent. In short, failure can and will make a bad problem worse. Moreover, failure may also keep a solution from ever finding its way to those most in need.

A more recent example, also from rural Alabama, clearly demonstrates this point. In "Project M," Maryland Institute College of Art (MICA) faculty and students were invited to join the Rural Studio and help identify community needs and propose viable solutions. The team immediately hit upon the lack of clean drinking water by more than a quarter of Hale County residents. With most residents on well water and lacking proper sanitary filtration, the rural population is drinking water contaminated by their own waste. The solution needs no great scientific or medical breakthrough. The solution is to connect homes to the public water utility. For a mere $425 per residence, each house in rural Hale County could have clean drinking water.

In translational terms, the team identified the most pressing public health problem and presented an affordable, readily existing solution. The real translation lay in developing a campaign to raise awareness

and funding; to be the bridge between those who could not speak for themselves and those who hold the keys of change. The outcome was shocking.

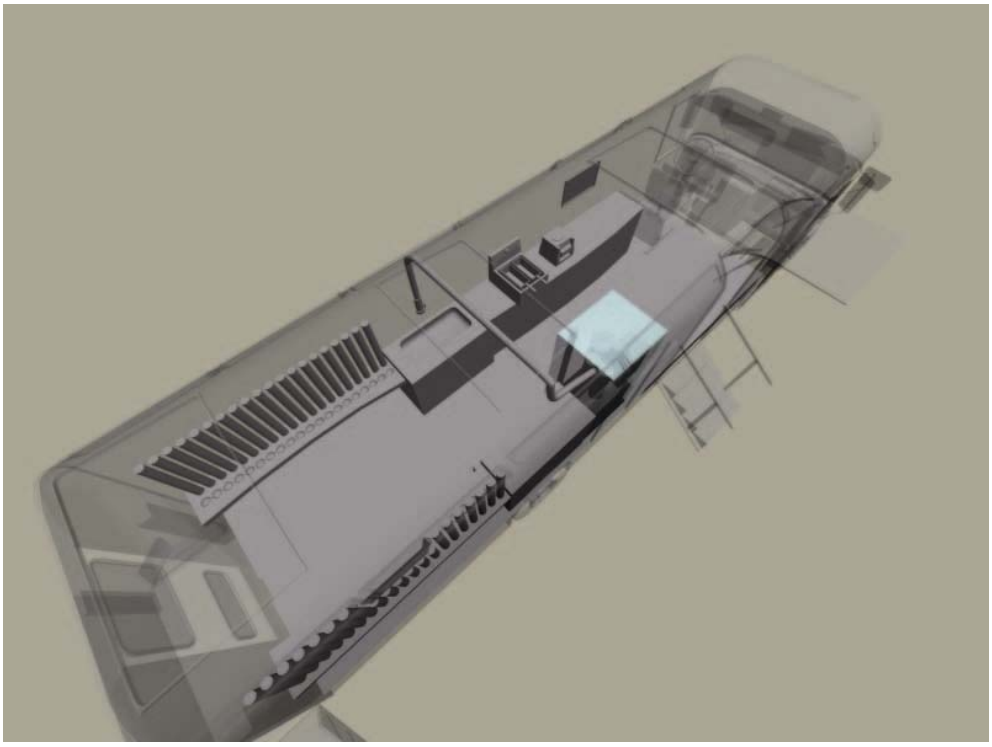
Several weeks after completing their study and publishing their public awareness and fundraising newspaper, the director of buyameter.com, our local partner, received letters from the affluent fraction of the community insisting there is no such problem and anything to the contrary is slander and only denigrates their leadership. She will most likely lose her job, close the foundation and possibly get sued while the rest of Hale County continues to drink their own sewage.

A recent successful example has also yielded valuable insights. This project, "The Biodiesel Bus," is a joint venture between MICA and the University of Maryland. Here, chemists, physicists, engineers and entrepreneurs asked MICA to help turn an old school bus into a mobile teaching lab. Designed to roam the United States on fuel grown on the bus, it will educate thousands on the possibilities of biomass and alternative fuel (Figure 4).

(Figure 4: The Biodiesel Bus before the collaboration)

The process for growing plants and converting them to biodiesel fuel within the confines of a bus was well thought out by our scientific partners. What they lacked was a way to package, brand and communicate the project's message about the benefits of biodiesel. Using students from several departments, including graphic design, animation, architecture and industrial design, our interdisciplinary team designed the bus, its teaching displays and graphics (Figures 5 and 6). Moreover, the class filmed the collaborative process between the designer and the engineer for a forthcoming documentary. The main translational aspect of this initiative was taking hard science and engineering principals and making it readily accessible to an uninformed audience; an audience as broad as the United States is wide.

