

A collection of reflections
written by Jon Kolko

THOUGHTS

ON
INTERACTION
DESIGN

SECOND EDITION

MK
MORGAN KAUFMANN

ONE: ABOUT PEOPLE

Interaction Design is a creative process focused on people. A number of well-known designers and academics have examined the commonalities across design processes as applied by various consultancies and have unrolled a distinct set of patterns that illustrate the movement of a design from conception through creation. These patterns explain the discrete steps that are taken when developing a cohesive Interaction Design solution. It is important to emphasize, however, that these steps are rarely delineated as carefully as they are described below. Instead, a designer works in a certain haze or fog—both lost within the trees but always aware, on some unconscious level, of the forest.



The process of design
John Zimmerman, School of Design at a formal framework during the design process. The core components, each requiring a unique approach, are named Define, Implement, and Reflect.² It's important to emphasize, however, that these steps are rarely delineated as carefully as they are described below. Instead, a designer works in a certain haze or fog—both lost within the trees but always aware, on some unconscious level, of the forest.

- 1 Zimmerman, John, *Formal Design Knowledge from the Future*, published in *Future Proceedings*, Melbourne.
- 2 Ibid. It is interesting to note that the six components in nature to IDEO's four (Implementation), Design or Smart Design's three (the propensity for design what it is they do is, act

The process of design

John Zimmerman, Shelley Evenson, and Jodi Forlizzi, of the School of Design at Carnegie Mellon University, have presented a formal framework for discovering and extracting knowledge during the design process.¹ This framework includes six core components, each building on the previous and each requiring a unique set of skills and tools. These components are named Define, Discover, Synthesize, Construct, Refine, and Reflect.² It's important to realize that the framework serves to paint a reductive picture of "what generally happens"—but the realities of design in business are rarely, if ever, as clearly delineated as the process described below.

Defining the design problem or opportunity

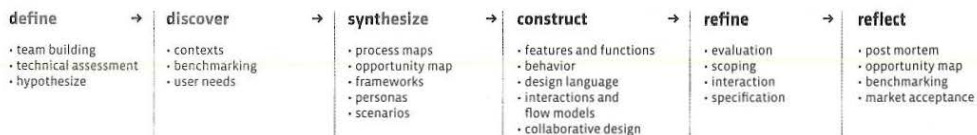
Definition occurs in an effort to understand. Rarely are designers given a blank slate upon which to start. Instead, designers commonly inherit projects under way or that have an existing history. For example, a designer may be explicitly given the task of improving the interface of a printer to make it easier to use or to add new functionality that has been developed. In the design process, a designer's role is one of skepticism. The designer is to "feel" the outcome of the project yet is often not sure exactly what needs to be done. To objectify this feeling, the designer explicitly lists questions relating to the task: What do we need to be redesigned? Is the new functionality feasible? Who are the stakeholders in the project? What types of projects has the team worked on in the past? Which projects failed? The designer attempts to understand the context and to balance political requirements with user needs and demands and business goals. The process of design relies heavily on modeling the behavior of users. In an effort to understand what people might do with a new design, a model is a representation of user behavior. A model of user behavior is a representation of how a person might perform and emotions a person might experience. One of the simplest yet most powerful tools for modeling user behavior is the user persona.

1 Zimmerman, John, Forlizzi, Jodi, and Evenson, Shelley. "Taxonomy for Extracting Design Knowledge from Research Conducted During Design Cases." Originally published in *Futureground: Proceedings of the Design Research Society*.

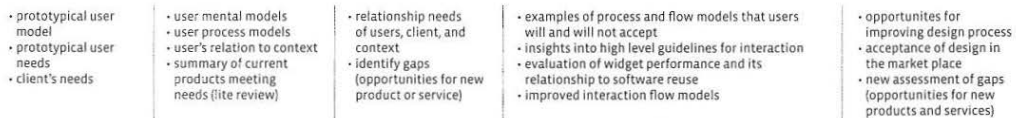
with detail and is thus predictable in the same way that one can predict the actions of a friend or loved one. While these predictions may not be right all of the time, it is possible to anticipate with some degree of accuracy what an individual will do in a given situation. The accuracy improves over time—a long-term relationship provides intimate insight into how people approach problems or situations. The same is true for these behavioral models. By “living” with these models, designers can begin to predict what these hypothetical people will do in novel situations. These predictions can be used prior to a system ever existing and can be used to create visionary and compelling rationales for new ideas. They can also be used to assist in understanding and revising existing systems; to structure scenarios of use that articulate ideal goals, tasks, and actions; and to understand actions that might occur in less ideal situations.

Engineers have formalized these scenarios and often refer to them as *use cases* in an effort to relate these written descriptions to *test cases* (systematic bug testing to ensure a piece of code is operating correctly). A modeling language (UML) has emerged to help visualize these use cases in a diagrammatic format. Yet the formality of these methods is a peculiarity that is useful but not necessary. A written scenario can also be thought of as a narrative essay, as it provides narration through a particular situation. It is, however, most usefully thought of as a story of a person using a product to achieve a goal. This presupposes that the product exists (it usually doesn't) and implies that the design team understands a great deal about what the audience will want to do and what they are likely to do. It also assumes, in many cases, that people will act rationally to achieve a result—as if they can selectively ignore their emotional drives and impulses or block out the distractions of real life.

