# The Challenges of User-Centred Design

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## *People Aren't ~~Perfekt~~ Perfect*

While human-beings are amazing creatures, we have our limitations. In the field of design, one glaring limitation is our willingness to overlook them. We design and develop systems that assume the visual acuity of an eagle; memory of an elephant; navigation skills of a bat; stamina of a camel and the dexterity of a monkey (see Figure 1) [1].

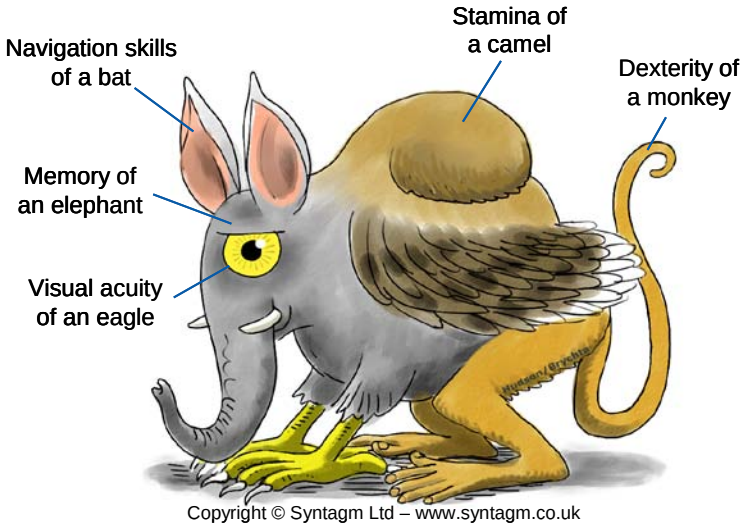


**Figure 1**

There are several reasons for this. The first is that, by default, designers and developers focus very intently on the problem at hand *in the abstract*. Issues that stem from human limitations or needs (such as leaving the office to eat or sleep) are peripheral to the solution being designed. However, to make matters worse, there are several human limitations relevant to interactive systems that are not very well known within the field of Human-Computer Interaction (HCI). These all stem from failings of visual perception and so are called 'blindnesses'; attentional blindness, change blindness and mud splash blindness.

Attentional blindness is well-known within the field of visual perception [2]. It is best illustrated through demonstration, but even a description of the problem is fairly dramatic. Perhaps the best-know example is a short video clip of two teams of students wearing either black or white T-shirts (depending on the team). The audience is told simply to count the number of times the teams pass a ball between them as they move about in a fairly distracting manner. About half way through the clip, someone dressed in a gorilla suit walks into the scene, beats their chest and then walks off. They are on screen altogether for about 5 seconds. At the end of the clip the audience is asked if they observed anything unusual. Only about half of the audience will have

noticed the gorilla. The other half of the audience was so intent on performing the task in hand that they were oblivious to this unexpected event.

Another surprising aspect of visual attention is our inability to see changes on a screen when a brief blanking field is present – the kind that separates virtually all web pages as the browser loads new content. The phenomenon is called change blindness [3]. Its effect is a little harder to predict than inattention blindness as some participants will notice the change straight away but others may give up after a minute or two.

The third perceptual issue is related to change blindness. Rather than a blanking field between screens, its contents are changed at the same time as simulated mud splashes – hence its name, mud-splash blindness. Participants find it almost impossible to say what has changed.

All three of these issues have important implications for design. Users who might be very distracted by their tasks risk not noticing important information (a gorilla!) on their screens. Changes to web pages may not be seen on reload because of change blindness. And finally, animations or popup boxes, similar to mud splashes in their effect, may mask other changes that occurred at the same time.

## *Designers Aren't Perfect*[1]

**Figure 2**

20 years on from Don Norman's *The Psychology of Everyday Things* [4] designers are still creating even simple technology with unhelpful user interfaces. The two examples shown here from a recent hotel stay made it difficult to know what temperature the water would be (contrary to what might be expected from the left-hand image in Figure 2, this is the cold setting). In the same hotel room, it is hard to

[1] This title could use any 'cute' but unhelpful design.

understand why a toilet would have two different flush controls when it is impossible to guess what they do.