(Figure 5: Rendering of the proposed bus)



(Figure 6: Rendering of the bus's interior)

The last successful case study involves public health policy researchers at Johns Hopkins University and an interdisciplinary MICA team. Johns Hopkins University, the single largest employer in the State of Maryland, with more than $4 billion in annual funding and for seventeen consecutive years ranked the best Hospital in the United States, suffers a long, fractured relationship with the city of Baltimore. For decades, as the university has expanded, grown wealthy and renowned, its neighbors in East Baltimore have suffered increasing crime, drugs and a population exodus. Figure 7 is a photograph taken from a roof at the Johns Hopkins Medical campus. Under the construction crane is one of several new, state-of-the-art medical research facilities. The small, largely abandoned and derelict row houses in front of the building house residents of one of our nation's poorest, most violent neighborhoods. In so many ways, this is the same global picture described earlier: worlds colliding and ripping apart.

(Figure 7: Johns Hopkins Medical School in East Baltimore, Maryland, USA)

For many years, this neighborhood contained the research subjects for dozens of research grants. Using the local population, researchers conducted studies and published the results in medical journals, which in turn led to securing more grants for more studies. Nowhere in this cycle would the results ever filter down to the subjects themselves. Standing literally in the shadow of medical breakthrough, those who contributed most benefited the least. Not only was the research not benefiting our neighbors but also a lack of community trust severely hampered learning from the research. In other words, the bench was not learning from the bedside. For this reason, the Johns Hopkins Bloomberg School of Public Health began working with MICA to help bridge this cultural gap.

A series of initiatives, led by Professor Bernard Canniffe at MICA began building the bridges. In each case, local community organization leaders would meet with MICA students and Hopkins researchers to help distill hundreds of pages of dense medical data into simple, succinct graphics with which the community could identify. With Baltimore suffering a 70 percent high school dropout rate, the translated research

had to touch people's lives at the most basic, intuitive level. This work provided much-needed education for a desperately underserved community. It provided the researchers critical insight. It helped repair the community relationships torn apart by years of mistrust. And it provided our students with invaluable experiences.

A few highlights from these projects illustrate the designer's critical, translational role. Recently, Johns Hopkins University public health policy experts and MICA designers co-authored a grant to the Centers for Disease Control and Prevention to research the relationship between the built environment and human health, particularly as it relates to at-risk adolescents in Baltimore. Another Johns Hopkins University joint study analyzed the effects of air-borne pollutants when neighborhoods are heavily renovated or demolished. And most recently, our product designers are working with engineers and health policy researchers to destigmatize bicycle helmets and co-create therapeutic and educational toys. In the widening economic and cultural gap are the convergence of graphic design, industrial design, architecture, urban planning, urban policy, engineering, gaming, health policy and medicine. In each case the designer bridged the gap between a theoretical hypothesis and its impact on individual lives. 2

The problems in Baltimore are big, and this work has had a transformative impact. Our neighbors in this community are perpetually torn apart by poor education, racial segregation, and low income. In the widening gap are drugs, crime and violence. What works here may help us address these issues elsewhere. The lessons learned at our doorstep will hopefully translate to communities not blessed with institutions such as ours.

6. THE KEYS TO SUCCESSFUL TRANSLATIONAL RESEARCH PROJECTS

Over the last few years, we have learned a great many lessons on what makes translational research successful. Outlined below are some generalized observations extensible to any institution.

[2] For specific project results see B. Canniffe, "Blue Collar Design Verses The Gorilla: Improving the Quality of Lives Through a Partnership Between an Art School, an Urban Community and Academic Health University", 2007

Forget about the solution. As counterintuitive as it sounds, sometimes the designer must stop trying to create a single solution and rather focus on the discussion. Often, a single solution is not appropriate. Energy should shift to facilitating the discussion. This is particularly difficult for students who believe their future success lies in a polished portfolio of clever design solutions. Translational research projects can provide invaluable experiences and can allow a student to take an important role in a socially significant initiative, but the end result will not necessarily lead to a tangible piece of design. Therefore, it is critical that any translational research leader clearly state this at the beginning.

You are now a strategist. Design educators and professionals often see themselves as service providers. Translational research requires a much broader, strategic view. The most effective solution with the broadest impact is often a set of strategic options; a framework that holds together diverse working groups.

Identify common tools. Sometimes researchers will use the same tools as the designers. In one Baltimore initiative with Johns Hopkins, we discovered that their epidemiology researchers used the same geographic modeling software as our urban planners. They provided the theoretical model of disease transmission and we provided the spatial model of Baltimore. The complimentary skills were multiplied through a common analytical tool.

Identify common values. In addition to our complimentary differences, our designers and their doctors share some personality characteristics as well. For one thing, both the doctor and the designer believe that they—single-handedly—can change the world. Designers of all sorts believe that the things we personally make alter how people live. Conversely, when the project is socially engaged and relevant, then the team takes priority over ego or any single idea. The team strengthens and leverages diversity; it breathes in convergence because of the contribution they are making and thus helps bridge the divergence gap. Appreciating our differences and celebrating our shared values streamlines activities and bolsters stamina.