Project process by phase



Research knowledge production by phase



THE DESIGN PROCESS, BY ZIMMERMAN, EVENSON, AND FORLIZZI

scenarios and often relate these written scenarios to testing to ensure a consistent language (UML) across a diagrammatic process. A scenario is a peculiarity of a scenario can also be used to narrate through a useful thought of achieving a goal. This usually doesn't) and is a great deal about what they are likely to do. They will act rationally to only ignore their emotional reactions of real life.

effect

- post mortem
- opportunity map
- benchmarking
- market acceptance

- opportunities for improving design process
- acceptance of design in the market place
- new assessment of gaps (opportunities for new products and services)

The use of scenario-based product development has several core benefits. Narrative allows designers to contemplate the more human side of their creations—rather than focusing on technology, narrative shifts the emphasis to one of creative learning, problem solving, or attaining a goal. As behavior exists in the fourth dimension, these scenarios become sketches of time. Industrial Designers and Graphic Designers can quickly explain the value of visual sketching in their design process: Sketching is a problem-solving tool, used not simply to visualize ideas but to actually discover and generate a large number of solutions to a problem.

In the same way, the act of building a scenario is useful as a generative tool for discovering new ideas. The scenario, quite simply, becomes an Interaction Designer's napkin sketch. In the same way that a drawing has specific attributes that contribute to its success (perspective, line weight, tone, content), a scenario too has several critical components that aid in comprehension.

First, a scenario needs to include a product and a person. In the early stages of Interaction Design development, the product may not actually exist yet. The scenario development is also a form of product development. The product may be thought of as an ambiguous shape or a piece of information space; it need not be concrete.

Next, a compelling story is created that includes precise detail, sensory awareness, and vivid descriptors. Precision

implies an exacting, accurate, and well-defined point of view. When combined with detail, the audience receives a comprehensive and thorough verbal discussion. Sensory awareness adds issues of sight, sound, and touch; paints an image of a smell; and may include (in rare cases) issues of taste. Vivid descriptors create colorful and dramatic emotional responses. The elements present in a story include a plot, characters, a setting, a climax, and an ending. These are also the major elements in a movie or in a television show that create the general formulaic essence of storytelling. Finally, the guiding principles of a compelling story include a point of view and the overarching goal of the story.

Explaining to your boss that you are going to require several weeks to write stories is a hard sell. Interaction Designers have developed various formalities associated with scenario writing in order to emphasize the business relevance of their creations. These may include matrices with formal variables described (including Actors, Goals, Tasks, Benefits, and Supporting Functions) or more formal step-by-step breakdowns of tasks into task flow charts. The essence of these creations is, however, the same: to humanize a situation and illustrate a cohesive vision of product use over time.



Discovering hidden wants, needs, and desires

After better defining the project scope and goals, designers attempt to gather data relating to the given problem. The next step in the design process, Discovery, is often lacking in many corporations and consultancies due to tight budgets and poor understanding of the value presented by this phase. Discovery involves understanding wants and needs and accumulating artifacts related to the defined opportunity. Traditional approaches to product or graphic design emphasize aesthetic qualities related to craft, beauty, and form. The solution to a problem of design is based on emotional value, and the judgment—or critique—is often grounded in the field of fine art. Interaction Design, however, shifts the focus from the visual to the human. A design solution is judged based on the relevance to the individual who ultimately must use the creation. Central to understanding this principle is embracing a very simple idea, but an idea that dramatically refocuses the locus of attention during the act of creation. This idea is that *The User Is Not Like Me*.³

When embraced by designers, this core philosophy implies that consumers are unique and that all members of the product development team hold a bias in the form of an expert blind spot. The more one knows about a topic, the more one forgets what it is like not to know. Expertise makes it nearly impossible to remember what it is like to be a novice.

3 I credit Professor Bonnie John of Carnegie Mellon University as developing this subtle mantra. While others have certainly realized that they are designing for someone unlike them, Professor John engrained this phrase in the heads of students in the Human Computer Interaction Institute, creating several generations of designers and engineers who truly believe in user-centered design.

To illustrate this point, consider an example. You are employed by a telecommunications company in Europe that wants to extend their products—both hardware and services—into the African continent in order to reap the benefits of developing countries filled with potential consumers. You have a suite of mobile products already designed for the United Kingdom, including games, applications for finding retail establishments, and different ways to record videos and share them with friends; it seems fairly trivial to convert the interfaces to other languages and then begin to offer these in Africa.

Now consider some of the nuances of Africa—not the least of which is the 2000 individual languages spoken throughout the various countries. Consider that of the billion people on the continent, less than 60% of them are literate.⁴ The majority has access to a mobile device, but in many countries, the device is shared among a group or even the entire village. Some areas enjoy full service coverage, but remote regions may have as low as 42% service availability.⁵ And consider that even with these challenges, many of the southern countries—like South Africa—have fully embraced the phone as a medium for payment, photography, and even health care.

The User Is Not Like Me, and the people that will be using your products have fundamentally different perceptions, cultural norms, and cognitive models on which they draw when using things like new phone services and products. To simply convert an

4 International Literacy Day, September 7, 2001. <<http://www.sil.org/literacy/itfacts.htm>>

5 Smith, David. Africa calling: mobile phone usage sees record rise after huge investment. In *Guardian*, October 22, 2009. <<http://www.guardian.co.uk/technology/2009/oct/22/africa-mobile-phones-usage-rise>>

example. You are
company in Europe
other hardware and
order to reap the benefits
potential consumers. You
designed for the United
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partners, record videos and share
them to convert the interfaces
for these in Africa.
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most spoken throughout
the billion people
are literate.⁶ The
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⁶ www.sil.org/literacy/litfacts.htm.
Worldwide literacy rates have
risen since 1990. See
www.guardian.com,
"Age-Rise," 2008.

existing product into a new language (often called *localization*)
without considering fundamental changes to features, capabilities,
and behavior ignores the rich cultural differences of the end
users—and almost guarantees failure. In order to understand
that *The User Is Not Like Me*, Interaction Designers practice
a form of user research that draws heavily on the fields of
Anthropology and the other social sciences, yet encourages and
emphasizes the richness of the individual over the demographic
style of quantitative research commonly utilized by marketers.

