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Get Your Product Used in Anger!
(Before Assuming You Understand its Requirements)

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Some months ago, Carl wrote to an email list about a bike light and a new requirement that he had discovered after using the light "in anger." "Anger!" I thought. "What a perfect topic for The Whiteboard! Use a product, get mad about its design, and take advantage of your anger to derive important but hidden requirements." It was only on receiving Carl's first draft that I discovered he wasn't talking about anger at all. In the UK, to use something "in anger" means to use it for real. But in fact, Carl does get angry about bad design. And I think that's a good thing.

— Elizabeth Buie

You cannot understand requirements precisely until a product is used "in anger." Surprising? I don't think so. But let's explore the evidence, look at possible remedies for poorly designed products, and think about the future of such products. Is there a kind of natural selection that favors good design?

My obsession with design, especially of things I've used in anger, coupled with my day job as a user interface (UI) designer, conspire to make me boring company at times. When I rant about my latest product-inflicted misfortune, generally people think I've gone mad. They're usually right—I'm hopping mad about missed requirements. Cooling off, I sometimes wonder what designers could have done to identify the requirements that came to light when I used their product in anger. Three prevalent approaches often help in getting product requirements and design right during the design process:

1. **User interviews** with the user population before design commences.

2. **Usability testing** as opportunity allows. Most human factors folks consider usability testing important, and I am always surprised by what I find when I get the chance to do it.

3. **Design patterns** that reinforce an understanding of the requirements for a class of products with an "off-the-shelf" solution.

Don Norman, author of *The Design of Everyday Things*, is renowned for his focus on design and bears partial responsibility for getting me started on all this. I wish I could count on a principle of Normanian Natural Selection. I want to believe that market forces will trigger a kind of evolutionary natural selection favoring good designs and successful adaptations and denying the long-term survival of bad designs.

OK, on with the evidence! Let's look at some products.

Some Products Used in Anger

BICYCLE LIGHT

First under the spotlight is a white LED bicycle light by CatEye. The light has a high specification: three bright LEDs, easy fitting to and removal from the bike, and a 100-hour battery life. Although the product cost was high ($30), I decided to buy the light, particularly since I've had a great CatEye rear light for years.

When I used this light in anger in my daily commute, a critical requirement became apparent. Can you guess what it might be?

Think about it: When you park your bicycle, you remove the lights so that they are not stolen. Now encumbered by two lights, you shove them into a pocket or a backpack. The designers clearly—and mistakenly—did not consider the inside of a backpack as a normal environment for their product. Have you guessed the requirement yet?

The light, used in anger, needs a switch firm enough so that it does not easily get switched on while it is being jostled in a backpack—a 100-hour battery life is unimpressive if your light is switched on all day!

Could this requirement have been identified earlier?

User interviews? Given enough cyclists, some would probably have had the switch problem. But would talented interviewers have been hired to extensively interview cyclists for a $30 bike light? Unlikely.

Usability testing? Would physical prototypes have been available for the real-world usability testing that could uncover this problem early enough to change the product design? Unlikely.

Design pattern? A design pattern for bike lights could solve a problem like this, if designers were aware of it and could be forced to follow it.

Will we see Normanian Natural Selection?

A cyclist that has experience with this problem will avoid a similarly designed light, so one survival gene of the weak switch design is triggered off.

Avid cyclists are vocal and likely to contact CatEye about their light's failings. Magazine product reviews may also bring problems to their attention. CatEye's reputation may motivate them to act on customer feedback. Who knows? Their designers may even get to hear about it. So, there could be a connection from the users back to the designer—another trigger.

To have a positive effect, evolution requires only the slight favoring of an adaptation. If some sales potentially were affected by this problem, Normanian natural selection could work—and perhaps bike lights will evolve into having stiffer switches. Working against natural selection, though, is that many millions of bike lights are sold to casual cyclists who are

motivated only to buy the cheapest light and would probably never notice the problem with the switch.