Develop your organization. Without question, the most difficult aspect of translational research is staying independent and focusing on the goals. It makes no difference if you are working with community groups or emerging economies, resources will be scarce and the underserved will see you as a conduit of powerful research funding. Therefore, it is critical to establish guidelines, roles and responsibilities. Moreover, pure research institutions, like those in science and medicine, operate on a fundamentally different paradigm than teaching institutions. Therefore, like the interstitial role of translational research

itself, a third organization is required to bridge these irreconcilable, organizational differences. For this reason, MICA and Johns Hopkins have together inaugurated a new, intercollegiate organization with the following objectives:

1. Foster research on the relationship between design and health behaviors and outcomes;
2. Develop and evaluate collaborative design programs aimed at improving the health and well-being of East Baltimore residents;
3. Explore the uses of the arts as strategies for community and individual empowerment and evaluate the impact of empowerment on program participants;
4. And develop new training opportunities for graduate students at MICA and Johns Hopkins.

Offer Problem-Based Learning . The translational classroom curriculum benefits most from teaching students how to learn. The core constituents of problem-based learning have proven an effective classroom structure in translational research projects. The key essentials include:

1. Students work in small, collaborative, interdisciplinary, cross-cultural groups;
2. Professors facilitate the learning process, acting only as guides, not presenters of information;
3. Learning is driven by open-ended problems where students create a unique methodology;
4. Students develop the skill to "pull" knowledge to them when needed, not according to a pre-written syllabus;
5. The use of real-world technology;
6. Use an outcome-based assessment accompanied by a design solution (where appropriate), and presentation or community action.

Don't screw up. As stated previously, the cost of failure is too high. Getting these projects wrong can cause irreparable damage. This work is not about creating a product that sells. It's about taking on big problems that require many diverse participants to solve.

7. WHY THE DESIGNER IS GOOD AT TRANSLATIONAL RESEARCH

I believe research for the emerging designer will be increasingly translational and supra-translational. Like the medical example I began with, tomorrow's research, whatever the form, content or discipline, must bring solutions more quickly to those who need them; and it must bring the lessons of the field back to the laboratory. In this way, the designer needs to think of context as much or more than the object. What good is designing the world's most beautiful faucet if the water flowing from it is polluted? In truth, the world needs both a great faucet and clean water. It needs the vaccine and the delivery system; it needs the instructions written in a universal, graphic language for all to understand; it needs the clinic, built in a culturally and environmentally sensitive manner. Solutions, be it micro-finance or drinking straws, must contemplate the breadth of their impact. This is why the designer is particularly well-poised to solve big problems.

First, a designer's education is marked by several unique and important characteristics. The designer is taught to integrate; how to seek, manage and leverage sub-specialties. Engineering, finance, policy and manufacturing are but a few of the many areas we constantly harness.

Second, the designer is taught to investigate. Great solutions come from a sketchbook full of experiments. The solution always stands atop a mountain of previous attempts. The results are tested in the crucible of debate, critique and prototype. We seldom produce in isolation. The concept may come from one mind, but many, many others hone its perfection. In this sense we have always performed translational research: We begin by emptying the box of ideas, then sketching and documenting all possible solutions. Then, through investigation, prototype and critique, we eventually construct a working solution. We've always invented from observation. We've always gone from bench to bedside and back.

Third, to borrow a phrase, we are starting to "design like we give a damn." I think this is a direct result of the convergent/divergent world we live in. Both tragedy and our privileged status are thrust upon us in real time. Perhaps there is an ethical or moral resurgence, but those who operate at the blurry intersection between disciplines are completely comfortable pulling together a team to solve some rather glaring injustices. The beauty is these solutions may now take any form. Not just sleek and sexy objects, but policy and pragmatics are just as readily deployed.

And lastly, and I think most importantly, the designer is taught to listen. Ideas rarely spring from emptiness. Rather, the act of imagining comes from paying keen attention to clients and customers; to cultures and trends; to success and failure; and to prejudice and injustice. Successful designers, and their solutions, invariably mediate competing interests. Ours is usually a balancing act of market analysis, manufacturability, aesthetics, budgets and legal constraints. Who better to unite the broad pipeline of pure, untargeted research with the achingly specific needs of a world drifting apart.

8. CONCLUSION

Globalization is changing our world in ways we do not fully understand. One thing seems clear, however; it is both a unifying and dividing force. Economies may integrate, but labor forces experience vastly different outcomes. Industries may collaborate but intellectual property may get caught in widely different legal systems. Wealth, technology and knowledge are flowing across borders, but the torrent is creating islands. An interlocutor is needed; someone to speak for many dissimilar constituents; someone to harness the research and genius of millions of drifting islands.

Designers, due to their unique education, have always played this role. Today's problems are getting bigger and more complex, and no one seems better-suited to play a crucial role in solving them than the multidisciplinary designer. Designers have always had to consider competing interests, and in response they traditionally have provided a single solution. Today's designers should go beyond providing one solution or one product, and instead consider how their solutions might transform entire systems.

From pure scientific research to practical application, from bench to bedside and back again requires a third party with unique and powerful skills. The designer whose tool box contains above all else the ability to integrate, investigate and ideate is the key to unlocking translational research. Going from bench to bedside and back will be at the heart of transforming our planet, and there is no one better to assume this role than us.

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