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Interface Quotas and Internet-Derived Value

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Bob Colwell

For the past few years, I've been pondering two theories: the Theory of Interface Quotas and the Theory of Required Internet-Derived Value. I'm working on refining general theories for both, but that may take a few more years.

INTERFACE QUOTAS

My interface quota theory is entirely self-serving, and it probably stems from my desire to stop feeling like the old dog staring resentfully at the teacher of new puppies. According to this theory, we're all born with an innate quota of machine interfaces that we can become comfortable with.

In your lifetime, you'll learn hundreds of machine or system interfaces, but, in a few languages, you'll be fluent only in those you learn when you're young. The rest you "speak" with an accent, or not at all. Eventually, any additional new interface is inadvertently mapped to pieces of those already learned, which will bring you no trouble, and you'll give up on the new machine in disgust.

In other words, youngsters eagerly internalize new technology, but eventually reach a limit, and in that instant it becomes much more appealing to criticize the interface than to learn it.

For example, you've learned how to use TVs, clock radios, watches, computers, automobiles, DVD players, iPods, cameras, cell phones, tools, printers, ATMs, kiosks, and a host of other devices. It's a list of length N , for N a large number.

But only a few days after getting item N working, your cell phone's keypad no longer dials the number 7, there's a dark band across the top of the LCD screen, the batteries only last about 15 minutes on a charge, and your ring tone is so damn loud that mothers cover the ears of their children when they hear it and hustle them away from you. You bow to the inevitable and get a new cell phone, with the salesperson's infinite list of wonderful new features ricocheting around in your head like a ping-pong ball dropped onto a wood floor.

In the past, you would have taken that cell phone home and put it through its paces, programming its address list, configuring it for Web access and instant messaging, setting its phaser to stun. But shockingly, this time you find you no longer care. You bought it to be a phone, and that's all you want from it. *The War and Peace-*

manual goes into the box, and the box goes into recycling. You've reached y interface limit: The part of your cranium that handles obtuse and completely machine interfaces is full, and there's no more room for yet another one. You machine interface neurons have linked their metaphorical elbows and former skirmish line: None shall pass.

At first, you think this is only temporary. Maybe it's related to the curry over from the Thai restaurant last night. Or maybe you're a Cleveland Browns fan huge fraction of your brain is tied up in trying to remember why.

Then your 17-year-old son walks in and says, "Wow, Dad, what a cool new p heard about this model. It has a 3D camera with X-ray vision, mental telepa satellite Web access, GPS, faster-than-light instant messaging, and a ring of awesome little lights that makes it look as though it's levitating in the dark. I control your blender and make margaritas. What have you programmed it to far?" He sees your blank stare, and his eyes go wide with dismay. "Dad, you programmed it at all, have you? You still have the default ring tones, don't y

Your son slowly backs away from you; you can see in his eyes that he is ree his entire relationship with you. You can no longer be the cool guy he mistoo when he was 10 years old. Your connection with him has irrevocably change doesn't see the problem. He still thinks it's great fun to explore the latest tec gadget and tease out its incredible facilities.

But there's nothing you can do. You simply can't learn another interface, no the cost in broken human relationships. It's sad, so sad.

MISSPENT YOUTH

When I was an undergrad, anyone using computers learned that poring over manuals, looking for command-line switches and hidden utilities, was time w You could "nice" your jobs to higher priority, give yourself larger swap partiti large files, and sling mag tapes like Rambo's bandoliers. Your friends came t you as a techno-wizard. Little did you know then, however, that you were pu your cranium full of bits that were going to be useful only for a short time; 3 later, those bits would turn to obstructionary sludge, indirectly causing a rift son.

Fortunately, there's a reasonably effective gambit to use in the cell phone sa hand your new phone to your son and say, "I'll pay you \$25 to set this pho way you would use it." An hour later, he hands it back to you, and, apart fro fact that your quick dial list now identifies your son's listing as "Darling Son" new ring tone is some kind of revolting gurgling to a hip-hop beat, it's mone spent.

In some ways, we're doing much better at human-machine interfaces. When child, if you wanted to watch television, you had to understand horizontal ho vertical hold, fine tuning, and which way to orient the rabbit-ear antenna for particular station you wanted to watch. Since there were only three stations, wasn't as hard as it would be today. However, the aluminum foil kept falling rabbit ears, and, depending on where the TV viewers were sitting, the pictur phase in and out. When someone entered the room, it was common for view snap, "Sit down and don't move!" so the picture would stabilize.

Another example is the engine control of automobiles. In the 1960s, many cars had a choke control on the dashboard. To start the engine, you had to pull the choke out. As the engine warmed up, you pushed the choke back in to keep the engine from stalling.

I still wonder how many people had any real idea of what that control did, why it was necessary then, and for that matter why it's not necessary anymore. Hint: Your engine computer is your friend—except in the 1984 Jeep Cherokee I had, in which the engine computer's ground turned out to be intermittent. Computers object to that kind of treatment, and take their petty revenge by removing all vehicle propulsion at the most inopportune times.

