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Abstract:
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Advocating for Common Sense and the Necessity
of Working with your Hands in Education, Life, and Design

The process of manual material manipulation is disappearing from daily life.

Why is it that we still have an educational and social environment that does not put the same priority on practical and theoretical knowledge as is does on virtual academics? This disconnect is particularly poignant in a field such as design that should demand the mastery of both. As a modern nation, we have repressed manual skill and incremental learning by fostering an educational climate geared solely towards the desire for white-collar status. We base the accreditation of our grade schools on the rate of their college placement and that mentality carries over to society at large. This trend has been going on long enough that the students currently in college have no longer had the opportunity to witness their fathers or even their grandfathers doing something as simple as changing the oil in the family car. Traits of competency and creativity that might actually have been hereditary at one point in time have been repressed to the point that successive generations are not even aware of them. Students have not been exposed to the possibilities and honor contained within these activities. We have a generation and a half of people who exhibit no mastery of their stuff and we have students getting to their senior year of college before realizing that there is a creative outlet that makes use of the material intelligence they seek. They learn to tap threads in a hole at the age of twenty-one and I end up teaching middle school shop to college seniors.

In the field of design, this lack of understanding carries over to the products created. Designers who don't make for themselves do not consider the values of object interaction that would be appreciated by an individual who makes. This results in crop after crop of products that help perpetuate a cycle of material unawareness, of waste and of limited development of the user/object relationship.

Making as Thinking

Over the period of the last five years, I have had the privilege of working with the students in the industrial design program at the Rochester Institute of Technology. During that short period of time, my understanding of what it takes to be an educator has expanded many times over and has been a platform for personal reflection on how my contribution to design education can be best put to use. As I have continued to develop as a new educator, I have become increasingly aware of a gap between my practical knowledge and that of my successive student groups. This could be considered a result of aging or of simple generational differences, but as my awareness of this disconnect has increased, so too has my recognition of the fact that it is a long-standing theme of my design involvement.

My involvement in the educational process has seen a gradual shift from that of traditional design practices to one of technical education. Originally I worked with students on a balance of theory and practice driven projects, but I now find that more of my time is being devoted to common sense education that centers around manual physical manipulation of your environment and the objects within it; the material arts.

More and more often I am requiring my students to abandon the paper and pen in favor of playing with actual materials. I find myself designing projects to specifically engender the use of three-dimensional sketching and shop time for assignments that might not otherwise elicit this. My own personal interests lie in the shop and in thinking with my hands so I often attempt to check those proclivities at the door in order to ensure that I am not forcing these work habits on my students. In contrast to that caution, a majority of my students display a thirst for this kind of experience and I believe that my encouragement of a common sense approach directly relates to the success of projects that I am involved with. I have been able to witness many times over how the simple act of working with your hands forces the application of cause and effect methods to all projects. Seat-of-the-pants engineering can often teach more in a design situation than stopping to learn the *proper* formula for the problem at hand. The very process of learning through experimentation allows for the occurrence of tangential accidents that both open up new venues of thought and inform the original problem at the same time.

What I have come to realize is that this kind of application was actually not only at the heart of the gaps in student comprehension that I have been struggling with as an new educator, but was also at the root of my own educational difficulties.

You Can't Teach Common Sense

As I continued to share my knowledge with the design students, I consistently ran into the same barrier which seemed to be rooted in a lack of practical physical understanding, or in other terms, a lack

of common sense. The encounters that illustrated this to me typically involved what I would consider simple technical skills. Perhaps I would use an example of how something works in the hopes that it would trigger other ideas, or I might reference a common work practice that I felt might help with idea generation. All too often these analogies were met with blank stares. I found myself continuously stepping backward to cover ground that I had falsely assumed was common knowledge. At first, I thought this was entirely my own short coming, that I was being too esoteric, or not using relevant examples. However, as I encountered more and more situations like this and I learned to take the time to find out if what I was saying was actually understood, I began to realize that it could not be entirely my fault because it was too consistent. On the other hand, my students are very intelligent young adults who for the most part exhibited a genuine thirst for the kind of practical demonstration I was offering. I was left trying to figure out what it was that had so successfully disconnected my students from the world that I know.

