

Integrating Sustainability into the Graphic Design Process

**A proposal for a sustainable
graphic design toolkit**

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ABSTRACT

The purpose of this thesis was to develop a toolkit of strategies to bridge the gap between the theories and practice of graphic design sustainability. The author identified five key problems inherent to the practice of graphic design that impede the adoption of sustainability in the industry. The author then developed five strategies to address these problems and incorporate sustainability theory into daily graphic design practice.

Five strategies were developed, using a qualitative methodology to research a combination of personal experiences, interviews, and historical accounts from nearly 50 individual sources. The research revealed a need for intervention and a desire on the part of the graphic design community to see sustainability implemented on a wider scale, but little thought as to how to incorporate it into design practice.

The author proposes that the problem of *little or no association with the end product* could be addressed by a strategy of *pushing production to the front of the line*. That means including production artists and printers in the concept stages. The industry's *emphasis on individualism* would be reversed with a new understanding of professional roles by re-envisioning *the design studio as a living system*. Agencies, with their *inflexible industrial work process* could address the ever-changing ecology and economy of business by embracing *graphic design modularity*. A *4-point sustainable design regimen* was also developed to help members of a team view each project through a sustainable lens. Lastly, *good production hygiene* was recommended as a way to ensure that all projects use resources efficiently and effectively. The author then hypothesizes further strategies and potential metrics for the entire toolkit.

The thesis concludes by identifying the immediate and long-term benefits of implementing the toolkit and pointing out some of the strategies already in use by cutting edge agencies.

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I. INTRODUCTION

- .1 In the September 2012 Graphic Design USA article *Where Design is Failing*, Gage Mitchell hypothesizes why graphic design has failed to embrace sustainability despite much dedication to the subject over the last decade¹. While he points to educational programs (or lack there of) as a major culprit, he acknowledges that there is no single solution to the situation¹. Instead, he implores the graphic design community to embrace and promote sustainability in their practice, as the time is running out¹.
- .2 Graphic design is at a crossroads. Graphic design as usual has thrived for years on the bedrock of a strong economy and a well honed set of trade skills and tools. In the last decade, the impact of multiple economic downturns has eroded this bedrock. The graphic designer's tools, previously exclusive to the design studio, have been democratized. While Microsoft Office handles much of the day-to-day design needs of business, Adobe Creative Suite has made advanced design tools available to anyone with a computer. The graphic design industry is now faced with the possibility that its historical importance in society may be waning. In the meantime, graphic designers' unwillingness to take responsibility for their economic and ecological impacts in the name of creativity means that they will be replaced by those who will. On the other hand, a willingness to practice design sustainability means not only ensuring work for the future, it ensures a future to work in.
- .3 In the meantime, graphic designers and their work are, in part, responsible for the over 70 million tons of paper waste that made up 28.5% of annual landfill contributions in 2010². Designers also bear a responsibility to the estimated 38 million tons of carbon dioxide released by the server farms that house websites into the atmosphere every year³. But that is just the beginning. The negative impacts of toxic printing inks and rotting billboards are as much a part of a graphic designer's legacy as the positive impacts of the recycling logo and the 'Barack Obama Hope Poster'. There is much work to be done and it starts with graphic designers.
- .4 A graphic designer must dedicate some combination of time, money, and energy to learn about sustainable design. It can add value to a creative portfolio as an aspect of professional service. But in the midst of difficult economic times, the cost of such a theory-rich education can be hard to justify. However, with closer inspection, graphic designers will find that many sustainability strategies and solutions are already at their fingertips. The key is to uncover these strategies and know how to integrate them into a non-linear design process that will cultivate their self-critique skills, creative agility, and a connection to their work. By doing so, graphic designers can gain a foothold into sustainability practice and develop their own solutions with practical knowledge.
- .5 Developing simple, understandable strategies for sustainable design thinking integrated into the graphic design process, or a sustainable graphic design toolkit, is the ultimate goal of this thesis project. This redesigned process will be a place for current and future

designers to imagine new ideas rather than seeking to copy the solutions of others. Graphic designers will then be free to develop their own ideas around the materials they use and the methods they already employ in their work. Integrating sustainability into the design process is the natural evolution of graphic design and graphic designers need to embrace the future to reclaim their historical importance in society.

1. The Roots of the Sustainability Movement and Graphic Design

- 1.1 In his recently published *Guide to Graphic Design*, author Scott Santoro defines Graphic Design as, “an umbrella term to describe the process of bringing form to intellectual ideas with the goal of organizing information into communicable messages” (*Santoro, Page 6, 2012*)⁴. Certainly a broad definition, what defines the graphic designer is intent and communication.
- 1.2 According to Phillip Meggs’ in the preface of his book *A History of Graphic Design*, graphic language has been around since prehistoric times⁵. A graphic language was created to fill in the gaps because humans needed to communicate to one another without being present⁵. Graphic design became the industry it is known as today as a result of the Industrial Revolution⁵. Methods of producing graphic design have been relative to the technological advances of the day ever since the invention of the movable-type printing press by Johannes Gutenberg in 1440⁶.
- 1.3 Socially oriented graphic expression is older than the industry itself⁵. One needs only to look at America’s most famous printer, Benjamin Franklin, to get an idea of where the graphic arts intersected with social activism. Well known for his support of democracy and enlightenment, Franklin also holds the title of America’s first environmentalist⁷. Franklin reportedly founded a paper mill and advocated coal use in a well-intentioned effort to stem deforestation in the Philadelphia region during the 1780s⁷.
- 1.4 Some of America’s first earnest dialogs about mankind’s industrial effect on the Earth began in the mid-Nineteenth Century⁸. Observing the relentless overuse of natural resources in America and the damage done through their extraction, John Muir formed the Sierra Club in 1892⁹. Already influential for his work in getting Yosemite National Park formed in 1890, he became an influential voice in the ear of Theodore Roosevelt⁹. Roosevelt in turn, expanded the fledgling US National Park system by one-third during his presidency⁹.
- 1.5 In 1933, a former naval officer and Futurist named Buckminster Fuller premiered his three-wheeled prototype car, the “Dymaxion”¹⁰. This was one of the first of Fuller’s inventions intended to benefit humanity⁹. His most famous invention, the geodesic dome, brought him international fame from the 1950s until his death in 1983¹⁰. During the 1960’s, Fuller lectured to students at colleges across the US about the concept of

Spaceship Earth while preaching his “10 Principles for Comprehensive Anticipatory Design Leadership”¹⁰. These lectures inspired legions of young designers to go work for the greater good⁹.

- 1.6 Rachel Carson, a middle-aged independent staff writer for the US Fish and Wildlife Service, published her third book *Silent Spring* in 1962. Previously serialized in the *New Yorker*, it was an instant bestseller and became the seminal book of the modern environmental movement¹¹. While the book is mainly focused on the overuse of DDT, Carson predicts such phenomenon as pesticide resistance, toxic shock syndrome, and genetic mutation as a result of increased use of ever strengthening pesticides¹². Her warning is of, “the contamination of man’s total environment” (Carson, 1962, page 8)¹². Carson was raising an alarm about industry and the public was listening.
- 1.7 Published in Great Britain's *Guardian* newspaper in 1964, the then controversial *First Things First Manifesto* by Ken Garland was endorsed by over 400 British graphic designers and led to an international dialog about graphic designer’s priorities as an industry¹³. While not literally about sustainability, it is the first time designers questioned the impacts of their work past the function of communication¹³. In 1999, the manifesto was rewritten, this time to include the growing urgency of unchecked consumerism on society and the natural environment¹⁴. The *First Things First Manifesto 2000* was immediately ratified by many of the 1990’s graphic design stars and this time endorsed by an even wider international audience¹⁴.
- 1.8 1964 was also the year US President Johnson signed the Wilderness Act¹⁵. While not specifically addressing design, it dealt a huge blow to unchecked natural resource depletion on US soil¹⁵. This indirectly impacted the paper industry and, in turn, the graphic design industry by changing how the timber industry harvested trees. No longer would US forests be potential resources for the timber industry without the consent of federal Bureau of Land Management¹⁵. Paper companies would need to think harder about how they sourced their pulp. 1965 saw the Water Quality Act (forerunner to the Clean Water Act) where President Johnson, during his statement said, “...there is no excuse for paper mills pouring tons of sulfuric acid into the lakes and the streams of the people of this country....”(Johnson, 1965, page 489)¹⁶. Society had come to call and things needed to change.
- 1.9 On April 22, 1970, the first Earth Day was held across the US¹⁷. In honor of the celebration, the Container Corporation of America (CCA) held a contest to design a universal recycling symbol. Gary Dean Anderson, an architecture student at the University of Southern California in Los Angeles created the winning submission¹⁷. Due to the immediate popularity of the symbol, CCA failed to acquire a copyright on the mark and it fell into the public domain¹⁷. Today it is one of the most recognized symbols in the world, on par with the Coca-Cola and Nike logos¹⁷.
- 1.10 In 1971, designer Victor Papanek released his first book *Design for the Real World*¹⁸. In the

preface, he wasted no time telling people his perspective, “There are professions more harmful than industrial design, but only a very few of them. And possibly only one profession is phonier. Advertising design, in persuading people to buy things they don't need, with money they don't have, in order to impress others who don't care, is probably the phoniest field in existence today” (Papanek, 1970, Preface)¹⁸. Papanek, in this famously cited criticism of industrial design, went on to criticize what was considered the most desirable arm of the graphic design industry at the time¹³.