The difficulties in these and many screen-based examples of poor design is that we still do not teach (or understand) visual language. We would understand it better if we worked more directly with the users of our creations, but that is still relatively rare. So, for every well-designed web site, desktop application or phone, there are hundreds that could be more self-explanatory and easier to use.


Figure 3

For example, the new Microsoft web site page for Intranet Explorer version 8 should be fairly straightforward (see Figure 3). But the visual language used suggests that selecting an operating system (A) will show appropriate system requirements (B). On the contrary, the two parts of the page are unrelated. Once the operating system is selected and the Go button pressed, the page is abandoned and replaced with a new one to perform a download.

## *UCD ≠ Usability ≠ Cool*

There is no shortage of design examples of this kind, but there is an even deeper problem. The pressures to engage and excite customers have created a fog of confusion around the concepts of user-centred design, usability and “coolness”.

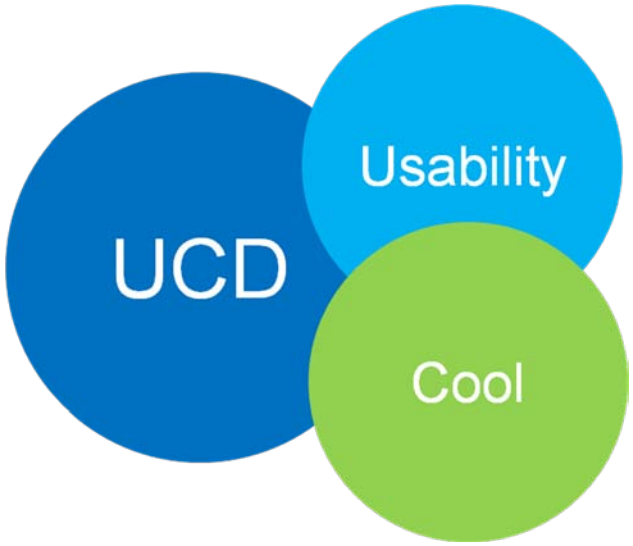


Figure 4

These three ideas are related, but as Figure 4 shows, not equivalent. User interfaces can be *usable* without being *useful* (as represented by the UCD circle) and they can be *cool* without being either. And regrettably, for customers and users, the current trend is towards coolness without substance. Microsoft Windows Vista, Office 2007 and Apple's iPhone are all examples of user interfaces that have been designed to be appealing, but in many cases are actually more difficult to use than their predecessors. (The iPhone requires that users have appropriate-sized fingers, for example. It does not recognize a stylus.)

Consider Figure 4, for example. This shows two views of the same toolbar from Microsoft PowerPoint 2007. The only difference is the window size. In smaller windows, the toolbar is compressed to fit. Cool, but very difficult for technical support departments who are trying to assist colleagues without seeing their screen. And, unlike all previous versions of Microsoft Office applications, the 'ribbon' as this interface is called, completely replaces the menus.

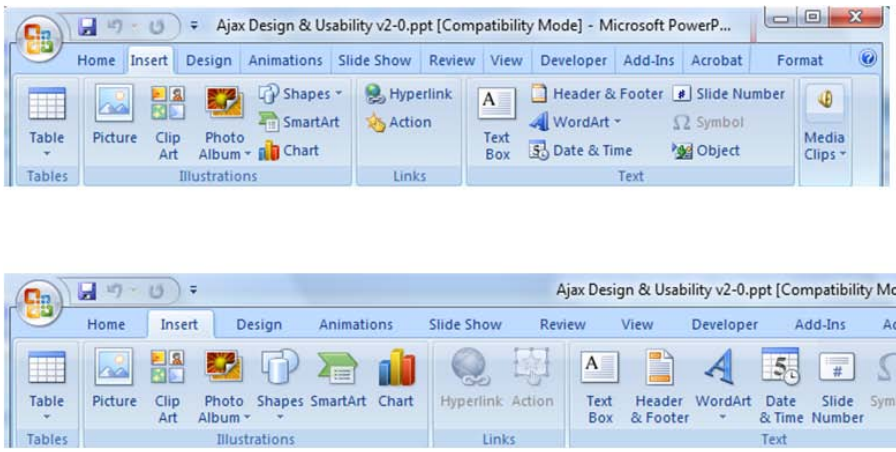


Figure 4

An additional challenge has been introduced for Windows Vista. The title bars are translucent, which although attractive to some, makes it difficult to see where the title