The World That I Know

I developed the skill set that I have through what I thought at the time was an unremarkable process of childhood development. I grew up in rural Pennsylvania; we had a family farm and business where we built timber frame homes tailored to fit the needs of each individual client. Building houses meant balancing technical limitations with the needs of others and the translation of information from one format to another. From plan to wall, or from the concept of how something needed to function to a homeowner eager to help make that happen. Living on a farm, we had to fix things. All those around could lend a hand to one degree or another. We grew our own vegetables and raised small amounts of livestock, planted fruit trees, brought the hay in from the fields and hunted the woods behind our house for fruits and wild game. We did not have video games, we did not even have a television until I was the age of ten and then it was only one small television for the whole house. All this I felt was relatively normal.

My education happened in an organic and incremental way, testing, playing and inventing solutions to everyday problems. There was no air of exclusivity or of higher intellectual practice, this was simply life. While not much thought was given to this at the time, the more I observed others I began to realize that the kind of education I received does not typically happen anymore. Very few individuals have the opportunity to experience such in-depth experimentation on, and in, the real physical world. I am not writing this and yearning for the “good ol’ days”, or suggesting that we should all make a move back to the family farm. But I am advocating for an awareness of the mental capacities that such activities develop in our brains and the application for those skills that follow. The practicality of welding something together so that it is once again strong is very apparent when you have to turn around and put

the welded mechanism back into function. If you are responsible for the use and function of what you fix or make, doing it right saves time, even if it takes longer to initially accomplish. That principle is as integral to life on the farm as it is for someone in the design profession. Responsibility for what you make and fix, or at least pride in the work, is vital to the generation of well-rounded and appropriate objects.

In addition to my exploration of the physical world around me, I was "smart". I read a lot, the library was as much a hangout as the shop, and so it only seemed natural to go to college. We all change during the college experience; horizons are broadened, new ways of thinking about the world are introduced, things that would have been taboo in life and learning are suddenly available and people have the chance to re-invent their identities. In many ways it is nothing short of magical. What the experience does not offer on the whole is a practical application for physical efforts; there is no cause and effect to the college effort. My background had prepared me to see the world in a different way, when flipping a switch on the wall, I knew how the electricity traveled to the bulb, I knew why elevators worked the way they did and why locks worked or didn't. In college I was surrounded by a populace that did not exhibit this kind of understanding and I repeatedly witnessed highly intelligent individuals thwarted by simple mechanical interactions. Yet, I felt like I was the only one alarmed by the lack of what I assumed to be common sense among my peers.

The Design Studio

In many ways I found the industrial design program to be a bastion of cause and effect, a place where physical experimentation could take place. However, even in the design studio, students seemed to be stuck in a disconnect between making and thinking. There was an incongruity between physical work and academic work.

On any given week you can visit any given industrial design studio and you will find a myriad of projects around: paper sketched on or folded into small models, foam and wire to indicate a form, balls of clay, etc. If you look past that and peer into the corners or under the desks, almost without exception, you will also find panels of wood glued together, fiberglass molds stashed away, stacks of plywood and bags of fabric. All these parts have little to do with the students official design education, they are personal projects undertaken to exploit the availability of a shop that they may have never had before in their lives. These projects are skateboards and snowboards and coffee tables for their first apartments or stuffed animals for their new nieces and nephews. In my opinion, these projects are also where the real design education is embodied. I can almost guarantee that in years to come, these students that have had the drive to take advantage of the resources in such a physical manner will remember the details of their skateboard manufacturing more vividly than almost any other course work that may have happened at the same time. As a program, industrial design incorporates things to encourage these activities. Elective classes are a

required part of the curriculum and physical models are often a requirement of specific projects. However, the students themselves often fail to recognize the importance of the integration of this kind of working into their thinking. The students who take advantage of these things are on the cusp of understanding that making is actually an integral part of their design process. However, in many cases this is the first opportunity that they have had to experiment in such a way. It is a lot to ask that these principles get fully integrated into their models of thought based on a few short experiences.