- 1.11 In turn, society and industry responded independently to the calls for environmentally friendly solutions. In 1970, Rose Rowan of Woodbury New Jersey invented the practice of curbside recycling (it wasn't until 1972 that a recycling mill was in place to accept the materials)¹⁹. In the mid 1970s, the first consumer grade recycled office paper appeared²⁰. In 1987, the first commercial soy-based inks were openly tested on the presses of the Iowa City Gazette²¹. This opened the door to a new era of vegetable-based and low-VOC inks for the printing industry. Troubled by the use of heavy metals found in packaging, the Coalition of New England Governors (CONEG) in 1989 created draft legislation, “to phase out the use and presence of mercury, lead, cadmium and hexavalent chromium in packaging within four years in states that enact the legislation” (CONEG, 1989, home page)²². This action later inspired the Restriction of Hazardous Substances Directive (RoHS) for the European Union, which took effect in 2006²³. Finally, in 1991, Germany enacted der Grüne Punkt (Green Dot) system, one of the most comprehensive reclamation and recycling programs in the world²⁴. Today der Grüne Punkt is found on the face of more than 460 billion packages across Europe and beyond²⁴.
- 1.12 The graphic design industry changed significantly in the 1990's as the personal computer became increasingly common and the World Wide Web opened the door to new creative roles. For the first time, it seemed as if concept and artistic craftsmanship could begin to decouple itself from the industrial process of production and printing. As Graphical User Interfaces improved and the World Wide Web became commonplace, graphic designers put less emphasis on the finished product and more on the creative expression while business owners abandoned quality in favor of the bottom line²⁵.
- 1.13 Today, college graphic design programs in the US have downplayed, or in some cases abandoned, graphic design production class altogether²⁶. Whether for print, web or motion graphics, production training is losing its importance to the industry²⁶. Assuming that printers and coders will pick up the slack, or that WYSIWYG design software will suffice, the industry has continued to use workflow models that distance craftsmanship from the creative process.
- 1.14 Since the early 80's, independent groups around the globe began forming with the intent of figuring out how graphic design could address this increasing resource use and waste²⁵. Through the 90's and into the 21st Century, many of these groups synthesized their ideas into strategic frameworks so that the graphic design industry could follow their leads.

2. Sustainability Frameworks, Methodologies, and Graphic Design

2.1 Virtually every sustainable methodology has a framework, or guiding set of principles. Like the 10 Commandments are of the operating language of the Old Testament, they supply the universal ideas after which laws and regulations follow. Sustainable graphic design is a vague notion without a set of goals to work toward. With some goals, it is not only possible to define the practice but also to guide the practitioners. Many frameworks allow for the opening of new pathways to sustainable design solutions. The frameworks below represent a portion of those in use today. In particular, they are either:

- A. Geared toward making graphic design projects more sustainable.
- B. Influential to various facets of the graphic design industry.
- C. Inspiration for the strategies detailed in this thesis.

2.2 *A Pattern Language*

The book *A Pattern Language* was written during the 1970's and released in 1977 by Christopher Alexander, Sara Ishikawa, and Murray Silverstein. This is the second book of five volumes on architecture and urban design and it was written for the non-professional as a way to democratize the design process²⁷. Each hypothetical "pattern" consisted of a problem, discussion, and solution that offered general links to other patterns²⁷. This allowed the user to stitch several ideas together and create their own languages for designing a 'built environment'²⁷. *A Pattern Language* has had a significant effect on software engineering that has also influenced web design²⁸. Graphic designers may use this work to form pattern languages as means to design sustainability-oriented projects for their clients.

2.3 *Biomimicry (and Life's Principles)*

Phrases for adapting nature's methods to modern production have been around for decades, but it was Janine Benyus' 1997 book *Biomimicry: Innovation Inspired by Nature* that brought the concept to a larger audience outside of the research science community. Life's Principles are the common strategies used by nature to thrive on Earth²⁹. They have application to all types of design, even graphic design. Graphic designers may benefit from Biomimicry and Life's Principles by reorganizing their design processes and visual systems to reflect nature's methods. In some cases, graphic designers are able to apply Biomimicry using materials inspired by nature to solve packaging problems.

2.4 *The Natural Step Framework*

Developed by Dr. John Holmberg and Dr. Karl Henrik Robert, The Natural Step Framework (TNSF) was first released in 2000. TNSF is a methodology to create sustainable strategies for dealing with the present-day conundrum of increasing resource use coupled with the Earth's decreasing ability to provide these resources²⁹. This framework raises straightforward concerns about how the biosphere is treated that may be specifically addressed through design³¹. A graphic designer may make informed decisions based on TNSF's four system conditions to approach their design work with sustainable goals²⁹.

2.5 *The SPC's Definition of Sustainable Packaging*

"The Sustainable Packaging Coalition (SPC) is an industry group committed to creating and implementing sustainable packaging solutions" (Jedlička, 2009, page 189)³⁰. With packaging waste representing a third of the solid waste stream in the US, the packaging industry and the greater graphic design industry can use the 8-point definition of Sustainable Packaging to approach design challenges through well-meaning and informed decisions³⁰.

2.6 *Cradle to Cradle (and Eco-Effectiveness)*

Introduced to the world in 2002 via a book of the same name, Cradle to Cradle is a framework for industrial cycles based around waste as food, or how to create an industrial output that is 'eco-effective' by nourishing the environment instead of damaging it⁸. Splitting waste streams into biological and technical nutrients and closed loop cycles, graphic designers may use the methodology to create work that is "eco-efficient" instead of "less bad"(McDonough, 2002, page 45)⁸. This is extremely valuable in print and packaging design, where phenomenal amounts of waste are created with little thought to exactly how materials are recycled.

2.7 *The Living Principles*

The American Institute of Graphic Arts (AIGA) launched a sustainability design community website (livingprinciples.org) and accompanying framework in 2010³¹. Initially conceived as a means to foster dialog within the graphic design community, it offers a design framework that puts cultural concerns on an even footing with environmental, economic and labor issues³¹. Communication is already a chief concern of the graphic designer and The Living Principles offers the potential for sustainability in the message.

3. Thesis Statement: Creating a Sustainability Toolkit for Graphic Design

3.1 The previous sustainability frameworks highlighted offer many options for graphic designers, industrial designers, and architects to develop sustainable solutions and many have been available for years. However, graphic designers were not the intended audience for any of these sustainability frameworks besides The Living Principles. The graphic design industry has its own nuances and unique needs that create obstacles to putting many existing sustainability frameworks into practice.

3.2 This thesis will examine the five key problems in the graphic design industry that are roadblocks to graphic designers' process of creating sustainable design. For the paper, each of the key problems will be followed up with specific strategies that directly address them. These key strategies in combination form a sustainable design toolkit that caters specifically to the needs of graphic designers. Each strategy will be articulated through short blog articles published as a collection to the well-known sustainable design website

LivingPrinciples.org. The articles will serve as a means to broaden the conversation about sustainable graphic design and to provide actionable methods to foster sustainable graphic design work.

3.3 *Problem 1: Little or No Association with the End Product*

It is commonplace for designers to share a brochure that they created, but a designer just doesn't create only one brochure. In fact, for one job a designer may create 100,000 brochures. With little understanding of the impacts of their work, graphic designers have little incentive to change.