LAVATORIES

Can you guess the missed requirements in these products that were discovered through use in anger?

You don't really notice the toilet paper holder when you walk in because it is deep grey and hard to see through. But when might you notice there is no paper?

Still life with toilet paper holder

What about the door lock? Well, sometimes when you lock the door you might like to try the handle to see if the door has locked properly; with the design below, as soon as you try the handle the door unlocks itself. You have no way to confirm that the door is locked from the inside.

Could this requirement have been identified earlier?

User interviews? Possible, but do door lock designers ever talk to a user?

Come to think of it, *they* are users, too. Do these things not strike them?

Usability testing? These problems could be discovered by testing, but would anybody ever do such testing?

Design patterns? These could be effective, but who is going to enforce them?

Will we see Normanian Natural Selection?

Designers of such products seem to be completely dissociated from the users (and cleaners) of lavatories because lavatories are so anonymous. It would take quite a crank to write to a door lock manufacturer, and the destiny of the letter would be predictable.

Therefore, I fail to see any triggers for Normanian natural selection for aspects of lavatory design to evolve, an observation borne out by the prevalence of such bad designs today.

FOOTPATHS

As early as 1912, planners have known that it is better to wait until paths are used in anger before completing their design. Often, when putting up new buildings, planners will leave out the footpaths and watch where people actually walk and then build the footpaths there, on what are called "desire lines."

Could this requirement have been identified earlier?

User interviews? Better to hold interviews in buildings without paths and watch where the tracks form.

Usability testing? Footpaths make their own usability test report in the grass to show where the designer went wrong. Sadly, I guess many desire lines don't actually become proper footpaths because of poor timing.

Design patterns? Desire lines for footpath design are the ultimate patterns for a design approach, flawlessly acknowledging human behavior. The pattern is perhaps successful because it's well known. When placing scratch protection pads on his new motorcycle's tank, a friend of mine used "the same principle used to place paths at Warwick University"—he waited to see where his jacket's zipper scratched the tank and then put the pads over the scratches!

Will we see Normanian Natural Selection?

The connection between the user and the designer of a footpath derives from use in anger but is communicated as an etched desire line. If the designer waits for these etchings to form before completing the footpath, the finished path will be in the right place. If not, the desire lines could become a living statement of inadequacy and promote "keep off the grass" signs.

Does Normanian natural selection, then, favor footpath design? I would hope so, because of the pure genius of waiting for their use in anger before finalizing the design. But I wonder

what percentage of footpath designers uses this well-known pattern for the design approach? A small percentage would be my guess—I certainly see a lot of dirt tracks etched into grass while taking unpredicted shortcuts.

HOBS (aka COOKTOPS)

Why is it almost impossible to buy hobs (or cooktops, as they are called in the U.S.) with controls that afford switching on the right element without ambiguity? Sampling 400 hobs revealed three configurations for sale in the U.K.:

86 percent have inappropriate mapping of controls to elements
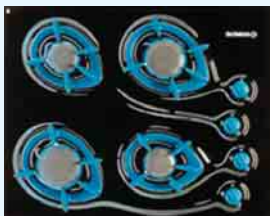
4 percent have poor mapping but use a visual aid to link element to control

Only 10 percent have a good mapping of controls to elements (but these include ceramic cooktops riddled with other usability problems).

An overwhelming 86 percent of hobs have an inappropriate mapping—and one of the best designed hobs for

human use is ironically called The Alien!

Could this requirement have been identified earlier?

User interviews? Users are not designers and would probably not highlight this problem if asked.

Usability testing? A 1997 Home Office (a department in the British government) report cited cookers as the second most common source of household fires. Poor hob design is never cited as a possible cause, but usage error rates of 11 to 19 percent found in usability testing should be taken seriously.

Design patterns? Could vastly improve hob design, but designers must follow the patterns instead of indulging their needs for funky expression.