We often take for granted the actual lack of exposure and experience that students have had to, and with, the world of material manipulation. Throughout grade school, most of our design students have seen physical work and action demonized. The propensity for action has been drugged out of energetic young children and rather than giving them an opportunity to see what it is like to work with their hands, we have taken away their shops and told them to sit still in front of a computer. A large percentage of students arrive in industrial design without ever having taken a shop class. Their schools have focused their efforts in order to prepare them for the virtual world of work and better their chances of getting into a good college. However, I have found that once they arrive here, there is a common deficit of knowledge needed to successfully interpret and manipulate objects, knowledge that is key to a comprehensive design understanding. As a result, students tend to continue to exhibit a disconnect between their academic learning and their physical projects.

Make

I find this disconnect analogous to the current *Make* movement. There tends to be two distinctly separate aspects in the lives of many of the practitioners of this movement and other similar movements; they are smart individuals who often work in smart jobs, but what they make is completely disconnected from what they do. The focus of their brain power is directed to what might be considered white collar work and as a backlash to this mind-only work, their minds and hands need to get together on the weekends to work on other projects. The current popularity of this pursuit evidences the basic mental need to have mastery over ones objects.

The problem, or handicap, with this activity is that in an affluent society our *needs* have already been met, by designers of all people. There is not much left in life that needs making. Almost everything you can think of can be purchased. This in turn is supposed to leave us “free” to live our lives as the perfect consumer, not bound to our objects or to menial manual labor. The things that are left to be made in life have been pushed to the periphery and we have to be creative just to find them. As designers, we have done an excellent job of dreaming up every imaginary need and developing a product to fit that niche. We have entire courses in design dedicated to this practice. Consequently, the purpose for a majority of typical *Make* concepts is to practice making just for makings sake, not out of physical need

but out of a mental one. We are starting to recognize that there is a now dormant, innate need to manipulate the things around us, but we have made our world so safe that we have to dream up ever more esoteric excuses to put those skills to use. In much the same way that the thrill seeker has to dream up ever more creative ways to push themselves to the edge, the makers and tinkerers have been pushed to the periphery by the very nature of our objects. They now have to think up display stands and speakers for their iPods rather than take the opportunity to make the tools to survive. We have been trained to think that fixing our own toilets and toasters is a waste of our precious time, but now we are left looking for something to fix so we can once again feel a connection to the things around us. We have reached a point where we have to fabricate excuses to go out in the shop and create.

The *Make* movement can be heralded as a creative renaissance, but at the same time I think it is a relatively sad renaissance since most of the results of the labor are of this peripheral nature. This tinkering is quite a successful form of entertainment, but I see it as an example of how the excesses of modern design have annihilated the *actual* need to create anything for oneself and showcased the *mental* need to make. One can look at this in terms of the possibility that these individuals have no longer been given the opportunity to find meaningful work that employs the same kinds of skill and manual dexterity that they now have to seek out in their hobby pursuits.

Regarding the Motorcycle

As an internal response to the non-tangible nature of graduate school I found it necessary to engage in my own tangible outlet to relax my mind and hands at the end of the long, disconnected academic day. In much the same way as we see *Make* practitioners forced to hide from the demands of their *work,* I needed to clear my head by putting it back in touch with my hands. In my situation, this mental reliquary took the form of a motorcycle.

This activity is a celebration of the kind of things that academic pursuits do not typically celebrate; the application of manual skill, manual labor, and a compressive vision that all come together into a working fluid machine. These skills are becoming a lost art. This kind of knowledge is something that we can thank the *Make* movement for attempting to help retain.

For me, before I can trust a machine I need to take it apart. I get some degree of re-buff for this habit, but I can feel the reward of its practice. Having dismantled a machine, I have an acute awareness of its strengths and weaknesses and of how to manipulate them to their effective edges. Before things like motorcycles were designed by industrial designers, they would have been designed by the people who used them. In that regard, they would have been built with this kind of metamorphosis in mind. The vision of the life that the object would take on and how it might grow and be changed would have been part of the original concept because it was being generated by an individual who was doing the same

thing. When I build something, regardless of whether it will remain in my ownership or not, I take the time to consider the future changes that it may be subjected to. In the case of something as simple as installing a bolt, someone that thinks about future changes will make sure that it is threaded into a captive fastener rather than a loose nut that you will not be able to access after assembly. This kind of thinking cannot be accomplished by someone who does not *work on stuff*. Designers who do not make, design things that cannot be made, or more importantly, fixed. We have endeavored to shroud the consumer from the nasty bits of their objects, but if we want an object to be really used, what is wrong with leaving the fasteners exposed and making sure they thread into something that will stay in place?