Ethnography can be considered a qualitative description
of the human social condition, based on observation. This
human condition implies that social phenomena occur within a
culture and exist when there is interaction between individuals.
Anthropologist Bronislaw Malinowski is considered to be the
first to embrace the notion of actually observing, in person, the
interaction between individuals. During World War I, Malinowski
observed the native culture of Papua by immersing himself in this
island culture and documenting the results in the text *Argonauts
of the Western Pacific*. Malinowski's methodology was unique
in that he used firsthand observation to document and analyze
daily occurrences—Malinowski can be thought of as the first to
utilize participant observation as an anthropological technique.⁶

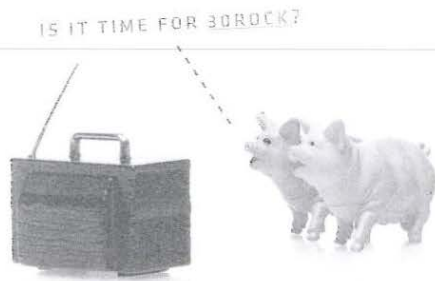
Participant observation is an important aspect of Interaction
Design, as it formally acknowledges that a product does not exist
in a rational and substantial way until it is considered in the
context of the larger social fabric. Simply producing a beautiful,
useful, or cost-effective item does not guarantee success. The

⁶ Malinowski, Bronislaw. *Argonauts of the Western Pacific*. Waveland Press,
Reprint Edition, 1984.

product needs to fit appropriately into the culture in which it
is to be used and sold, and this requires a deep understanding
of the value structure of that culture. This is a core distinction
between design and art. While art may be appreciated in the
eye of the beholder, the artwork can be considered successful
on creation (or when the artist deems it finished). The piece
of artwork—and the artist—still creates a sense of dialogue
with the user, but the dialogue is completely unconstrained.
Conversely, design cannot truly be considered successful until
the user considers it finished—on consumption. The dialogue
has a much deeper set of constraints placed on it, and good
design will help the user engage in that conversation fluidly.

Ethnographic tools used by Interaction Designers attempt to
understand what people do and why they do it. The first is easy to
determine; the latter is tremendously difficult and time consum-
ing to discern. People have a very hard time explaining why they
do the things they do, and human behavior often seems illogical
when considered by an impartial observer. Therefore, interpreta-
tion—making meaning of gathered data—plays a critical role
in translating research into valuable design criteria. This act of
interpretation is one of the primary differences in skill between
design and more traditional market research. Interpretation
often requires a leap of faith (or an intuitive jump from one point
to another), and while the designer (as artist) learns to trust this
intuition, the marketer (as businessperson) is frequently taught
to doubt or ignore it. While the latter may end up with a more
sound argument, the former may be in a better place to truly em-
pathize with the target audience and provide something of value.

When applied in the context of product development, most ethnographic tools are generally poor methods of determining if someone would buy a certain product, identifying how much someone would pay for a certain product, and understanding what color, texture, material, size, or shape to make a certain product. While tools like surveys or interviews can certainly ask questions relating to these details, people have a difficult time in estimating or remembering details related to this type of preference. Instead, ethnography helps designers identify problems with existing designs (understanding the nuances of product usage); understand how people work, play, and live; and identify why people do the things they do with a product, service, or system. A basic premise of anthropology is that context shapes a great deal of factors in society, and the same holds true when considering the “society” of the workplace or the home. One form of ethnography that emphasizes the importance of understanding work in its natural environment is called Contextual Inquiry.



Contextual Inquiry in the context of work

A Contextual Inquiry is similar to an interview but recognizes how heavily an awareness of the workplace conditions will affect and inform action. Ethnographers Hugh Beyer and Karen Holtzblatt have identified four key principles of Contextual Inquiry.⁷ These principles help emphasize that the User Is Not Like Me. The principles of focus, context, partnership, and interpretation allow an Interaction Designer to truly understand the hidden work structures—and hidden needs and desires—in a target audience.

Everyone has a point of view. The problem with a point of view is that it both reveals and conceals. When one approaches a problem with a particular direction already established, it is difficult to have an open mind to changes that may take place. However, the opposite is equally as difficult: Approaching a problem with a truly clean slate is nearly impossible. Focus is the acknowledged preset view of what is going to be addressed through the ethnographic inquiry. It gives the designers a central topic to attend to and a statement to rally around. This statement can be thought of as the focus statement and is particularly relevant when trying to articulate the reason behind the research. A focus statement takes the conceptual approach of framing the inquiry.

For example, when conducting research intended to investigate and understand the various tools used in a copy shop, any of the following foci may apply:

1. “The focus of our research is to understand the process of creating a printed document.”

⁷ Holtzblatt, Karen, and Hugh Beyer. *Contextual Design: A Customer-Centered Approach to Systems Designs*. Morgan Kaufmann, 1997.

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2. “The focus of our research is to understand the complex-
ity of the tools used in creating a printed document
in order to simplify the process for the designer.”
3. “The focus of our research is to examine the individual
printing and binding tools used by the designer in the
creation of a printed document, with a particular em-
phasis on ink, consumables, and maintenance.”

