

# Designing to be used

## novel interfaces for transformative technology at aQtive

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### ABSTRACT

aQtive is a start-up company, founded by long-standing researchers in HCI and AI and aimed at bridging the gulf between the Internet and users' day-to-day work and life. We are driven by the vision of PopuNet, the pervasive, permanent connectivity of ordinary people. Designing interfaces to novel products in no standard category, with no clear interface parallels and with short time-to-market; we find standard HCI design paradigms impractical. Our solution is a combination of forensic analysis, theoretically driven design and focused test users. Furthermore, the integrated Internet market demands we design products that are not just usable, but will be used.

### Keywords

Internet, PopuNet, community networking, intelligent interfaces, appropriate intelligence

### INTRODUCTION – USABILITY IN TIME

aQtive was founded in 1998 by the authors. Russell and Alan are well known in the CHI community for their textbook on HCI [3] and Andy is also a CHI author [5]. Naturally, effective interface design is an essential part of aQtive's mission!

Less than 9 months after start-up, aQtive's first product was launched in the UK – onCue, a mass-market desktop–Internet integration product. Even though the company had by that time grown to 8 full time employees, the task of producing a robust, commercially releasable product in such a timescale was daunting.

So, what happened to the interface? Iterative design with extensive usability testing? However much we might have liked to, this was sadly impractical. Indeed, this will be the same story told by interface design teams across the world.

If we were designing forms-based interfaces to airline booking systems, this would not be too great a problem – a combination of existing example systems and standard guidelines would yield pretty good systems. However, many aspects of our products involve non-standard interface issues, die-stamped interfaces will not do.

Happily, there is extensive evidence that relatively simple evaluation methods can catch the vast majority of usability problems (e.g. [4]). Although we do plan formal usability

testing in conjunction with academic partners, three factors have given us confidence in our interface design.

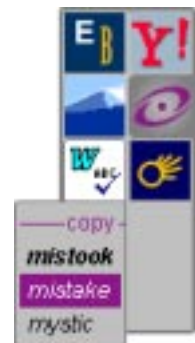
The first, a key part of our usability testing, has been a small number of 'typical' test users. These range in educational background from those with little post-16 education to PhDs and include an antique dealer, an IT executive, a technophobe homemaker and a dog breeder. Some of these we have observed face-to-face, but often feedback has been via telephone. The most useful feature of such test users is for them to be intolerant – not accepting 'that's the way it is', but telling us when things don't go right. In fact, the best lesson for any HCI course is the importance of intolerance.

The second is a forensic analysis of errors and design alternatives – not only discovering what is right and wrong, but understanding why; digging deep into the human and technical issues surrounding each decision. Without this, iterative design is a random walk through design space.

The third factor is theory-driven design, which we'll look at in more detail using onCue as an example.

### ONCUE

Although hard to categorise, the easiest way to think of onCue is as an intelligent toolbar agent that watches what you are doing (by monitoring the clipboard) and then offering potential Internet and desktop services depending on what kind of data you have selected. If you copy a name to the clipboard it offers various on-line directory services, if you copy a table of numbers it suggest drawing graphs or adding the numbers up.



onCue poses many design challenges: ■ how to present the results of asynchronous activity unobtrusively, but salient when required; ■ how to let the user feel that Internet services are 'part of their world', not 'other' ■ how to design interactions that work cross-platform, but also meet users' expectations about each specific platform. Although there are other systems that have faced similar challenges, this is not textbook design (and we should know!).

## APPROPRIATE INTELLIGENCE

Intelligent interfaces have often had a bad name. We believe this is partly through an overestimation of the power and accuracy of AI techniques. The most effective use of intelligence is typically low key and does not adversely affect the user when it is wrong (because it will often be!). We call such a use *appropriate intelligence*.

One example of this is the Microsoft Excel ' $\Sigma$ ' button. When you press this, Excel 'guesses' what cells you may want to add up using simple heuristics. If it gets it right it is useful and quick. If it gets it wrong you just continue to select the range you require and the 'guessed' selection is automatically cancelled. Examples that don't embody this principle are common, including excessive auto-formatting and help systems that pop up and demand attention.

This principle has driven many aspects of onCue's design. Suggestions are based on relatively simple heuristics, which are often useful, but which are not too resource intensive. The toolbar changes by slowly fading buttons in and out, thus causing no distracting flicker in peripheral vision. The onCue window floats so that it is salient when required, but does not grab focus and interrupt work.

## THEORETICAL UNDERPINNINGS

Central to the architectural design of onCue has been status–event analysis [1,2,6]. Within digital systems, phenomena occur in discrete events. However, in the real world and in the user's perception of the interface many phenomena have persistence over time: a mouse always has some location, the air always has some temperature. These are status phenomena and it has previously been argued that interface design and specification should include an understanding of both types of phenomena. Further, many contextual and environmental phenomena are status and as context-sensitive applications become the norm, effective treatment of status becomes an essential, not just desirable aspect of design and implementation.

onCue is just such an application. Not only are status–event issues central to its interface role, but the underlying implementation architecture, aQtiveSpace, has been designed as a computational embodiment of status–event analysis. Implementation architectures have a habit of 'leaking' their fundamental assumptions into the interface, so we deliberately match architecture with interface style.

## POPUNET

It is clear that the Internet is changing society, and also changing itself. There are three trends that we believe will change the role and transformative nature of the Internet:

*everywhere* – pervasive connectivity at home through set-top boxes, on the move in PDAs, in public places;

*everyone* – popular use of the net at first within particular groups and increasingly across society as a whole;

*everywhen* – permanent connectivity, no dialling up!

Of the three, the last everywhen is most transformative, we do not 'connect' to the Internet, but simply are connected. aQtive aims to design products that work within current technology, but which are ready for this coming *PopuNet*.

## DESIGNING TO BE USED

For a product to be used, we need four things:

- (a) it must be *useful* (functional, decorative, trendy etc.)
- (b) it must be *usable* (easy-to-use, fun, challenging, etc.)
- (c) it must be *seen to be useful* (appeal)
- (d) it must be *seen*

The first two capture usability, but, (c) and (d) are essential if a product is to be used. No matter how useful and usable a product is, if it is not used it affects no one, improves no lives and is a failure.

Often technology-driven design ignores (a) and (b) hoping that advertising and marketing will save it with (c) and (d). Traditional IT design has tended to focus on (a) – get the functionality right – and only late in design take onboard usability (b). In HCI, we are well aware of the importance of both (a) and (b), but may still regard (c) and (d) as the province of advertising and marketing.

In the Internet we see a unifying of the medium of use, the medium of distribution and the medium of marketing – it is no longer appropriate to separate out the factors of usability (a&b) and use (c&d). At aQtive, we are taking all four factors into account in the design of our products, establishing a detailed analysis of the Internet community and Internet market so that our products are not only useful, but also be accessible and will be used – by design.

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