What we are now faced with (I hope) is a consumer realization of the toll that being shrouded from our objects has taken on our minds and our independence. As of late 2010, there is a poignant open source *Self-Repair Manifesto* poster generated by a subsect of the *Make* movement that has been circulating around. The poster espouses the consumers right to the knowledge needed to maintain, fix and modify the objects in their lives. These points embody the best of what the movement could bring to the forefront of product design if we embrace the user as a vital part of the life of our objects. To do this, we need designers that know how to make.

The Object: A Reality Check for Designers

As a contrast to the small market segment of consumers who want to fix their objects, the majority of individuals in modern American society don't make or fix anything. As a result, they have what I venture to say is a limited connection to the objects they surround themselves with. The user-object relationship is devoid of the possibility for a deeper meaning or connection. The objects in modern life consequently become nothing more than consumables and the users nothing more than consumers searching for the connection that they would quite simply have if they were able to see the possibility in the objects around them.

That activity of identifying possibilities is what I define as creativity and we all have the potential for it. However, it does not typically get showcased in the modern world unless we are forced into relying on it. One situation where this naturally ingrained model of creativity becomes apparent is in harsh living conditions. Disadvantaged societies are adept at seeing objects not for their intended purpose, but for what can be done with them to aid in survival. I am fascinated by what people do, and what they do it with, when they have nothing. There is what I would consider a higher level of creativity, drive, common sense, and even satisfaction in those situations that we have designed out of existence in the modern and advanced portions of our world.

Post apocalyptic film and fiction provides a body of research that, albeit tangentially, explores this model of creativity. Examining representations of how individuals interact with objects in a

theoretical post apocalyptic environment and then contrasting that with how people interact with those same objects in daily life can be very enlightening. In a post apocalyptic world, objects take on new meanings and are used in altered contexts that provide a deep sense of connection, individuality, identity, and even community that relates to and contrasts with the everyday use of those same objects. These attributes are strikingly similar to what we seek as consumers. In many ways we are in the midst of a consumer apocalypse, one of a lack of understanding, of missing connections and a lack of context, a splendid barren wasteland of creativity.

The models explored in this kind of fiction are drawn from the possible outcomes of our current social paths and as such can provide exaggerated illustrations of current situations. In the recent best seller *World War Z*, the author relates the difficulty of the post apocalyptic rebuild process that stemmed not from a lack of leadership or resources, but from the fact that a huge percentage of the population was unemployable. Too many of them worked as individuals who had no practical skill that could be put to use in a world where the infrastructure that they relied on had failed. The workforce consisted of people with titles like creative professional, manager or investment entrepreneur. However, what was needed were stonemasons, builders, welders, and machinists.

The examination of a shift in what skills are considered important at a given time is often an enlightening exercise, but so too is a look at how objects change meaning. In the *Mad Max* series, the mechanism from a simple music box takes on a whole new level of meaning. It is seen in a new light due to the fact that the technology that made it is now lost. In much the same way, the language itself changes to reflect that loss of mechanical knowledge. The tradition of oral storytelling has been revitalized out of necessity, but the practice has changed its name to '*The Tell'* to reflect the change from a time when the television was the predominant story source.

The current-day equivalent of this out-of-context object examination can be found in the field of archeology. We are left with remnants of the things that have come before and we have to interpret those things based on current models of thought. The archaeological process can teach us a great deal about where we came from and what things have been lost. We can then look at this post apocalyptic interpretation as a way to determine what we might become, or are at risk of loosing, and it can provide an interesting basis for analysis of our modern objects.