3.4 *Problem 2: Emphasis on Individualism*

Graphic design is a team sport with many roles that influence the outcome of a project. Rewarding the few for the deeds of many means missing out on sources of sustainable solutions down the road.

3.5 *Problem 3: Inflexible Industrial Work Process*

While "design thinking" is revered in sustainability, the graphic design process is really what designers hold to. Unfortunately, it's based on an outdated industrial model that doesn't meet today's agile business needs, let alone the needs of a sustainable tomorrow.

3.6 *Problem 4: Don't Know Where to Begin*

With communication and client satisfaction being the only drivers of the graphic design industry for so long, the very idea of sustainability is daunting. A new theory that reinterprets how designers do their job is perhaps too much to add to the new technologies and visual styles appearing daily. Unfortunately, this means that designers are unable to deliver the 'sustainability goods' when they're called upon.

3.7 *Problem 5: Poor Production Hygiene*

Everyday print jobs are thrown into the recycling bin and computer systems crash because graphic designers concentrate on communication and aesthetic while ignoring something as basic as good spelling.

3.8 *An Opportunity to Reinvigorate the Industry*

The strategies –or 'tools'– for integrating sustainability into the graphic design process are already found within the design industry. The challenge is for graphic designers to know when to use the available tools in a way that is intuitive and contributes to the goals of a job, regardless of the client's needs.

3.9 What follows are the proposed strategies to address the 5 key problems, outlined above. These strategies are intended for graphic designers who are charged with integrating sustainability into their designs. Together, the strategies form a sustainable design toolkit consciously developed for graphic designers who are seeking solutions and ways to keep projects moving in the direction of sustainability. Graphic production artists and designers who want to incorporate sustainability thinking into their design work will benefit from

these strategies. They are the product of both academic study and industry experience. The toolkit is intended for application and will help graphic designers learn to work from the bottom-up by figuring out how to design for optimal printing and end-of-life disassembly. It will also change the structure of the graphic design process to encourage overlapping roles and simultaneous creative development between what are currently sequential design phases.

II. THE TOOLKIT

4.1 The five strategies developed and articulated below are intended to form a practical sustainable design toolkit for graphic designers. The strategies utilize methods that graphic designers are already familiar with and are intended to be actionable. Knowing that graphic design is in a constant state of flux, these strategies are intended to adapt in order to remain relevant. As they are born from the trenches in the design studio, the strategies are intended for graphic designers who are expected to generate results. The strategies are described in the format of a blog post that will be posted as a collection to *LivingPrinciples.org*.

4.2 **Strategy 1: Pushing Production to the Front of the Line**

4.3 Currently in the graphic design process, sustainability is born of the creative minds of the art directors and designers, early in the concept phase, if at all. But it is in the production and implementation phase where a sustainable project goes to die. The top-down management model of today's graphic design studio, branding firm, or ad agency is not readily compatible with the demands of sustainable design. Thankfully, this may change without jeopardizing anybody's job or the industry. The first important step to turning more sustainable concepts into sustainable results is to 'push production to the front of the line.'

4.4 Simply put, pushing production to the front of the line means that the graphic design production team will be *part* of the creative process, from tip to tail, rather than *separate* from the design process and brought in to remediate the work at the end of the process. When this shift happens, the mandate of the production artist can change from, "make this poster that the team already designed into a 'green' poster," to "create some kind of eco-printed piece," or even better, "come up with the most sustainable execution for the scenario that fits the clients needs." Eventually, the mandate may sound like, "as part of this design team, what are your thoughts, ideas, concepts, etc., for the project?" Especially in the case of designing for sustainability, this front-end involvement trumps the current model of top-down design development.

- 4.5 Currently, a design studio operates through a top-down model where orders are passed from one stage on to the next until a finished product is released into the world. The graphic design process begins to resemble a traditional product assembly line (Figure 1).



Figure 1: The graphic design process resembles a traditional product assembly line.

- 4.6 While research and concept are the first two steps, production is the last step. Production artists have responsibility for the success of a project yet they usually have little creative input. Top creative roles (i.e., Creative Directors, Art Directors, Design Directors, etc.) are the equivalent of middle management found in typical office environments. Lead creative roles must review work and make decisions that are often lacking the proper research required to insure a successful sustainable design. This research is every bit as important as beta-testing and client demographics.

- 4.6 Proper production techniques, material sourcing and even life cycle analysis can turn an average project into a sustainability project. Bringing production into the first two steps opens the production teams to research and execute strategy based on the goals of the project and client as is depicted in the refined graphic design process in Figure 2.

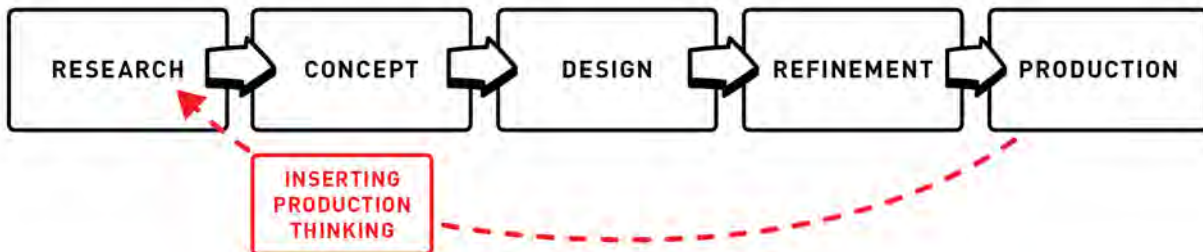


Figure 2: The graphic design process with production integrated from the beginning.

- 4.7 A subtle change, but the results should be significant. For example, by researching sustainable production options before a business card concept is designed, a design team would be able to reduce cardstock consumption by 50%³². Typically, 500 standard sized (3.5 x 2") business cards can be produced on 63 sheets (letter-sized paper; 8.5" x 11") of 130lb sheets of cardstock that weighs 2.95lbs. By eliminating bleeds (where color runs to the very edge of the paper) the same number cards can be produced on 50 sheets, or 2.34lbs of cardstock. Further, by changing the cardstock sheet size to the commonly used 26" x 40" sized sheets, only 4 sheets of paper are needed and only 2.08lbs of paper would be consumed. In a slight design twist, by taking the last 0.5" off the end of the business card the paper usage would be further reduced; only 3 sheets (or 1.56lbs) of cardstock paper would be required to produce 500 business cards. In three minor moves, the same 500 business cards are produced using about half the paper; a subtle change that when

applied to the business cards of an entire company can also positively impact the client's budget depending on the stock³².

- 4.8 Integrating production options into the first step of the design process is a simple variation yet, as demonstrated above, it can bring with it some sweeping and significant changes, even for small projects such as a five hundred piece business card job. The moves themselves aren't really special, but the technical knowledge to make these moves is almost entirely in the domain of the production department. In production's current position of the design process, it is usually too late to justify such changes creatively or economically. By inviting the production team to play in the creative sandbox at the beginning of the design process, there is a far greater likelihood that whatever sustainability concepts are presented to the client will stand up through implementation.
- 4.9 But the results go deeper than creative solutions. Production teams are usually expected to be apathetic to the project and its outcome, only to engineer the finished product as best they can. A production department that is creatively invested in the design process - and its outcomes- will perform better, work more passionately, and create a better work environment.³³.
- 4.10 Imagine a creatively motivated production department. This could easily happen by shifting production artists' roles away from being design industry commodities and toward elevated roles as knowledge brokers and strategic thinkers with responsibilities for creative deliverables at the heart of the project.
- 4.11 **Strategy 2: The Design Studio as a Living System**
Re-evaluating what makes graphic designers effective
- 4.12 The graphic design agency has essentially remained unchanged for the last hundred years. Any seasoned designer, no matter how progressive, will be quick to explain, "how it's done" and will usually follow the workflow and studio model they were trained to follow, even if they don't know why.
- 4.13 Currently, most design studios operate using a top-down model (see Figure 3) where orders are passed from one step in to the next until a finished product is released into the world. The organization and design process usually follows some variation of a typical product assembly line.