The statements become increasingly more specific, and this
specificity will provide the design team with much more detailed
information. However, this detail is at the expense of the larger,
systemwide view. Generating a focus statement, then, must be
tied to a higher goal or a set of strategic project statements.
These statements, often mandated by a client or an executive,
can assist in the directional goals of research in context.

Context implies the interrelated conditions in which work
occurs. This principle is the easiest to embrace on a theoretical
level but hardest to implement on a pragmatic level. To under-
stand context, go to the place where work occurs: Go to the
users, rather than bringing the users to you, and watch what
they do as they conduct real work. So simple, yet so evasive!

Consider again the previous example: You are an Interaction
Designer working on the development of a printer interface. You
want to view context in order to truly understand how people
go about printing with their existing tools. This knowledge
will give you good ideas of how people print and also will
provide insight into problems with existing printers. Can you
creep into a print shop and watch a designer go about her
day? How can you be sure that she will be using the printer
during the time you spend at the office—what if she chooses

to sketch things by hand instead? And consider the amount
of preparation required to get into that office for the 1 or 2
minutes of printing. Is it worth your time to travel all the way
to the office, get your recording equipment set up, and wait for
printing to occur—just to watch someone press a few buttons?

The answer is emphatically yes. It is worth your time, and
it is tremendously difficult to rationalize why it is worth your
time—especially to a skeptical manager who demands that
you remain billable and to a client who is, ultimately, billed.
Context offers fodder for innovation. Hidden in the physical
work space, in the users' words, and in the tools they use are
the beautiful gems of knowledge that can create revolution-
ary, breakthrough products or simply fix existing, broken
products. People do strange things—unexpected things—and
being there to witness and record these minute and quick
moments of humanity is simply invaluable to the product
development process. These details trigger design insights and
the equally important rationale to back up design decisions to
other members of the design team. But more important than
catching the “magical moment” (which most likely won't occur
during your visit) is understanding the culture of the context.

Once you have arrived in the physical context, or the
environment where work is done, it may seem logical to remain
quiet and observe the work as it occurs. Most people assume that
they will disrupt the natural flow of work and wish to remain as
unobtrusive as possible. As the goal of a Contextual Inquiry is
to gather as much rich data as possible, it is important to reject
this logic and become an active participant in the inquiry. This
participation takes the form of partnership and is likened to that

of a master and apprentice in the days of guilds. An apprentice did not sit quietly and observe. He became engaged, and tried things, and questioned things, and assisted in the process. When observing people printing in a print shop, it is imperative to ask questions. “Why are you doing that? Is that what you expect to happen? What are you doing now? May I try it?” Experience is a guide to better understand when to ask questions and when to remain quiet, but a master and apprentice relationship will allow an investigator to best understand the nuances of work and truly gain the confidence of the participant being observed.

Interpretation, or the assignment of meaning to fact, is a subjective form of synthesis. It is also the most critical part of the Contextual Inquiry process and the portion of the process that is ignored most frequently. The probable reason this principle is tossed aside? Put bluntly, interpretation is difficult. To interpret data is to ask question after question, making assumption upon assumption, always getting toward the heart of the largest question of all: Why do people do the things they do? Interpretation occurs in context, but the critical interpretation often occurs back in the “lab”—in the design studio, while the designer is sketching or the engineer is building, or in a meeting where data are passed around in nicely printed binders. Interpretation is qualitative and can be wrong. This makes for a difficult combination when trying to justify design decisions. However, interpretation is a creative form of synthesis that provides a smooth and elegant transition between Discovery and the actual generative form of design. A strong interpretation session combining various techniques of data aggregation can yield tremendous results.

Frequently, interpretation occurs in the head of the designer. This “moment of epiphany” may be thought of in the shower or scrawled on the back of a napkin. An Interaction Designer understands the importance of structuring this interpretation into a repeatable and formal process, and a good Interaction Designer is able to communicate not only the pragmatic interpretation but also the necessity of interpretation.

Marketing frequently participates in the Discovery phase of a project. In many companies, Marketing will actually conduct the entire Discovery phase of a project before ever asking for collaboration with Design. Thus, on the surface, Interaction Design and Marketing seem to have a great deal in common. Both fields are interested in human behavior. Both fields care about brand and presentation and understanding the value in human experience with products. The interpretation of gathered data, however, is dramatically different across disciplines. Marketing relies heavily on gathered opinions and generalizations that can be made across a demographic and uses statistical data from a small group to predict what a larger group will do, feel, or purchase. Interaction Design cares primarily about actual behavior (often of the few rather than the many) and uses qualitative data from a small group to inform what could be designed.

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Focus groups and competitive analysis

A common data-gathering technique used by marketing firms has been the focus group. This method, combined with questionnaires and competitive analysis, creates the core set of tools used to gather opinions, wants, and needs from end users. A typical marketing firm may poll an Internet message board, a group of volunteers, or shoppers at the mall to find out their feelings about existing and novel products. This appears, on the surface, to be strongly user centered and to be a useful way of understanding purchasing trends. While the method can certainly be applied properly, it is also quite easy to misuse or misinterpret the results of a focus group.

A successful focus group depends on a successful moderator. This requires an individual who is unbiased and creative, has the capacity for empathy, can understand and gauge the direction and flow of conversation quickly, and can adapt to unforeseen circumstances. What a rare individual! A focus group depends on a compelling and continual discussion among six to eight people—people who may share similar traits but usually have never met each other before. In a group of this size, there will most likely be personality differences—some differences of the magnitude that can absolutely destroy the value of the entire experience. These differences may include vocal distinctions (someone may simply be louder than the rest) or morale oppositions (people may get into conflict over root issues of ethics and proper behavior). Worst of all, however, is the apathetic focus group—the members who are willing to be persuaded, pulled, and shaped

by the rest of the group. In a situation like this, gathered data will not only be poor, it will frequently reflect the opposite of the truth, and it will most likely be thrown out during analysis.