Humans exhibit an astounding level of creativity but only when they are forced into a situation that requires it. Industrial design has unwittingly endeavored to remove that type of creativity from the daily life of the consumer. We purposely design objects with our own job security or validation in mind. The goal of modern objects is not to be transparent and open, but instead to be shrouded in mystery and to *protect* the consumer from having to know what it is, how it works, where it came from, and how to fix it for themselves. This removes the possibility of human ingenuity and creativity that is found in the ability

to fix things. In the past, we fixed the things we had. We needed our tools and when they broke, we had to fix them. All that we are faced with having to fix now are our iPods and designers have made sure that you can't do that yourself.

As a maker, I hold dear the archaic methods of construction, not for their historical value or context but for the fact that the visible implementation of those skills becomes a way to teach understanding and appreciation of objects.

As designers, the thinking about making should align with the thinking about use, about fixing, about modification, and product life cycle extension. This is creativity and common sense, something that should be fostered in every human, not just an elite designer caste and it is not the kind of thing that designers can facilitate unless we teach at least some of them to be masters of the material world.

Talking to Old People

A project, such as the motorcycle I mention here, often takes on another role; it becomes a good excuse to elicit the help and advice of others. In many ways, this kind of work becomes a communication medium long before the project is completed. The project can provide a common ground on which to premise things like stopping by for a visit. This is a process that I am familiar with and typically engage in with a camera in hand. In this particular case, my thinking about the project and about making had become entwined in my mind and as a result the photographs that I took during these visits shifted focus from the projects that were being made to the people who made them. I was in a mindset of visiting the knowledge, not the work, and this in turn informed my photographs. The result became an unplanned photo documentation of my friends in the maker community.

This group of friends is a bit of an atypical one. They are a bunch of guys who are linked together by friends of friends who all hide out in their garages and oddly enough, they are almost all *old*. These individuals were at one time very useful members of society. In this particular geographic area we have a fairly high concentration of retired engineers, mostly from places like Kodak and Xerox. These men are smart and were needed for the industry of the past century. They worked hard and earned their retirements with their hands. At one point, they were maintenance or production engineers and machinists. Their skills were in demand and the work was honorable. In their retirement, they engage in a successive stream of self-inflicted projects in order to keep their minds engaged. They work on cars, motorcycles, airplanes and the like and they all have this need to continue using their hands to keep their minds going, a situation that I have started to refer to as the *Kodak Complex*.

The interesting thing to note is that these projects are also all peripheral, much like the ones characterized by the *Make* movement. Their function is typically for the sole purpose of keeping aging minds sharp, just as *Make* projects are to keep current-day working minds balanced. It is more the action

than the result that keeps these individuals going. Depending on the personality of the maker, many of the projects will never see the light of day. These tasks live out the entirety of their lives on the workbench, gradually morphing from trying to attain one imaginary goal to another, rather reminiscent of a design student stuck in the sketching phase.

Loss of a Language

The involvement that I have with this group of aged makers would not be possible were it not for my ability to speak with them in the language of the trades, of work, and of the physical world. As a *youngin* in comparison to many of these antiquarians that I have had the pleasure of interacting with, my presence is both un-nerving and refreshing at the same time. While immediately being perceived as out of place, that is quickly overcome by this common language that I have worked hard to develop. The knowledge that I learn from this group of friends is the exact same kind of knowledge that I witness students exhibiting a genuine thirst for, but those same students have not had the opportunity to develop the language needed for this type of communication. I have, what I would consider, enough of a limited experience in both the modern digital world and the archaic material one to be able to facilitate communication of this sort and I have attempted to be a translator between the worlds of makers and students. The problem with this kind of communication is that when it is filtered through an individual, certain things are lost. Just as with a game of telephone, one person is not necessarily in tune with what the other is actually saying. It is vital that we have at least some designers and design students capable of using the language of work. This knowledge is not learned in a cursory manner, these makers from past generations did not *learn* this language; it became part of them in the same incremental and organic way that it became part of me. In contrast, our students have been subjected to educational standards that de-emphasize the importance of that language.

