

Human Factors 101: How About Just Trying Things Out?

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While I was staring at my iMAC screen pondering options for this month's column, one of my favorite images, a self-portrait by Norman Rockwell, came to mind. In the portrait, we see Rockwell from behind, scratching his head and staring at a canvas that is blank, except for a Saturday Evening Post banner across the top. A clock, a calendar, a pinned-up note with the deadline for his cover, and assorted crumpled-up sketches make it clear that the artist (Rockwell preferred to call himself an illustrator) has little time and no ideas.

In that mental state, I looked over at the iMAC mouse, a cute little thing that is an ergonomic nightmare. It's round, like a smallish and multicolored hockey puck, which means that it provides few tactual cues as to its orientation. It can-and does-end up rotated left or right in one's hand, the result of which is that the cursor moves in strange and unintended directions.

Why, I wondered, didn't Apple have three or four people try out its cute little iMAC mouse before manufacturing and unleashing a zillion or so? The problems with its design are not, after all, subtle and hard to notice: They become apparent within a few minutes of use. (Not long after the iMAC appeared on the market, a company called Macsense began doing a brisk business selling an "iCatch," an oblong-shaped cover that snaps over the iMAC mouse.)

The Susan B. Anthony dollar coin is another case in point. Before producing and distributing that coin, why didn't the U.S. Mint ask a half dozen people to see how readily they could discriminate them from quarters in a pocketful or handful of change? Perhaps there were good reasons not to create a large coin, but the British, after all, had demonstrated with the one-pound coin that a coin's thickness provides another basis for its being discriminated, tactually, from other coins.

Roberta Klatzky has argued that designers routinely fail to appreciate the importance of tactual cues and fail to take advantage of the remarkable sensory capabilities of the human hand. She has pointed out, for example, that it should be possible, using controls of different shapes, textures, positions, and movement characteristics, to design the radios, CD/tape players, and climate controls in our automobiles so that they could be operated with our eyes actually on the road. In short, it is probably possible to improve markedly the typical controls, which require that we look at them, not the road, in order to choose which of many similar buttons to push (perhaps while holding a latte or cell phone in our other hand).

But let me get back to the main question. The iMAC mouse and SBA dollar are far from the only cases in which having a few typical users simply tryout some product or procedure might have

avoided human-factors design errors. Figure 1, for example, shows a photo of a card key that is widely used in Marriott hotels. Note how the company producing the card key designed and positioned its logo in a way that makes the logo confusable with the arrow indicating how the card is to be inserted in the door. I can testify that it renders the user, at least in a dim hotel hallway, pretty much at chance in terms of which end of the card is inserted first.

Here are some other examples:

Forms. Why is it agencies and companies produce hundreds, thousands, or millions of forms on which the space provided for information of different types does not correspond to how much space it takes to print that information? In Figure 2, for example, I've also shown the top third of the form UCLA uses for removal of "I's" and other types of grade changes. I have filled it out with hypothetical, but realistic information. As illustrated, the amount of space for one's signature is excessive, even for the Mihaly Csikszentmihalyi's of this world, let alone for those of us with names of average length; whereas the space allocated for one's extension and email address is ludicrously inadequate. With the UCLA form – and the multitude of other paper and electronic forms that suffer analogous layout problems – wouldn't it have been a good idea to have a few people fill out the form before putting it into widespread use?

Typeface and contrast. Individuals responsible for designing visual information, such as restaurant menus, control panels, and other types of displays, seem to be motivated by considerations other than optimizing function. Working in (I presume) bright lighting, they are fond of combinations that are colorful, such as grey print on an orange background, but which reduce contrast. They are also fond of typefaces that are small and/or flowery, particularly in the design of restaurant menus. Maybe before such menus and displays are finalized and produced, a few typical users could be asked to try to read them under typical restaurant lighting conditions?

Manuals. A question for the writers of hardware and software manuals: Maybe you could find a few average users and watch them trying to solve a problem or achieve some goal using your manual? I don't really think that the creators of such manuals purposely try to create frustration and exasperation in the average user. Rather, I think that such manuals tend to be written by engineers and others who know so much about a given product that they cannot adopt the average user's perspective. The net effect, though, is the same.

It's entirely possible, of course, that- as an Ivory Tower type – simply don't understand the real-world pressures that force companies to design and produce products without even the most minimal of testing. I think, though, that the neglect of behavioral testing – of even the most minimal types – is symptomatic of a broader problem: an under-appreciation of empirical behavioral science coupled with an unwarranted faith in face validity and intuition.

The examples I provided illustrate ways in which simple testing could make significant improvements in a product. But it's not just the simple cases that need to be informed by human feedback and testing. In today's complex and rapidly changing era of human-machine

interaction, the pressures on companies to get products out quickly may result in even more frequent failures to carry out systematic, controlled human-factors testing. In my opinion, though, the absence of such testing, in addition to fostering ever more ergonomic nightmares, will also prove to be poor business. More and more, as I see it, the success of hardware and software will depend on the compatibility of human and product on how well the design of the product meshes with the cognitive and motor capabilities and limitations of the user.

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