bar ends and the next window begins. Since users must drag the title bar to move windows on the screen, they sometimes end up clicking in the wrong window. It is hard to imagine what user need has been addressed by these and many other changes on the path to coolness. Yet, at the same time, truly helpful features are overlooked. As a case in point (and through no fault of Microsoft), it is not possible to buy a flight and a hotel package from a travel web site if you would like a hotel that is not near an airport. So, booking a flight and overnight stay in Heidelberg (Germany) is impossible in a single transaction since there is no airport in Heidelberg. It is left to the customer to find an appropriate airport, means of transport and hotel.

## *Why is there not more UCD?*

Apart from the drive for coolness, what is holding user-centred design back? One of the most common reasons was expressed perfectly by Jack Warner of the Hollywood studio bearing his name:

"I don't want it good, I want it Tuesday."

UCD and usability are thought of as either optional (when thought of at all) or enhancements that can be added later. A further complication with usability is that it is actually very limited in its scope. If a travel web site does not offer the means of booking a hotel away from an airport, then that missing functionality will not be usability-tested by definition. It is a very brave usability specialist that tells their customer or employer that they have built the wrong system.

Many of these shortcomings stem from an unwillingness to conduct early user research and the continuing trend of hiding systems builders away in back rooms. The 'back room' approach is fine in large companies with well-established processes for user-research and communicating user needs in detail to system builders. But given that the majority of interactive systems are built in small companies with small teams having little or no understanding of user-centred design, such a pronounced separation of technologists from their users is extremely counter-productive.

In organizations that do employ usability professionals, their efforts are often misdirected for two reasons. The first is that many commercial organisations are reluctant to allow anyone other than sales staff to have direct contact with customers. The second is that where bespoke usability facilities exist (such as an expensive lab with video cameras and observation rooms), there is enormous pressure to make good use of them, at the expense of the design process itself. In this latter case, success is often measured as a fully-booked usability lab, even if the work that is booked – user research, for example – should be conducted in the field [5].

## *Empathetic Design*

Before we look at solutions to some of these challenges, there is one further problem area to explore. Like the visual perception issues discussed earlier, it is inherent in the human condition: the people who are best at creating technology are often the worst at understanding how and why other people find it difficult to use. The evidence for this comes from a different branch of psychology, investigating the causes of autism and Asperger's syndrome (AS). Simon Baron-Cohen and his colleagues at Autism Research Centre have developed a model they use to explain the differences in behaviour between men and women, called empathizing-systemizing theory. A

related theory, known as the ‘extreme male brain’ characterizes the more extreme differences between the normal population and suffers of autism and AS.

Empathizers are interested in people and social interaction while systemisers are more focussed on the physical world and causality. On average, men score higher than women on systemizing while women score higher than men on empathizing. Not surprisingly, a large study of empathizing and systemizing within the IT field (441 participants) showed systemizing scores for men and women that were both substantially higher than the average population [6]. However, men whose job roles were predominantly technical had significantly lower empathizing skills, as illustrated in Figure 5. (The few women who stated that their job roles were primarily technical also showed this effect, but it was less significant.)