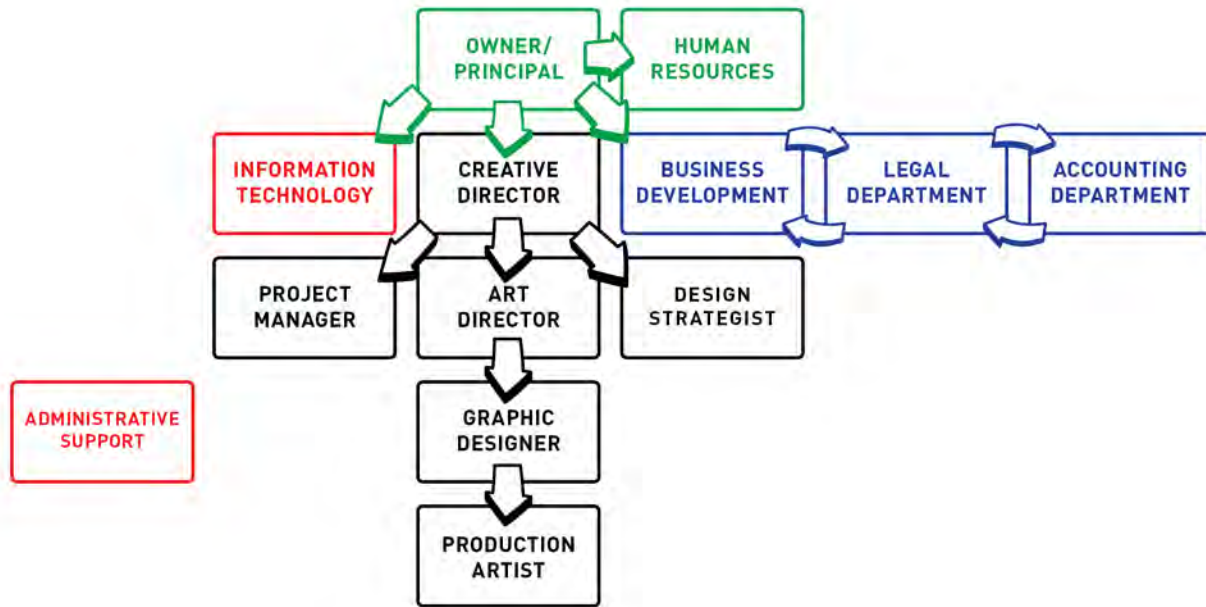


Figure 3: The standard, top-down design studio model.

- 4.14 A closer look at the assembly line process of a traditional graphic design studio model exposes flaws in the studio structure (see Figure 3). Some seemingly marginal roles are involved at every step, whereas some centralized roles only appear once in the process. Granted the time commitment for each role can vary, but in most cases it serves to underline the point that this model is unbalanced and possibly ineffective for today’s design landscape, let alone sustainable design. It has been fine to follow “business-as-usual” over recent decades as graphic design has because, in most cases, technologies like the computer have mainly served or accelerated the existing design process. But the typical studio model has flaws that do not lend themselves well to recent technological breakthroughs, economic changes, or sustainable design challenges. How might the studio model be better prepared for what may come on the horizon? What can studios do to adapt to rapidly changing conditions?
- 4.15 One thing we can do is to change perspective. When the design studio is re-envisioned as a living system and the roles of each member of the studio are compared to biological roles, the system can be reorganized in a myriad of ways. Simply put, organizations (including design studios) may be biologically interpreted as living systems. Figure 4 illustrates the traditional studio and process re-envisioned as a living system.

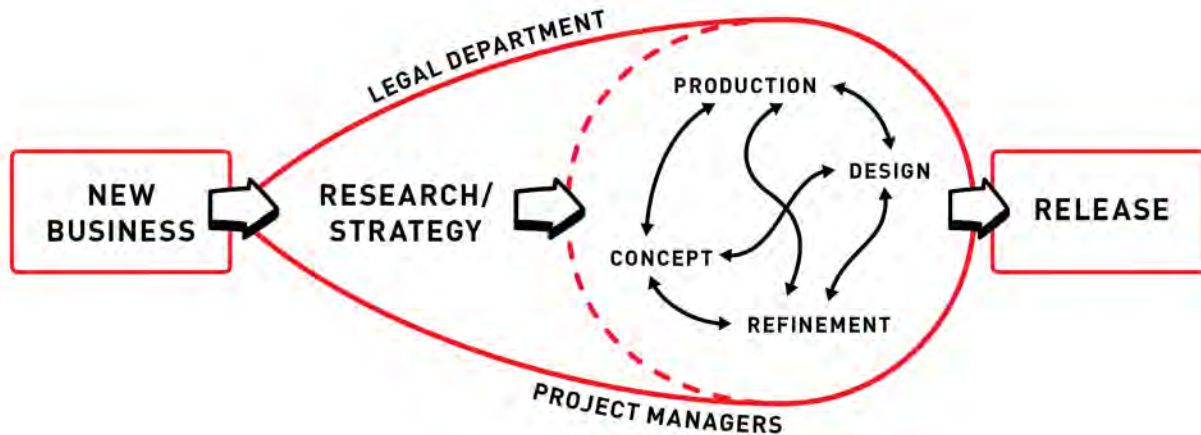


Figure 4: The traditional design studio and process re-envisioned as a living system.

- 4.16 In this model, 'New Business' brings the new work to the doorstep; then, the new work is taken up by the 'Strategist.' Almost immediately, strategic thinking begins to move into the center of the design process where it mixes with the latter design steps, constantly flowing back and forth while being continually fed by new research and strategy.
- 4.17 There are a few things missing but it is important to consider the larger picture in this new perspective. In a living system representation, New Business functions like inhaling (determining the quality of air coming in) and the Release step is like exhaling (what is being put out into the world). Project managers and the legal department, instead of being two marginalized roles in the agency, are understood as two system boundaries (a.k.a., the skin) for the system; they delineate the boundaries, both literally and figuratively.
- 4.18 Often, seasoned creative directors will say some version of the following:
"Never underestimate the value of a good project manager."
- 4.19 An inexperienced designer will be quick to question their relevance. Usually, graphic designer wonder why their time commitments should be tracked by others or why their roles should be determined for a project when they already have job titles. Under the "business-as-usual" model, project managers are seen as little more than glorified task managers. But in a living system model, they can be interpreted as protection. Project managers filter comments from the client, keep "scope creep" from occurring and ferry studio work to the proper place at the proper time. This is just one example of a living system, but if a studio is re-envisioned this way, seemingly marginal roles may become very important. On the other hand, central roles become less isolated. Graphic designers can work more closely with strategists, production artists and printers to create a higher-quality 'Release'. Likewise, unacknowledged connections between unrelated roles can then be recognized and strengthened, ultimately creating a stronger studio and stronger projects (a better exhale, as stated above).

- 4.20 All graphic design can benefit from this thinking, but sustainable graphic design stands to gain the most from a living system perspective. By taking a linear set of steps and turning them into an interdependent team system, design studios can adapt to the needs of each client while project roles work cohesively and simultaneously. This leads to better design and better feedback loops. Ultimately, this will mean a better solution for the client.
- 4.21 **Strategy 3: Graphic Design Modularity**
The era of big design is over
- 4.22 Modularity is the use of structures (modules) which when assembled in particular ways, or added to pre-existing systems create new behaviors without changing the nature of the individual part or system. The current form of the graphic design process is monolithic. The work is done in one fell swoop. Because of the steps involved, the design process resembles a typical product assembly line (see Figure 1).
- 4.23 As a result, graphic design workflows require long lead times, increased hiring, and adjustments to resource allocations. In today's high-speed business world, this can be costly. Because of resulting financial constraints, multiple projects are usually taken on at once to sustain the studio. This leads to multitasking issues (i.e., delayed response time, bottlenecking, and attention-splitting, etc.). While lots of work is better than no work, the effects of simultaneous workflows can overwhelm the creative output of a studio³⁴.
- 4.24 Typical assembly line and workflow models are consistently large and consistently scheduled for output. But in today's graphic design industry, jobs are seldom consistent in size or scope. Assembly lines also require refined feedstock of both quality and quantity. Due to the speed and structure of today's business world, no two clients are going to contribute to research and analysis (the feedstock of a project) in the same way. This makes the industry standard of "big design up front" virtually impossible to deliver on.
- 4.25 More and more graphic designers are being asked to deliver solutions for their clients that are wide in scope yet small in scale. With the advent of web design and digital printing, smaller, more refined executions are replacing previously large scale, resource heavy "one-offs." Modularity is how the industry can best exploit this change and produce high quality, low footprint solutions.
- 4.26 In 1970, Dr. Winston W. Royce, a pioneering software engineer for NASA, produced a report about project development models³⁵. The predominant method of the time was also based on an assembly line style of execution. The diagram shown in Figure 5 is a copy from the original report and is today referred to as the Waterfall Method.