Most important, poorly run focus groups will highlight hypothetical behavior. A naïve facilitator may ask questions pertaining to opinions and encourage people to consider what they *would* do or *would* buy. In a hypothetical situation with fake money, people may be more willing to “purchase” anything—and would most likely pay a lot more in false currency than they would when their wallet is open. These hypothetical opinions rarely translate directly into behavior.⁸ Thus, the value of the data gathered from a focus group is entirely dependent on the ability of the moderator; perhaps those engaged in design activities are more capable of engaging users in this type of study than are marketers.

Ethnography performed during the Discovery phase of the design process should be user focused rather than competitively driven. A competitive analysis, or competitive product benchmarking, is a method used to understand the similarities and differences between products that have already been released. The outcome of this technique traditionally includes the creation of a competitive matrix of products, highlighting trends related to features and functions.

⁸ The late Jay Doblin, the founder of Doblin Inc. in Chicago, recalled an anecdote of just such a phenomenon: participants were asked to talk about and discuss a set of pens. Some of the pens were blue, and some were black, and the members of the focus group discussed at length why the black pen was simply superior in every way to the blue pen. After the discussion had ended, the participants were rewarded for their time by being allowed to take a pen for themselves as a “thank you” present. Sure enough—all of the participants selected the blue pens, leaving the “preferred” black ones behind.

While this is a valuable tool for understanding strategic marketplace positioning, it is frequently performed instead of ethnography, user testing, needs analysis, or a more formal product evaluation. This is problematic for a number of reasons. First, the emphasis of the competitive analysis is placed on features rather than goals. By collecting and analyzing similarities in feature sets, the design team has implicitly embraced extra functionality as a goal for design. The quantity and scope of features, however, are nearly irrelevant to the user, who cares about more conceptual issues such as goals, tasks, and activities.

An additional and larger implicit problem with relying solely on competitive product analysis, however, is the assumption that the features the competition has selected to include are the right features. The communication of product features and value throughout the production chain is so skewed within a company that comparing this value set across companies is a nearly useless exercise.

The internal channel communication of distribution and sales is murky and convoluted within a particular company. If the design team simply looks at the competition's features with the intention of copying them, the entire product segment begins to include that irrationally specified feature. Consider how quickly the trend towards enormous SUVs blanketed the vehicle market or how the need to brand an engine ("hemi") found its way through various companies. Discovery should be focused on understanding goals and tasks rather than features or functionality. The articulation of specific features will come later and will be driven by user need rather than by the competitive offerings of other companies.

Synthesis, creation, and refinement

After Definition and Discovery, designers begin an iterative cycle of Synthesis, Construction, and Refinement. These phases represent the most elusive and perhaps time-consuming aspects of the design process because they are the most dependent on experience, informed intuition, and talent. These phases, while highly intellectual, frequently rely on rapid ideation sketching (making a breadth of drawings and ideas to explore multiple ways of solving a problem), additional narrative development (through more scenarios and storyboards), and mind mapping as a generative method of problem solving and concept development. Designers work through a messy process of creation and reflection, testing ideas both with real people and also with other designers, all the while honing in on a particular solution. A designer works through both a convergent and a divergent thought process of ideation.

Convergent thinking attempts to locate the best answer—the optimum solution to a given problem. Typically, convergent thought is one that argues away potential ideas until the best idea is left. Designers use this method of thought to hone in on a solution that can easily be presented to other stakeholders involved in the product development cycle. A solution occurring from a convergent thought process implicitly has some sort of evidence that makes it appear to be a proper route to follow, and it is familiar or safe in its correctness. A good designer, however, balances convergent thinking with a healthy level of divergent thinking.

Divergent thinking can be risky, as the output may be unexpected, illogical, and even simply wrong. But divergent thinking also leads to innovative new ideas and challenges traditional

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ways of considering products—and doing business. This form of thinking forces the designer to shift perspectives away from the safety of familiarity in order to explore what could be. This is frequently done by producing a large quantity of ideas and suspending judgment of these ideas until much later in the process.

Author Richard Buchanan discusses the importance of shifting “placements” in order to encourage and assist in the development of innovation in design. Buchanan explains that “innovation comes when the initial selection is repositioned at another point in the framework, raising new questions and ideas.”⁹ He describes how signs, things, actions, and thoughts can be considered in light of one another in an effort to build new and creative ideas. Consider designing a new thing, such as a chair. Now shift the placement to imagine that chair as an action, or a sign, or a thought. This divergence away from the norm—a chair as an object—makes for wildly creative ideas of a chair as a service or sitting as a philosophy; the notion of these placements, and their ability to be shifted, is what Buchanan refers to as the “quasi-subject matter of design thinking, from which the designer fashions a working hypothesis suited to special circumstances.”

Divergent and convergent thinking requires a mixture of analytical skills (logic, engineering, and the development of “appropriate solutions”) and creative skills (drawing, mapping, “blue sky thinking”). This mixture is a rare but required duality that must exist in a successful designer. A designer will sketch, and think, and diagram, and write—and do these things over and over, each time refining and pruning away the wrong ideas

⁹ Buchanan, Richard. “Wicked Problems in Design Thinking.” *The Idea of Design*. Eds. Victor Margolin and Richard Buchanan. MIT Press, 1996, p. 9.

in order to find the right one (convergent thinking in action). But *wrong* and *right* as applied to design are impossibly finite and are obviously the incorrect words. A designer may reject an idea as being “less good,” as it does not fit well within the constrained design space, and may temporarily embrace a ridiculous idea that still fulfills the stated constraints or guidelines from the client. The constraints placed on the design are a mix of human, technical, and aesthetic boundaries. The difficulty lies in discerning the hidden constraints, which the process itself helps uncover, and balancing these with the more explicit constraints, often defined by a client or a business executive.