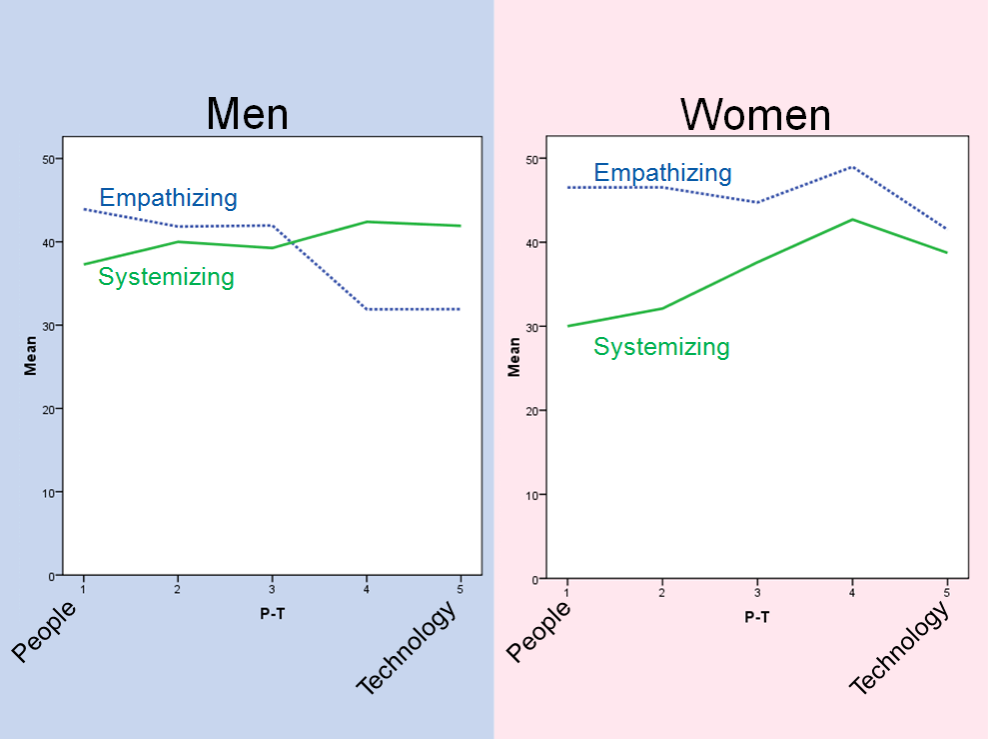


Figure 5

This issue of reduced empathy in science and technology fields will not come as news to many people. Some industries – automotive and retail design in particular – already have their own solutions in the form of empathy-assistive technology, illustrated in Figure 6. The man in blue is from Loughborough University and is modelling a ‘third age suit’ intended to make young, male car designers appreciate what it is like to have the limitations that come with old age. The woman in red is wearing the ‘age explorer’ developed by Meyer-Hentschel for a similar purpose in supermarkets, department stores and other potentially challenging environments. Ideally, we would like something similar for interactive technology [1].


Figure 6

Ideally, we would have equivalent technology for interactive systems that would allow designers and developers to empathize with users. They would do this by showing how a web page looked to a 60-year-old (that is the purpose of the yellowed goggles and helmet visor in Figure 6) or simulate how difficult it is to select a menu when you have trouble moving the mouse in a straight line.

A big part of selling empathetic design, though, will be persuading people that it is necessary. Happily, this is where the gorilla returns. Many of the audience in the visual perception demonstrations mentioned earlier are truly stunned by what they have learned of the human condition. The same revelations occur almost every time a developer watches one participant after another fail at the same point in a task during a usability evaluation. Many technologists may not be naturally empathetic, but the difficulties that users face are not beyond their understanding.

So, humans have shortcomings not only as users, but also as designers and developers (and possibly managers, executives, entrepreneurs and other roles in which systemizing skills are valued). To overcome them – to design useful and usable systems – we must recognize those limitations and take steps to compensate for them. In user-centred design in particular, it further emphases the need for multidisciplinary design, field research of users and collaborative design techniques such as card sorting or affinity diagramming.

But for everyone concerned with creating technological solutions, it means a much greater emphasis on understanding people and seeing problems through their eyes. To do that means involving more empathisers in the design process as well as persuading more technologists of the need for empathetic design.

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