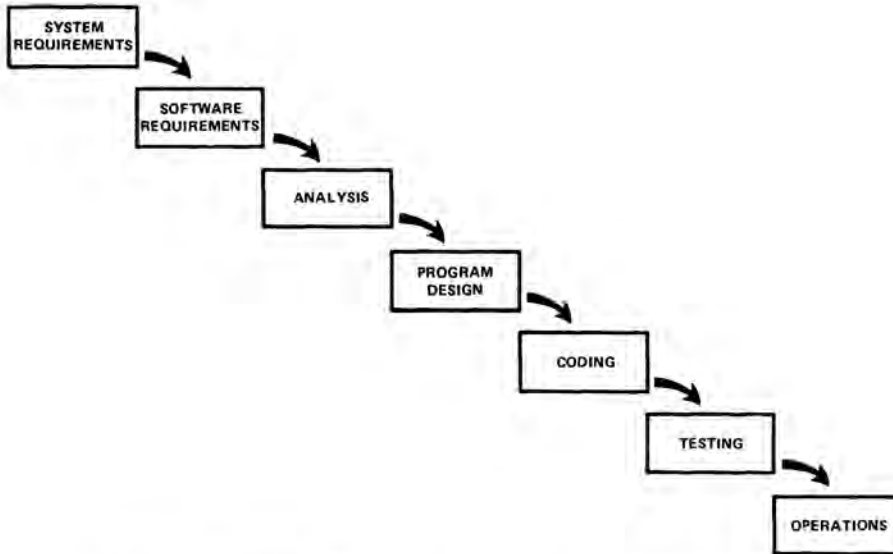


Figure 5: The first graphic depiction of the Waterfall Method used in computer programming by Dr. Winston Royce, 1970.

4.27 Summarizing the Waterfall Method Royce wrote, “I believe in this concept, but the implementation described above is risky and invites failure” (Royce, 1970, page 329)³⁵. Incremental software development eventually became a response to this risk, later evolving into the Agile Software Development method. This work model was first codified by a group of senior software engineers in the Manifesto for Agile Software Development in 2001³⁶.

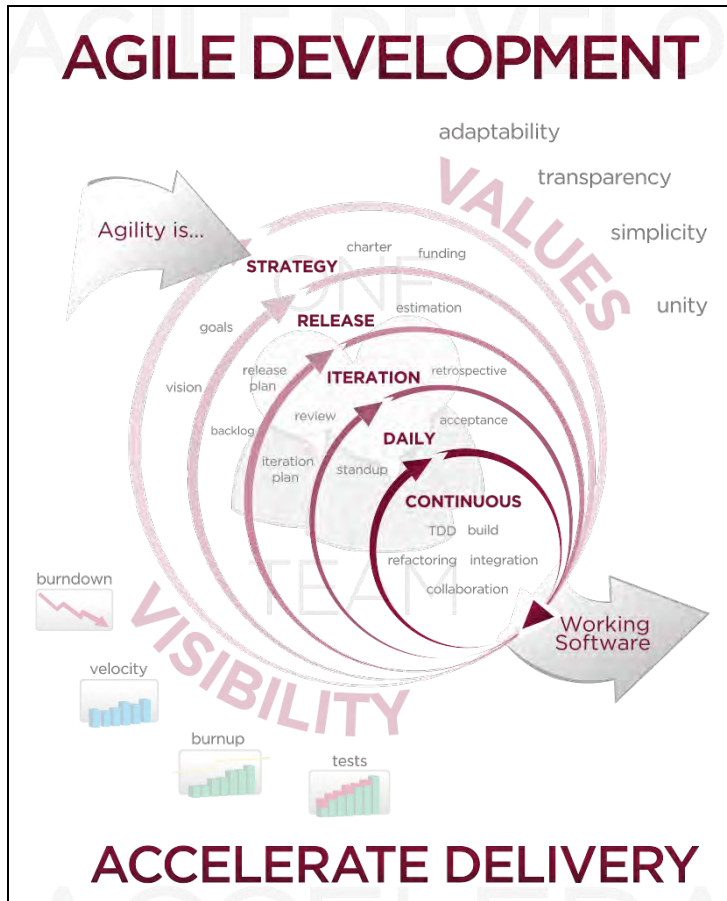


Figure 6: Depiction of the Agile Software Development Method by VersionOne, 2012.

4.28 Stressing modularity in team, task, and execution, many agile principles became bedrock methodologies of the web design community, a sibling of the graphic design community. Modularity could serve sustainable graphic in the same way, through team, task, and execution.

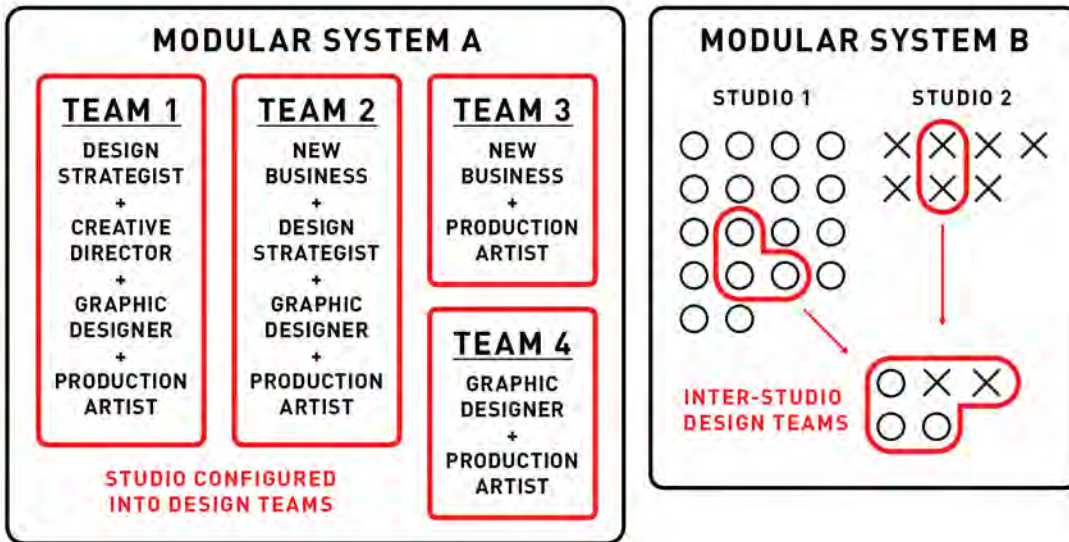


Figure 7: Team modularity.

4.29 Team modularity makes feedback loops almost instantaneous, insuring that proposed solutions work sooner and require little rework. It also supports empathetic design studio models, practiced at places like Rockwell Group, frog (formerly Frog Design), and IDEO³⁷. A broad cross-section of people in the process contributes to intelligent and effective design³⁷. This creates an ideal platform for sustainable solutions through a blending of holistic theory and execution. It also encourages expansion and contraction of a studio workforce based on goals rather than available resources. Theoretically, this could even result in inter-agency cooperation, as opposed to the current form of the high turnover so commonly found in the graphic design world today.

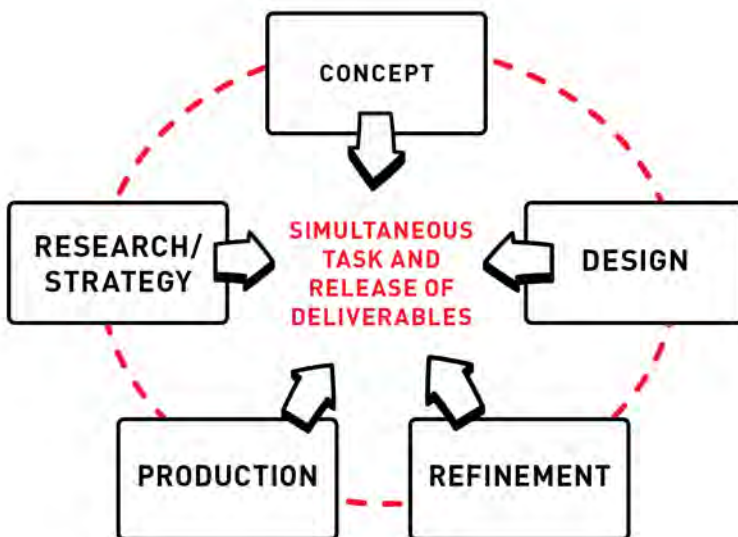


Figure 8: Task modularity.