I used to cite VCRs as examples of impossible user interfaces, but nobody uses them anymore. TiVo seems to have wiped them out—another example of adding complexity in the right place to make the user interface simpler. If my wristwatch had a lesson to learn from, say, the infrared port of my laptop, it might actually know the time. As it is, those have been random numbers for several years now, not a part of the Theory of Interface Quotas.

But where TiVo has fixed VCRs, digital cameras have taken up the slack in interface complexity. If all you want to do is point and shoot, these cameras do a good job—assuming you can figure out how to download the pictures and refill the flash memory. If you want to do more than that, though, you should first realize that you're in big trouble, and pray for guidance.

NO THINKING

Steve Krug has written a delightful book titled *Don't Make Me Think: A Common Sense Approach to Web Usability* (New Riders, 2000). In his winning writing, Krug addresses the topic of creating a great Web site from every angle: navigation, organization, fonts and sizes, graphics, icons, writing, colors, and speed at which the site loads.

Krug also relates an eerily familiar story. It seems that in *A Study in Scarlet*, Watson discovers that Sherlock Holmes doesn't know that the Earth goes around the sun. Holmes replies that the finite capacity of the human brain dictates that we must have "useless facts elbowing out the useful ones." Precisely, my dear Watson.

One of Krug's fundamental insights is that if visitors have to think about how to use a Web site, that site has already failed in some important ways. After all, they come to the site hoping for an interesting logic puzzle or an intellectual maze. If they come with something else in mind entirely, and any cognitive effort that the site requires will be a distraction or hindrance.

Using real Web sites, Krug offers numerous examples of good sites and bad sites. He also shows several years of evolution of Web sites such as Amazon's, to graphically illustrate the learnings such major Web presences have collected.

If Krug has his way, I won't have to get my son to navigate for me around the Web because the interfaces will have been engineered out of the way. Horizontal navigation bars will have been absorbed into the site's innards, leaving me free to enjoy the show without additional cranial strain.

Software safety expert Nancy Leveson says that when replacing old mechanical

system controls of, say, a chemical plant, the new computer-based controls : leverage what the plant operators already know (*Safeware*, Addison-Wesley, "Because humans often revert to stereotype, stereotypes should be followed design. This criterion includes making computer displays look similar to the displays they are replacing." Aircraft pilots expect throttles to be in a certain and to behave a certain way. When designing a fly-by-wire plane, it's a real idea not to put levers where the throttles used to be or to have them control something other than engine speed.

Charles Perrow's analysis of the accident at Three Mile Island indicates that confusion was a substantial part of the problem (*Normal Accidents*, Princeton 1999). Evidently, it was fairly common for some of the hundreds of valves at complex subsystems to be set wrong, despite locks and logs expressly aimed preventing such a misconfiguration of the reactor.

When the operators at TMI began a routine test on an accidentally misconfigured reactor, they unwittingly initiated a series of events that culminated in a near Chernobyl-style meltdown. At many junctures in a drama extending over several days, reactor operators misunderstood apparently conflicting pressure gauge made the problem worse. In effect, they had to infer the state of certain first aspects of the reactor, most importantly the level of the cooling water covering reactor core. Although it's not clear why, their interface to the system purpose: no direct measurements available.

Designing safe, effective human interfaces is difficult under the best of circumstances but it can be a matter of life or death in such large plant designs.

ME AND MY BROWSER

Here's what I want: Every electronic device and computer-based widget should communicate civilly with my computer. My computer can roam the Internet worldwide seeking whatever information is needed to tame, say, my watch or my amplifier. But when I interact with those devices, I want to be looking at my Windows interface.

To be clear: I make no claims that Windows is the best interface out there. I claim that Microsoft invented it. I don't care about those things. I only know I have learned that interface, and I know it's general enough that it can be used by great many other interfaces that I otherwise won't learn.

I don't want to fall off the techno-bandwagon just because I maxed out my imagination capacity in my reckless youth. I just want to sit at my computer and set my car to check my car's engine performance and service record, program my guitar to program the burglar alarm system, and monitor the heating system in my house from my browser window.

The observation that electronic devices are no longer independent stand-alone products led to my Theory of Required Internet-Derived Value. According to my theory, all electronic devices must connect to the Internet, and they must derive value from doing it, or they'll be supplanted by devices that can and do.

When I park my car in my garage at night, I want the engine computer to wirelessly talk to my PC, uploading the latest information on the car's status. Then I let my PC traversing the Internet, comparing my car's age, model, and performance

that of equivalent cars to get an early warning of any impending problems. The environmental quality inspector can use this same radio connection instead of to crawl under my dashboard to find the connector. Likewise, toll plazas could be negotiated directly by the car and the plaza, without requiring driver intervention.

When all devices can be routinely expected to talk to PCs and the Internet, then owners will be able to more readily maintain, repair, and program them. Do you have an impressive pile of remote control units littering your family room, as I do? My PC could tell me what electronics I have in the room, it should be able to fetch the infrared control codes from the Internet and then automatically program one universal remote control.

Make things simpler. When designing, reuse interfaces we already know. The savings you save may be your own.

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