The *Make* movement addresses what I refer to as the cyclical nature of skill awareness. Knowledge, skill, and the interpretation of what is important to know at a given time go in cycles. Everything tends to come back around again so there is no use pining for the ol'days when this-or-that was done. There has hardly been an age when our elders did not utter the phrase "kids these days…" The hope is that there are always *torchbearers*, however dim the torch may become, that carry the flame of some lost knowledge until the time it can be reignited. However, at this point in our history, I wonder if we are faced with too large of a gap in that cycle and I worry that we stand the possibility of loosing an entire knowledge base and the language that goes with it. The issue is not that change needs to be stopped, but rather that it needs to be built upon the things that came before. There is no way to do that without first learning those things. Nothing lasts forever and if we do not know what came before, we cannot maintain or recreate what we already have.

Archeology and the Past

The loss of a language, in this case the language of the trades, is not a new concept. Languages have been lost countless times in the past. We have entire fields of anthropology and archeology devoted to the study of those lost languages. This only seems natural. What does not seem natural is the fact that we are faced with the very real possibility of having to employ archeological processes to determine how things that we rely on today were done or made as recently as the second part of the last century. Industrial systems such as HVAC, plumbing, and electric require specialized knowledge to create. The workers in possession of this knowledge are almost universally on the verge of retirement with little prospect of anyone following in their footsteps. The knowledge needed to keep something running is superficial in comparison to the knowledge required to recreate the system from the ground up. Our society puts a lot of faith into the assumption that our infrastructure will never need to be recreated.

In the archeological and anthropological fields, there is a well-known man who was the last known member of the Yana tribe in northern California. He lived traditionally, and mostly alone in the forest until he wandered into Oroville in 1911. The Berkley Anthropology Department consequently scooped him up and used him as a learning tool until his death. What this individual, known by the name of Ishi, was able to offer was an in-depth practical knowledge regarding how his tribe made things. There are specific flintknapping and stone working methods that had stumped archeologists until this *torchbearer* simply sat down and showed someone how it was done. To this day, traditional flintknappers use a tool referred to as an Ishi-Stick to give flakes the precise patterning that had previously baffled archeologists. While Ishi was a rare case, I don't think that the general situation is such a rare one. I have been in many situations where the simple act of someone more experienced providing an example of how to do something would allow for a previously complicated task to become simple.

For me to sit here and say that we are loosing a language ignorant of the fact that things go in cycles is nothing short of ridiculous. We come back around to all things in time. In an optimistic sense I can say that we may be on the cusp of a tangible, technological reinvention. I can also say that if that revolution does not happen very soon an entire body of knowledge will be lost, quite simply, because modern day iterations of men like Ishi are dieing off.

Design and the Future

It is important to recognize that we have generations of students making their way to college who have been weaned on the pretense that the future of their world is solely virtual in nature. The force behind this trend is being increased exponentially as oxymoronic educational and social principles continue to steer all smart people, regardless of their propensity to the material or immaterial, into the

virtual world of work. As virtual reality becomes entwined with our physical reality, what backlash will we witness from individuals who want to retain mastery over their objects? More importantly, what will happen to the knowledge required to master the physical world and what responsibly will industrial designers have in the development of the objects of our future?

As this paper evolved, I realized that I was examining the relation between the extremes of the virtual and material world; between aged skilled workers and the new generation of students slated for white collar careers, between individuals who value core principles similar to those espoused by the *Make* movement and designers who continue to make objects that cannot be fixed, manipulated, or understood by the consumer. As an educator, I realize the importance of providing students in industrial design with the opportunity to explore the relationship between these ideas and to learn from each side of the equation. Students need to understand the value of working with their hands, the processes necessary for manual material manipulation, and how the design of an object will affect the consumers relationship with it. If the trend toward thinking in our heads continues to surpass thinking in the world, future individuals who posses manual capability will find themselves in positions of great freedom, and even power.

We do indeed need masters of the virtual world, but it is vital to recognize that the digital world cannot exist without the support of an analog infrastructure. We are quickly reaching a point where individuals capable of managing, creating and maintaining analog machines and systems are becoming a lost breed, practitioners of a lost language. We need to learn from history and continue to build on the knowledge base that already exists rather than ignore the importance of its contributions. We need to make sure that becoming a master of the material world is perceived as worthy of dedication from at least some of our brightest minds.

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