4.30 Task modularity makes many steps simultaneous and therefore speeds up the design process considerably. It can also increase, reduce, or eliminate steps to reflect the needs of a specific project. An example of this is called 'timeboxing,' a commonly used technique by software engineers and web designers (see Figure 8). It is used for prioritizing and scheduling work regardless of deadline or labor constraints³⁸.

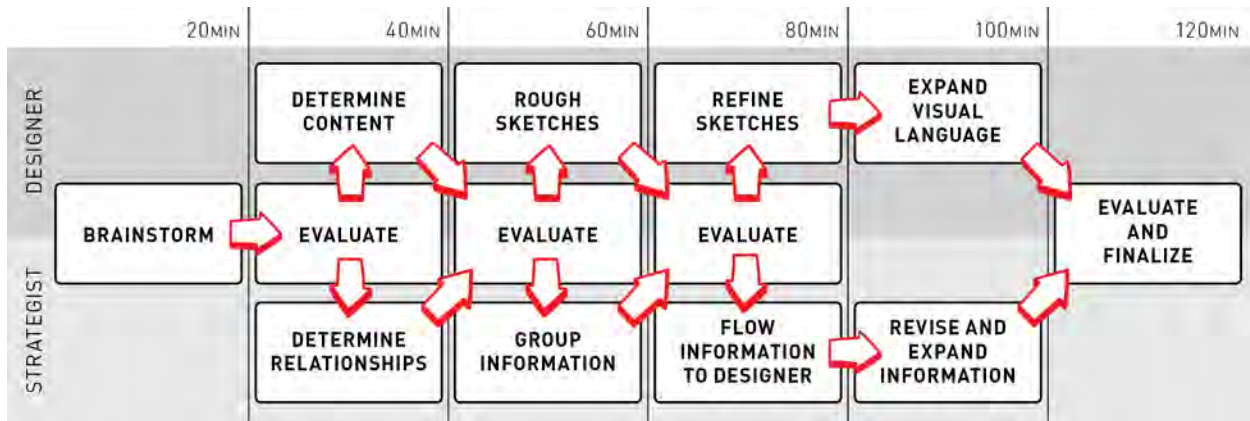


Figure 8: Example of timeboxing used for a two-hour design project. This diagram is based on David Sherwin's 2010 model.

4.31 Task modularity can free up time, money, and labor for the research and development of sustainable design solutions. It does this by putting resources where they need to be, not where tradition dictates. This reduces or eliminates the risk of scope creep or a ballooning budget³⁸. Environmentally friendly solutions can be hypothesized and tested during creative development, rather than at the end of the line (see Strategy 1: Pushing Production to the Front of the Line).

4.32 Modular Execution is already present in graphic design (see Figure 9). It is defined as a structural principle, employed to manage content³⁹. Typeface design, branding, and signage systems make use of modular concepts, but rarely is Modular Execution recognized by name. This is because of the emphasis on monolithic design solutions and the use of technical terms rather than strategic language. Modularity becomes a powerful tool in branding when a design studio is hired to work on a project they are previously unacquainted with. Clearly defined modules can be rearranged into new solutions. For instance, the same modules (i.e., logo, typeface, illustration, colors, etc.) that make up a postcard can be used to develop a billboard with an entirely different message. With clearly developed relationships between the modules, the billboard will not lose its brand identity and the branding will grow successfully.

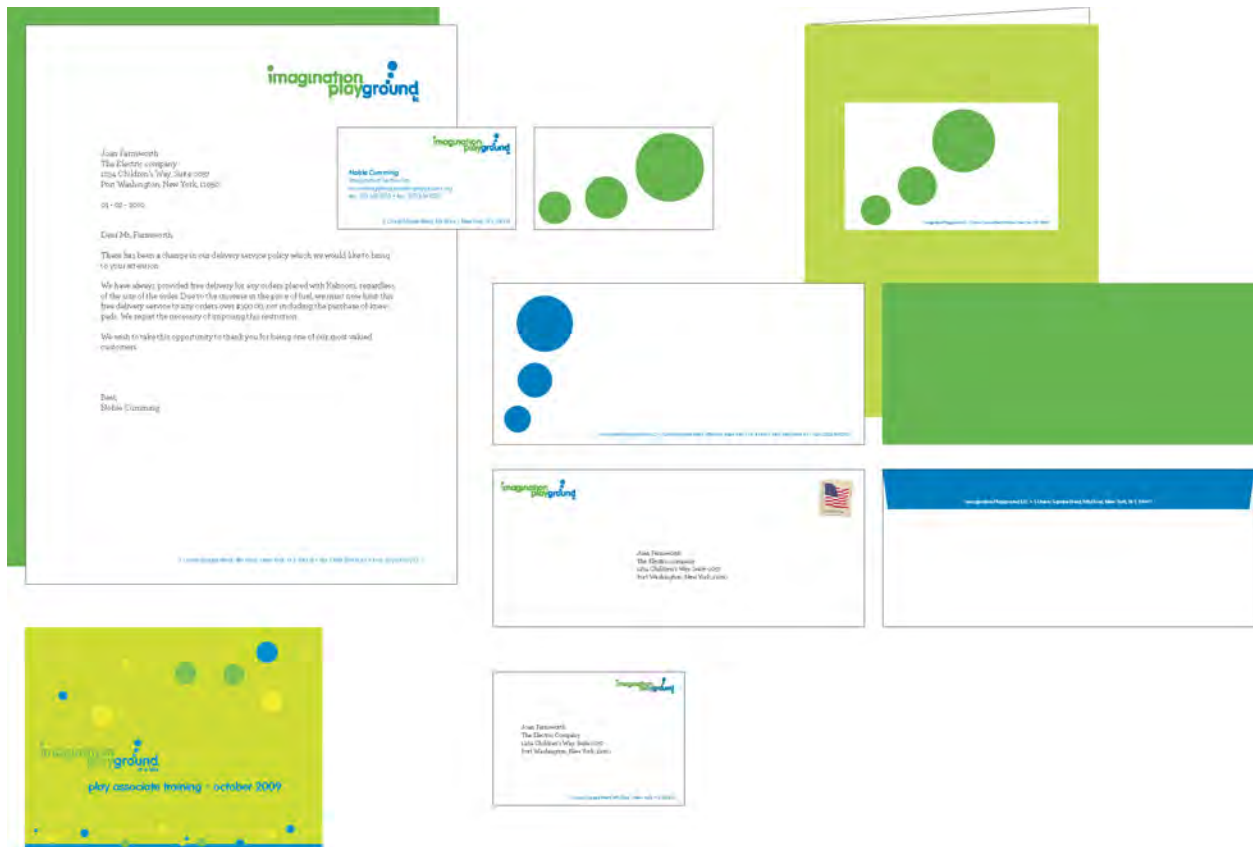


Figure 9: Branding is an example of Modular Execution. Imagination Playground is the property of the Rockwell Group.

- 4.33 Open-sourced modularity has been present in web design for many years as a way to guarantee good code for a website. It's hard for many print designers to understand, but taking and applying the code of others to your work isn't plagiarizing⁴⁰. For example, the HTML code for the color green or to embed a movie is universal. By keeping to these constraints, the designer is both reassured of using the most efficient design tools possible (sustainable web design equals efficiency⁴¹) and freed up to find the most efficient code configuration possible for the task at hand.
- 4.34 Modular code has even found its way into print design with the advent of meta-programming. Building self-generating print files that enable anyone to change language, content, and certain promotional graphics without owning design software isn't new. The Coca-Cola Company launched DesignMachine six years ago, turning their vast multinational (complex) design footprint into a sleek, modularized design tool for the web⁴². Overnight, Coca-Cola's list of preferred graphic design vendors shrank from hundreds across the world to approximately 40. Though the impact on labor is of concern, it pales in comparison to the staggering amount of design resources Coca-Cola no longer needs to remain a leading global brand⁴².