In order to understand if the various creations have succeeded, it is important to test them with real people—people who represent the target audience—and to test not only their appeal but also their comprehensibility. There are both formal and informal methods of testing ideas. A common misconception is that formal methods of testing can only be used with very well-established ideas. In fact, formal methodologies like Think Aloud Protocol can be used even with new, “half-baked” ideas in order to gather data about how useful or usable these ideas are.

Think Aloud Protocol (also referred to as Talking Aloud or simply User Testing) is an evaluation technique commonly used to understand problems people have with software interfaces. It has roots, however, in a subtler and more important aspect of humanity: understanding how people solve problems.

People solve countless problems throughout the day. A problem need not be something as formal as a math equation. Consider the increasingly common problem of understanding how to use a cell phone to make a phone call. Understanding the

various buttons, navigating the menus, and ultimately placing the call is a problem to be solved, and a method to understand how people approach problems of this kind would be of huge value to anyone in the business of shaping complicated user experiences.

Herb Simon, arguably the father of the field of artificial intelligence and a beautiful thinker, was also interested in how people solved problems, yet his goal was a bit more lofty than creating a cell phone. In order to create intelligent computer systems that may simulate or predict human behavior, one must first understand how human behavior itself works. Simon, along with Allen Newell, developed a series of experiments to understand issues of cognition and working and long-term memory.³⁰ Through these experiments, Newell and Simon determined that, among other things, people could articulate what they were doing, as they did it, without affecting the outcome of the task. That is, a person can attempt to dial a cell phone and explain what he is doing, as long as he is not prompted to explain why he is doing it. This running description of action—formally called a *protocol*—is, ultimately, an intimate look at the contents of the working memory in a participant. Evaluators can use this technique to understand what someone is doing and can later interpret why that person

did it. By understanding what people have done, designers can begin to understand when they have errors and can interpret, or create credible stories about, these errors. Additionally, designers can understand the rationale behind actions by seeing them in totality. Actions will appear as a running set of steps in a task to achieve a goal. The protocol can be interpreted by designers, who can then contemplate the underlying behavior that occurred.

In order to successfully conduct a Think Aloud User Study, a designer requires a prototype, a participant, and a set of tasks. A prototype is a representation of the final product. The prototype can be of any fidelity. For example, if testing a piece of software, the prototype can either be a functioning and working version of the software or a simple set of hand-drawn screens. When testing physical products, the level of finish given to the testable model is relative to the complexity of a task.

Just as the prototype should be representative of the final design, so should the participant represent the end users of the creation. For example, when testing products intended for use in an industrial kitchen, it is worthwhile to find participants who spend a great deal of time in industrial kitchens and actually represent the target audience of the product.

A set of tasks will be given to the participant. These tasks attempt to engage the participant in actions that represent normal behavior when using a product and should thus be structured around predictable and probable goals a user may have.

Once the prototype has been created, the participant has been recruited, and the tasks have been established, running the study is straightforward. It is, in fact, so simple that it may seem too easy. The difficulty is not in the mechanics of the procedure,

³⁰ Herb Simon and Allen Newell are responsible for a number of advances in the fields of computer science and cognitive psychology and can continually be found throughout the literature relating to Interaction Design and Human Computer Interaction. Newell worked with Stuart Card and Tom Moran in developing a unified vision of human-computer interaction when the field was still in its infancy and ultimately co-authored the text *The Psychology of Human-Computer Interaction*. He helped build the computing system and computer science department at Carnegie Mellon University. Simon's list of accomplishments is no less impressive and includes the ACM A.M. Turing Award in 1975 with Allen Newell and the Nobel Prize in Economics in 1978. Newell and Simon are continually recognized with the Newell-Simon Hall at Carnegie Mellon University, which houses, among other things, the Human-Computer Interaction Institute.

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but in the interpretation and application of the results. The prototype is presented to the participant, and he is instructed to use it to accomplish the tasks. He is then asked to think out loud as he uses the prototype: He is to vocalize what he is doing throughout the task. If he falls silent, the facilitator will prompt him to continue talking but will be unable to help him in any way. These instructions frequently become comical as participants realize that they are, truly, on their own. Once the rules for the study are established, and a sample think aloud is demonstrated, participants generally take to the technique quickly and only a little prompting is required to keep them continually verbal.

Less formal but still useful versions of the technique have evolved that focus more on moderator-led probing and less on simple vocalization of working memory. Moderators may ask questions like "Is that what you expected to happen?" or "You look confused—is there something on the screen that isn't what you expected?" in an effort to draw out reactions from participants. The value of any form of user testing is in the critical incidents that are recorded during the protocol: "By an incident is meant any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act... To be critical, an incident must occur in a situation where the purpose or intent of the act seems fairly clear to the observer and where its consequences are sufficiently definite to leave little doubt concerning its effects."¹¹ These incidents usually

¹¹ Flanagan, John. "The Critical Incident Technique." *Psychological Bulletin*, 51 (4), 1954. pp. 327-358.

indicate design errors relating to navigation, cognitive structure, or labeling and can be wonderful insights into the way people approach problems relating to designed interfaces and objects.