Will we see Normanian Natural Selection?

We have known about this problem for almost 45 years, and 86 percent of hobs on sale today still suffer poor mapping of controls to elements. Usability testing has failed to improve hob design, and Normanian natural selection isn't working. We know cookers cause household fires, and hobs probably contribute to the problem, but designers, playing in the sandpit of aesthetic self-expression, remain ignorant of the problem.

MICROWAVE OVENS

This brings me to microwave ovens and the one I bought for my grandmother.

I researched this well—you just turn one timer dial to operate this.

What design flaw became apparent when this appliance was used in anger?

I had missed the context. This microwave oven resides in a house frequented by grandchildren whose toys teach them the fun of turning dials. A microwave oven switched on when empty does not last long.

Could this requirement have been identified earlier?

User interviews? Users are not designers—I doubt this requirement would have surfaced.

Usability testing? No lab test would identify this kind of requirement.

Design patterns? Could evolve, perhaps when a microwave oven designer buys a microwave for her grandmother!

Will we see Normanian Natural Selection?

I think the evolution of microwave ovens has stopped—I can't see any useful evolutionary triggers. The drive to make them look funky seems far stronger than the evolution of useful product design. Or should I say, further evolution. A friend pointed out to me that microwave ovens *have* evolved. Ovens in the first generation were a mass of buttons and most are now far simpler to use. I wonder what triggered this evolutionary step. My guess is sales—I reckon a designer tried a simpler design and it sold quickly.

Questions to Ponder

Do many requirements remain hidden until the product is used in anger? Yes.

How can we discover requirements earlier?

Interviewing users has some potential to ferret out hidden requirements. Hiring decent interviewers and getting them a good sample size to work with could be an effective way to uncover certain hidden requirements.

Usability testing invariably seems too late. Given the nature of production cycles, real-world testing often cannot be done early enough to feed into the design. Perhaps the best chance for usability testing is to identify hidden requirements between product versions. For this to happen, there needs to be a connection between user and designer.

Design patterns have endless possibilities for ruling out bad design, so long as they are followed. Japanese firms such as Toyota force engineers to go through "lessons learned" books, so perhaps this is a way forward.

Will Normanian Natural Selection come to our aid?

I want to believe that companies that make a good job of design—such as Palm, Apple, Smile Banking, Google, and Amazon—will become supremely successful, allowing market forces to show other companies that they *must* take design seriously. Their success would be a key evolutionary trigger for good design. Design patterns seem a natural part of this evolution because if you want to beat Amazon you'd better learn from what they do and what patterns work for them.

For some products, evolution appears to have stopped—cooktops and lavatories seem destined to never improve collectively.

For all products, often something is wrong somewhere; the connection between the actual field use of the product and what the designers did is broken. I wonder if a classic usability issue worsens the situation—we often don't notice well-designed products because they do not stand in our way, so they fail to gain evolutionary favor. Bad design stands in our way and we complain about it, but perhaps nobody is listening, or perhaps we are just blaming ourselves.

What depresses me most about the evolution of design is that poor design adaptations survive, even in the harshest commercial conditions where losing money is a direct consequence of bad design. The design of automated teller machines is a stark example: To a bank, the most valuable asset in the transaction is the bank card; to the user, the goal is money. So, when do you give the user the exciting cash—before returning his boring card or after he has put it back in his wallet? It amazes me that some U.S. banks fail to follow the normal interaction design pattern. How many of their cards get lost? How much does this cost them?

Does nobody think this is about design?

Carl Myhill is the principal designer for GE Network Solutions. He has been designing corporate systems (such as geographic information systems) for more than 10 years, and he wishes he designed products like those he rants about in this article! His unique ability to always be the one to push the door marked "pull" and fall foul of every possible usability problem is perhaps his greatest talent—though it would be nice to switch it off sometimes. Carl's opinions are his own and do not represent those of GE Network Solutions.