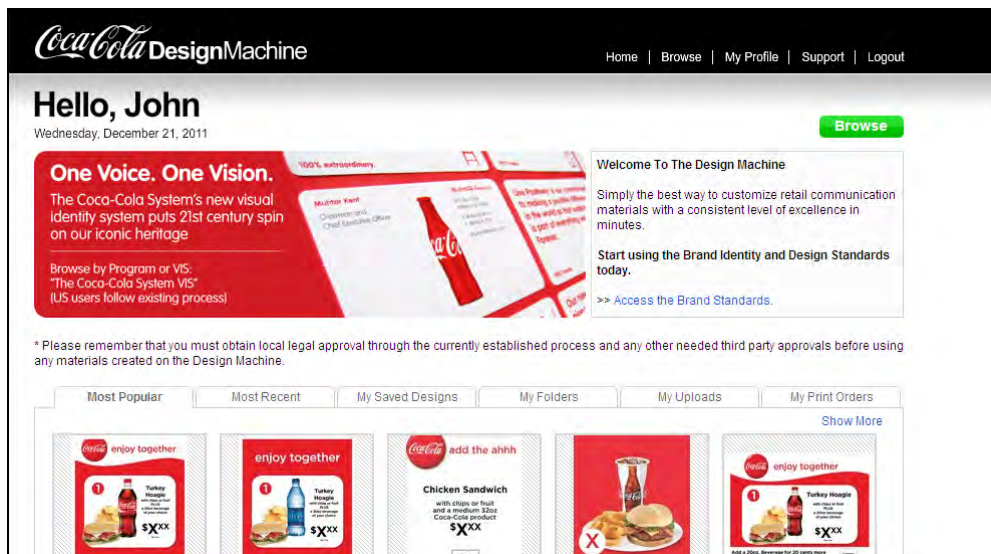


Figure 10: The front page of Coca-Cola’s DesignMachine. Property of The Coca-Cola Company

- 4.34 Modularity will allow the sustainable graphic designer to survive and excel in the Twenty-first Century. Sustainability requires multiple perspectives and solutions at an increasing urgency. The graphic designer of today and tomorrow needs to be able to meet their challenges and adapt accordingly. By reinterpreting graphic design as a modular act and approaching problems with agility, the designer will be prepared for change.
- 4.35 **Strategy 4: The 4 Point Sustainable Design Regimen**
Cultivating a new way of seeing
- 4.36 When it comes to sustainability, many design studios don’t know where to begin. A number of books and websites are available for graphic designers to reference, but without proper context these can be confusing to a first time visitor. Some solutions look costly, don’t fit into the scope of a project, or may compromise artistic integrity.
- 4.37 A familiar substitute for books and website data are “Top Ten” punch lists. Usually found in graphic design articles about sustainability, they are as far as many design studios will go to research sustainable solutions. But these lists can’t address the changes in culture, environment, and technology that are common in the world. Only the practice of sustainable graphic design can. There is no rote formula for successful sustainable design. On the other hand, everybody from artists to athletes train. They get better by using a training regimen. Usually, this is broad range of strategies to prepare one’s self mentally and physically for real world scenarios. The goal is to cultivate instincts or habits that will increase the chances of a successful outcome for the trainee.
- 4.38 Published in 1941, Kimon Nicolaides’ *The Natural Way to Draw* lays out a large practice regimen for not only learning how to draw, but how to see the world and draw from it⁴³. The book is known for being laborious and time consuming, but most of all, successful⁴³. A regimen for sustainable graphic design, where the designer learns through broadening

layers of perspective could garner similar results. Designers learning to see their work differently would expand their horizons, changing their role from visual stylist to sustainable problem solver.

4.39 A :: Addressing Mindset

What happens when designers start looking at things differently? Do they more readily answer the questions the brief poses? Perhaps. When graphic designers know the answers to the functional questions, they are ready to move on toward the bigger picture. This is where innovation really happens.

4.40 Print :: Printing is still a cost effective route and requires no electricity to operate during the use phase. What does the audience prefer or need? Does it align with the client's goals?

4.41 Web :: Who is being connected to? What kind of information can be shared and can it be shared like a recipe (rather than a finished product) around the world?

4.42 Signage :: Will a sign fix the client's problem? There are still places all over the world that would benefit from the most fundamental way finding signage. Can a low-tech solution do the job as well as a high-tech one?

4.43 Mobile :: Most people are experts at running their own devices. Can mobile work together with print, web, signage, or any other technologies?

4.44 B :: Addressing Structure

Graphic designers should not leave the structures and materials of their work to others. A growing number of clients see graphic design as the painting of existing physical objects that others create. Designers are problem solvers, communicators, and pattern creators. Sometimes the best solution to a visual problem lies in the physical realm. After all, everybody looks at physical items, don't they? Likewise, don't designers already have influence over physical items? Why shouldn't the industry think that way? They can be as much in control of the vehicle of their work as they are of the graphic printed on it.

4.45 Print :: Printing is a manufacturing process. The feedstock (paper, ink, labor, electricity) can be used much more efficiently or with better resources. Every printer has their own methods and learning them will ultimately benefit the design process.

4.46 Web :: Web design needs to look good, but also run smoothly and efficiently. Technology is changing all the time and code optimization is a requirement, not an option.

4.47 Signage :: Can a sign be designed for reclamation? In what ways can resiliency be engineered into a sign without resorting to toxic chemicals?

4.48 Mobile :: Does the client need an app, or will a mobile site do? Can adaptive content and

liquid layouts that change based on browser size or resolution reduce a site's load time and server space?

4.49 C :: Addressing Product

Sometimes design jobs are crazy. The clients want something that doesn't solve their problem or asks for an update of an old solution thinking it will get them new results. But does the brief really pose the right questions? Sometimes challenging this notion can move everyone forward.

4.50 Print :: There's a lot of air in the box that houses the product can it be reduced? Does the client really need a brochure? Does a business card have to be in the standard US format?

4.51 Web :: Does the site need so many pages? Where is the server physically located and what sort of energy powers it? Consider whether the style of writing is best for the clients' web site.

4.52 Signage :: What does it point people towards? Is the sign system getting people the right information? Is the information even in the right location to be effective?

4.53 Mobile :: What *don't* people access on mobile devices? What service does the client offer that people need to leave the site to access and should it be integrated? Does mobile really integrate with the client's business model?

4.54 D :: Addressing Graphics

This is where graphic designers are supposed to excel. As communicators weaving words, images, and structure together, design decisions become more than just aesthetic. Reproducing graphics is a form of manufacturing. The typical project subjects people to toxic chemicals and creates waste that cannot be reclaimed. Did the copywriter forget a misspelling? A minor graphic change such as a typo may have a large effect on the carbon footprint of a project.

4.55 Print :: With traditional print design, the key is minimization. How can the same execution be done with fewer resources? Can less ink, surface area, or materials be used on the project?

4.56 Web :: In the realm of the web design, efficiency is key. There are many ways to display the same graphic. Are there ways to communicate the same message with less energy use?

4.57 Signage :: There are many ways to make a sign graphic. Some are resource intensive with short life spans. Others have long life spans and light footprints. What is the projected lifespan of the graphic and do the strength of the graphic vehicles reflect that?