Perhaps even more valuable than uncovering usability problems, however, is the direct manner in which these usability problems can be communicated to stakeholders and others involved in funding or judging a project. Video of the user testing can be shown to engineers, project or product managers, marketers, or others involved in the development of a product. The reactions of real people serve to appropriately contextualize the designs that have been created. Rather than having debate or discussion about what could happen, invoking a hypothetical use case, this type of user study presents something that did happen with actual people. The value of a video record cannot be overstated.

CHICKEN



Thoughtful reflection

The final step in the framework proposed by Zimmerman, Evenson, and Forlizzi focuses on Reflection—the act of assessing success. “Design researchers can examine their own process throughout the case and identify opportunities for increasing efficiency. Also, through the collection of reflections and summaries of many case studies, designers can begin to develop models that allow them to more accurately estimate both the time and resources needed for future projects.”¹²

Unfortunately, this critical step is nearly always ignored by professional designers. Assessment implies internal criticism, something many companies prefer to leave up to public relations or external product reviews. The assessment must be at a user and project level, rather than a quality assurance level, and benchmarks for success have generally not been developed or acknowledged within corporate America. In many high-pressure design consultancies, to reflect means to waste time. Reflection is not productive and is frequently viewed as a poor use of money and resources.

Design is a creative field, and in order to successfully create, one must achieve a sense of Flow.¹³ Flow is, among other things, the absence of self-doubt and the nearly auto-telic and automatic creative process. Beginning students of design are painfully aware of their process. They reflect and doubt and self-criticize

both their creations and their skills. They are like the gawky 13-year-old girl who has sprouted up too quickly, nearly a head taller than the rest of the kids, and obviously slouching to fit in. To be so painfully aware of so-called deficiencies causes others to notice and comment on these shortcomings as well. Malcolm Gladwell discusses the fragility of process in his text *Blink*, making the connection between the creative process (flow) and the sports process (in the zone): “...problems that require a flash of insight operate by different rules... as human beings, we are capable of extraordinary leaps of insight and instinct... all these abilities are incredibly fragile. Insight is not a light bulb that goes off inside our heads. It is a flickering candle that can easily be snuffed out.”¹⁴ A mature designer respects and embraces the often ill-structured nature of the process, and—because he knows to expect messiness during the act of creation—he promptly forgets about it completely. Process becomes innate, and the phenomenon of design intuition takes over.

The process described above is very succinct and appears to be quite linear. In fact, the process is elusive, recursive, and messy, and a cohesive process frequently means a process of relative unawareness of structure. That is, there is rarely a definitive declaration of beginning or ending to any of the steps mentioned, and while the steps generally follow the order presented, there is often overlap and reordering of processes. The messiness of process can be difficult for designers, and even harder for clients, as each project is unique and it's difficult to predict (at a detailed level) what will happen at each stage.

¹² Zimmerman, John, Forlizzi, Jodi, and Evenson, Shelley. “Taxonomy for Extracting Design Knowledge from Research Conducted During Design Cases.” *Futureground 2004*, (Conference of the Design Research Society) Proceedings, Melbourne, Australia, November 2004.

¹³ Csikszentmihalyi, Mihaly. *Creativity: Flow and the Psychology of Discovery and Invention*. HarperPerennial, 1996.

¹⁴ Gladwell, Malcolm. *Blink: The Power of Thinking Without Thinking*. Little, Brown, 2005. p. 122.

Externalization of the process—taking the reflective, intuitive, and messy parts of design and finding a way to draw them, model them, or represent them in reality—becomes critical for rationalizing and communicating the process of design.



The role of intuition

Design intuition is most likely not a genetic disposition to be creative. In the same way that one is not predisposed to be a doctor or a lawyer, a designer must ultimately select a career path and hone the particular skills necessary to succeed in that path through a great deal of practice. What many refer to as *intuition*, then, is not the untaught or unteachable but instead is a learned understanding and respect of process, molded by experience and refined over a great deal of time and practice. Designers may appear to work based on intuition, but the magical nature of an innate process carries little weight among engineers or business owners. Designers have learned to externalize and justify the above process along the way, in an effort to alleviate the pain that may come from explaining how a design “just feels right.”

A designer who trusts her intuition does not abandon the procedural set of pragmatic steps as outlined above. Instead, she learns to balance this process with two outside forces: confidence, and personal experience. Confidence allows the designer to form an opinion and then believe in it. This confidence is informed by personal experiences, experiences that rarely have anything to do with the subject matter of a given design problem. Philippe Starck, a French designer who has found his way into popular retail stores and thus into the lives of many Americans, has been one of the most vocal proponents of so-called intuitive design. His confidence is obvious in the dramatic, and often amusing, style of his work—and the experiences from which he seems to draw have nothing to do with design and instead frequently pertain to sex or the erotic nature of the human form.

Starck explains that as a designer, you “must have your own responsibility, your own consciousness... I work only with intuition.”¹⁵ It is interesting, then, to see the highly charged results of such an intuitive approach—Starck lives extravagantly and has thus been continually described as a “sellout” or a “playboy.” He might be both, but the dramatic success of his products at Target implies that he is succeeding in evoking emotional responses with his intended audience.

Not all of the well-known and successful or high-profile designers have embraced intuition in the process of design. Stefano Marzano, CEO and Chief Creative Director at Philips Design, has vocalized a near polar opposite view of the role of designer. While Starck explains that “... there are already thousands of really, really good chairs. There are thousands of good lamps. There are thousands of everything... I am not interested in designers,” Marzano takes a much more refined and intellectual approach, and views a process-driven design methodology as a business differentiator.¹⁶ During a speech to the German Marketing Association Conference in Hamburg, Marzano explained that “...arty’ product design, the sort of strikingly individual designs produced by Philippe Starck... may help provide differentiation for a while, but it is easily imitated and soon becomes a commodity.” Instead of relying on the artistic intuitive, Philips practices a

user-centered design process that relies on researching “social, cultural and visual trends by various international institutes and universities” in order to help shape complicated experiences.¹⁷

One can ultimately consider the outspoken artist of Starck and the humbler approach of Marzano as having the same positive focus: a focus on people, and emotions, and on making the world a better place to live in. This may embrace the visual aesthetic and lead to the production of objects of visual beauty or focus on the creation of products that save lives and increase the value of the human condition. Both designers, however, view the role of design as a human-centered, emotionally driven, complicated, and culturally informed process of creation.



15 Starck, Philippe. Lecture at Harvard University Graduate School of Design: Design Arts Initiative Lectures. October 1997.

16 Designboom. Interview with Philippe Starck. May 23, 2005. <<http://www.designboom.com/eng/interview/starck.html>>

17 Marzano, Stefano. Presented at the German Marketing Association Conference, held in Hamburg on November 9, 2004.

The role of Design in considering the whole

When Design occurs in a business, a project changes hands several times; different groups claim ownership at various points in the project. In some larger companies, designers frequently complain of the “over the wall” problem. Research is conducted by Marketing and “thrown over the wall” to the engineers. The engineers build to the written specification, and over the wall it goes to the designers. The designers are left to do the plastics or push the pixels, and there is little communication or cohesion between disciplinary entities.

The designer mentioned above, Philippe Starck, designs a product as an isolated object, and while his products are sold in large retailers like Target, his specific design consultancy is small. As a result, Starck generally enjoys making executive decisions spanning across Design, Marketing, Engineering, and Distribution. A designer at the larger entity of Philips, however, may be much more constrained to specific actions and may not have any input into issues tangentially related to design. In a development team made up of Engineering, Marketing, and Design, each participant has a distinct role to play and the relationship forged by the various disciplines helps determine the relative success of the product.

The engineer may be responsible for the functionality of the product, and in the case of digital or electronic products, that functionality is frequently embedded in emerging technology. The engineer implicitly becomes the advocate for technology. While not necessarily proposing the latest technological advancements, the engineer remains responsible for making sure that a product is technically sound and that

it functions correctly. Similarly, a marketing manager may be responsible for ensuring that a brand presents a consistent and compelling image. This may include understanding the target demographic as well as gaining an awareness of purchasing patterns and buying trends. A project manager may own the product development schedule and be responsible for delivering the project as specified, on time and on budget. Each player in the development of a product has a primary focus.

An Interaction Designer, too, takes ownership of a particular area of expertise. While engineers may be advocates for function and marketers for brand, an Interaction Designer becomes an advocate for humanity and behavior. This advocacy must occur on various levels of detail as a project progresses from a business goal into a tangible form.

At the beginning stages of a project, an idea may be driven solely by a business necessity: increasing profits, gaining brand equity, or disrupting a traditional channel leader. An Interaction Designer, if invited to discuss the project at this stage, may ask questions like “Does the user need this product at all?” This view might be informed by an understanding of culture, or an intricate care and love of society. It may, however, simply be a representation of viewing the world through a technologically wary filter. This is clearly a philosophical question first; the right answer may be the wrong business suggestion, and Interaction Designers are rarely invited to discuss the project at this stage. This is unfortunate. If the process of Interaction Design is to be applied to the business processes themselves, designers need to be firmly embedded in the upper echelons of the corporation or have a strong relationship with those upper levels of management. To achieve

this level of executive influence, designers need to be more versed in rationalizing their human-focused recommendations with financial data and speaking the language of the boardroom.

Farther along in the process of product development, it may become apparent that particular elements of functionality are more difficult or expensive to implement. At this stage in the project, an Interaction Designer is responsible for forcing a dialogue of cost/benefit analysis from the perspective of the end user. How much contextual evidence is there for such an element of functionality? What is the value of a more expensive piece of technology, measured on a human scale, rather than a financial scale? At this point, the designer shifts to speak in terms of value proposition.

As a project nears completion, Interaction Designers are frequently called on to consider the visual aesthetics of a solution. This detailed level of refinement gives an Interaction Designer a final chance to advocate for the end user—this time, on a purely emotional, or visceral, level. In this way, *Interaction* Design often becomes synonymous with *Interactive* Design or *Graphical User Interface (GUI)* Design.

Interactive Design focuses on the development of interactive systems, placing technology at the center of attention and ultimately emphasizing authoring techniques. These authoring techniques frequently focus on the visual aesthetic of content presentation—the eye candy relating to interfaces. GUI Design takes a similar approach, emphasizing the nature of technological constraints and platform-specific paradigms. While these two disciplines certainly cater to a user, they place a dramatic degree of emphasis on technology and allow technical con-



straints to guide the development of interfaces. An Interaction Designer will most likely have skills related to Interactive Design or GUI Design, but these skills do not define his existence.

At the core of an interaction is the dialogue between a product, system, or service—and a person. Design exists as a means to a greater end—enhancing the human experience, solving complicated problems, and ultimately creating designs that resonate with their audience. Understanding that design work has direct consequences on people adds a unique, and humane, side to the elements present in the act of creation and dramatically shifts the focus of what could otherwise be thought of as technical artwork. At the heart of the Interaction Design process is a simple notion: that design should be user-centered and that the only way to truly understand what users want or need is to interact with them. The process describes attempts to capture what people do, think, say, and want so that a designer can create usable, useful, and desirable creations.

HEY...
THAT'S A LOT OF CASH,
OVER THERE...