- 4.58 Mobile :: Mobile is closely related to web design, but with content and function as the leader above form.
- 4.59 These questions should be used to peel projects apart -layer by layer- like an onion to find out what is best to improve. Doing this over and over will not solve problems, but it will get a mind limber enough to realistically address them. As graphic designers become accustomed to the regimen, they will start adding their own questions to consider. Eventually they will want to delve deeper, finding out how the impacts of their work add up. For now, the goal is to get one's feet wet with sustainable graphic design. Broadening the design perspective can lead to design clients to broaden their perspectives too. That can lead to many unforeseen solutions.
- 4.60 **Strategy 5: Good Production Hygiene**
"Waste is a design flaw." –Kate Krebs
- 4.61 In his August 2012 netmagazine.com article, *Save the Planet Through Sustainable Web Design*, Dr. Pete Markiewicz brings to light a problem seldom on anyone's minds, anywhere: just how green is the internet?⁴¹. The common assumption is that having a web page to replace a printed brochure is better. One website means one flexible design. A million people can look at it without any trees being felled for paper or toxic chemicals mixed for ink.
- 4.62 But the truth is much more complex. Websites reside on servers which are computers used to house data communally. These servers require an energy source but they need to be up and running all the time so that anybody can access a housed website at will⁴⁶. That means constant energy use. Servers generally reside in large groups and produce a lot of heat and bad air too. That means HVAC systems to keep the indoor air around the servers clean and cool. Lastly, these servers must again be accessible at all times. That means that if the power goes out, a barrage of diesel generators are utilized to keep the servers operating. The economic and environmental impact of server farms is still largely misunderstood, but current estimates place their portion of US energy use at about 9%⁴¹. What's more, the most optimistic estimates, say that only about 12% of the server space in data centers is ever utilized³. In fact, the energy wasted by these data centers is about 30 times the actual energy needed to house and access information kept on the servers³.
- 4.63 According to his 2012 London Observer article *Graphic Designers are Ruining the Web*, John Naughton argues that graphic designers are contributing to excessive energy waste through poor website optimization. Based on best industry estimates the average website has sextupled over the last ten years⁴⁴. This is a result of too many large images and too many externally accessed elements on the page (both of which have doubled their presence over the last five years on average)⁴⁴. Sadly, the results of this behavior are just as prevalent with sustainability design community sites. In his blog article "*Green*" Design vs. Sustainable Web Design: Some Data, Dr. Markiewicz plots the evidence of some (not

means well-constructed files that translate into a lower carbon footprint. Good file hygiene is good for the environment.

- 4.66 Static print design can benefit from this thinking too. According to Gary Jones at Printing Industries of America, print vendors are finding sloppy production files to be more and more common⁴⁶. While no specific data on the ecological impacts of poor print production files exists yet, assumptions can be made based on economic factors. Considering that printing is a manufacturing process, the cost to a client hinges on a combination of material (feedstock), time and energy. Sappi Paper illustrates this in the variable journey map seen in Figure 12⁴⁷.

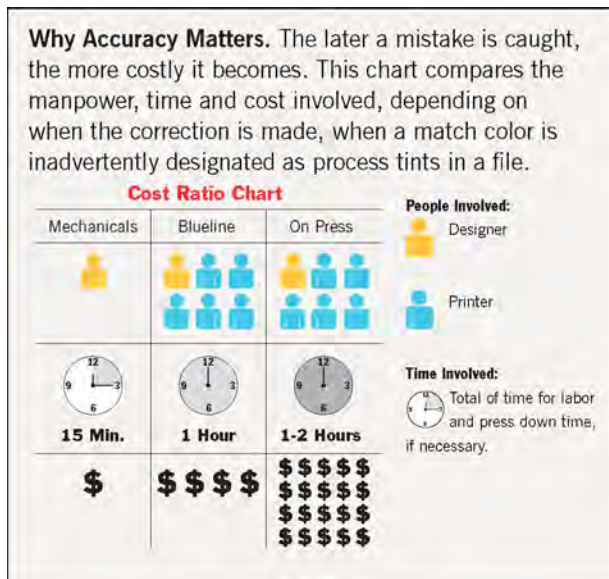


Figure 12: Why accuracy matters by Sappi Fine Paper, 2005.

- 4.67 A file (feedstock element) with a mistake in it, compounds production costs to a greater degree the farther along it moves through the printing process. Not shown is the cost of a complete redo if the file gets printed and then the mistake is found. On the printing end, the entire cost must once again be incurred. Computer prepress, paper, ink, labor, electricity, and drying time must be paid. Some printers will argue that preflight will cover those mistakes, but preflight cannot take care of spelling errors or upside down photographs. It also can't tell if a file is too complex or bulky to be processed correctly. Such files can crash an entire system, requiring printers to use their time, money, and labor to get back online. These situations not only cost the printer money, but the idle printing presses they create can prevent printers from earning money too.
- 4.68 Good file hygiene is the simplest and most essential form of sustainable graphic design. It makes no assumption about end-user behavior or framework methodology. It exists on the simple premise that well constructed graphic files are the benchmark for proper life cycle calculations. Graphic designers have no clue whether their strategies are actually

working unless they know their files are correct. It would be terrible for both the designer and the client to put time and money into a sustainable solution, only to lose any environmental gains as a result of a poorly produced product.

4.69 **Expanding the Toolkit with Further Strategies**

4.70 1. Designing for Recovery

Unfortunately, there is still too much stuff being produced without regard to the final stages of the product life cycle. Learning how to design work that is as easy as possible for companies to recycle and make the materials as easy as possible to recover is the goal. This creates jobs in the recycling industry and ultimately helps producers reduce their bottom line.

4.71 2. Driving Technology

An effective sustainable designer will be aware of as many technologies as possible and hopefully have some skill at exploiting them. After that, the next step is to look at these technologies and ask, "What's next? How can this be done better?" Ideas for new technologies abound. Is it possible to design a soda can that can be written on like a notepad? Can Biomimicry-based tools like structural color be used together with breakthroughs in 3D printing to make nontoxic printing inks?

4.72 3. Diversifying project and client bases

Even as the design industry touts multidisciplinary design, specialization is still extremely prevalent. Expanding the horizons of the design studio and the professional-grade skill set of the designer ultimately serves the entire industry. It stimulates design thinking and builds stronger defenses against economic uncertainty.

4.73 4. Dialog across design disciplines

One symptom of specialization is that many design disciplines don't interact professionally (or even socially). However, IDEO, Landor Associates, Rockwell Group, and the Rocky Mountain Institute all employ a broad cross-section of people in the design process with contrasting viewpoints, contributing to intelligent and effective design solutions. This strategy will ultimately open graphic design to many previously unknown ways of thinking.

4.74 **Establishing Metrics**

4.75 A commonly held belief in business is that if it can't be measured, it can't be monitored. Implement this toolkit into daily design practice, and several measurable advantages can begin to emerge.

- 4.76
- Job Profitability
 - Material Cost Reduction
 - Agency Operating Cost Reduction
 - Efficient Labor Allocation
 - Efficient Resource Allocation
 - Resource Reduction
 - Higher Quality Deliverables
 - Waste Reduction
 - Environmental Footprint Reduction
 - Talent Acquisition and Retention
 - Employee Satisfaction
- 4.77 The emergence of each of these metrics is not a given. They require the focus and determination of agency leaders and employees alike. Also, none of these can replace a healthy team dynamic, but they can nurture its growth and support the team on an ongoing basis. The toolkit brings with it a myriad of opportunities waiting to be unlocked.

III. CONCLUSION

- 5.1 Early in the thesis process, the consequences of unchecked development and environmental degradation underlined the need to write this paper. On October 29, 2012, Hurricane Sandy descended on New York City and the Tri-State area. My position as Design Director at New York Cruise Lines meant I would be among the first to have to deal with the storm's devastation. But I was unprepared for the ways Sandy intersected with my life and the design trade. I expected to lose signs and some print inventory, but I was surprised to see restaurants and grocery stores (some of whom were clients of my colleagues') go out of business. Coworkers were stranded without power or public transportation. Even a famous design agency (home to several of my colleagues) let go half of their workforce as a result of flooding.
- 5.2 With the US economy in its current state, there is a concern about how graphic designers can compete and thrive. This concern grows with increasing environmental degradation and its impact on "business-as-usual" in the design industry. But, as Gage Mitchell points out, this concern is hardly being addressed¹. The graphic design industry already has wonderful tools in place for instituting change. The strategies in this thesis stand to give designers the best chance at taking full advantage of those tools. Using them to build a bottom up model for the design process will immediately make a difference in the studio. The question is whether the graphic design industry can quickly switch gears and move in a new direction.

- 5.3 If I have done my job and this “bottom up” model catches on, eventually a new work dynamic should emerge. Studios need only to rally around what works for them, so they can learn to look for the right strategies for their projects rather than copying the “solutions” of others. There will be some resistance by design leads who enjoy their place in the sun, but eventually the drive for positive change should overwhelm this resistance.
- 5.4 Many of the strategies in this paper are already in use. In a strange coincidence, last week IDEO announced the results of their branding experiment entitled “Brand New IDEO”⁴⁸. While it is not strange to see IDEO using these strategies (as they inspired some of them) it is surprising to see a graphic branding project making heavy use of living systems, modular teams, and production thinking. Because it’s IDEO, these concepts will receive a lot of traction in the larger design world. How well graphic designers pay attention still remains to be seen.

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