# Internet Usability and Accessibility

Designing for the optimal customer experience

**BT**exact
TECHNOLOGIES

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## Introduction

The Internet has proved to be a truly disruptive technology, changing the 'landscape' as it spreads across our planet. The way we communicate, conduct business and more lately entertain ourselves has changed forever. An indicator of this change is the way some of our habits have altered. The talk around the office coffee machine is now more likely to be about the latest cool web-site than the TV soap and gone are the days of planning a holiday months in advance; everything we need is 'on the web'.

Although these comments may be true for a large and growing proportion of the UK population, they are certainly not true for all.

For many people there is still a fear of the Internet; what is it, what do these strange terms mean, how do I access it? Those of us who have been involved with computers and networks for many years have made the transition to the Internet without too much thought, in fact for those who have used it since its early days we find it far easier to use today than ever before. However for those for who are not familiar with computers, the constant bombardment with Internet addresses at every turn can be both irritating and intimidating.

The goal of those involved in the industry should be to make Internet services something that anyone can use easily and intuitively and, by doing this, take away the fear.

At BT we have developed a methodology for the design of Internet and web-based services, which attempts to address these issues. Essentially we put the user at the centre of our design and development process, considering usability and accessibility across the entire user experience, from initial service information through registration and service delivery to ongoing use and support.

To do this we have fully integrated our 'customer experience' teams, comprising social anthropologists, psychologists and ergonomists with our Internet engineering teams. They literally sit in the middle of the Internet engineering.

Our customer experience team lead on all aspects of usability, bringing their social science skills to bear whenever we are designing or re-designing Internet services.

Our methodology is based on four drivers:

- Understanding the business client's vision for a service
- Viewing any Internet service from the perspective of the end user
- Involving end users and clients in the design process
- Considering the whole customer experience, end to end

Our goal is to produce Internet services that are:

- Intuitive
- Quick
- Productive
- Interesting
- Informative
- Secure

## Understanding the client's vision for a service

Our user centred approach starts with the initial capturing of client and user requirements; here we have developed a faster and more efficient process.

At this initial stage there are essentially two 'users' to consider, the business client for the service and the end user of the service.  It is essential to capture precisely the client's thoughts, ideas and vision for the service. Traditionally this was carried out by 'requirements capture specialists', who would listen to the client and then document what they heard in engineering terms, so that this could be passed to development teams. This was essentially an iterative process, as the requirements documentation was checked by the client and changed as necessary to more closely represent their concept or idea, but its essential weaknesses were twofold:

- The client team and engineering team spoke 'different languages' and often the client ideas were not fully understood by engineering.
- The engineering language used in the documentation was fine for the development team but was often not fully understood by the client.

This led to initial prototypes being different from the client's visualisation of their service and re-work was inevitable.

In the development of Internet services there is no room for re-work, either in terms of cost or time to market, therefore a better way of capturing these initial requirements was required. It was also essential to use a group who could 'speak' the language of business clients, end users and engineers. This is where our customer experience team excels; with their multidisciplinary structure they are able to 'translate' between the different groups.

With the arrival of software applications that allow the creation of detailed 'simulations', we were able to introduce a new element into the requirements capture process. When a client presents us with an idea for a service we are able, using these new tools, to model the Internet service for the client in a matter of hours / days. They are able to try it and see if it matches their visualisation. We can also add scenarios to the simulation so that the client can see it in a ' real life situation' and we can also test the simulation, at this very early stage, with end users.

We also utilise facilitated client discussions and user focus groups to feed into our design process. The output of this stage is an agreed initial design for the service, which can then be engineered.

A full diagram of our process known as Scenario Based User Needs Analysis (SUNA) is shown in Figure 1.
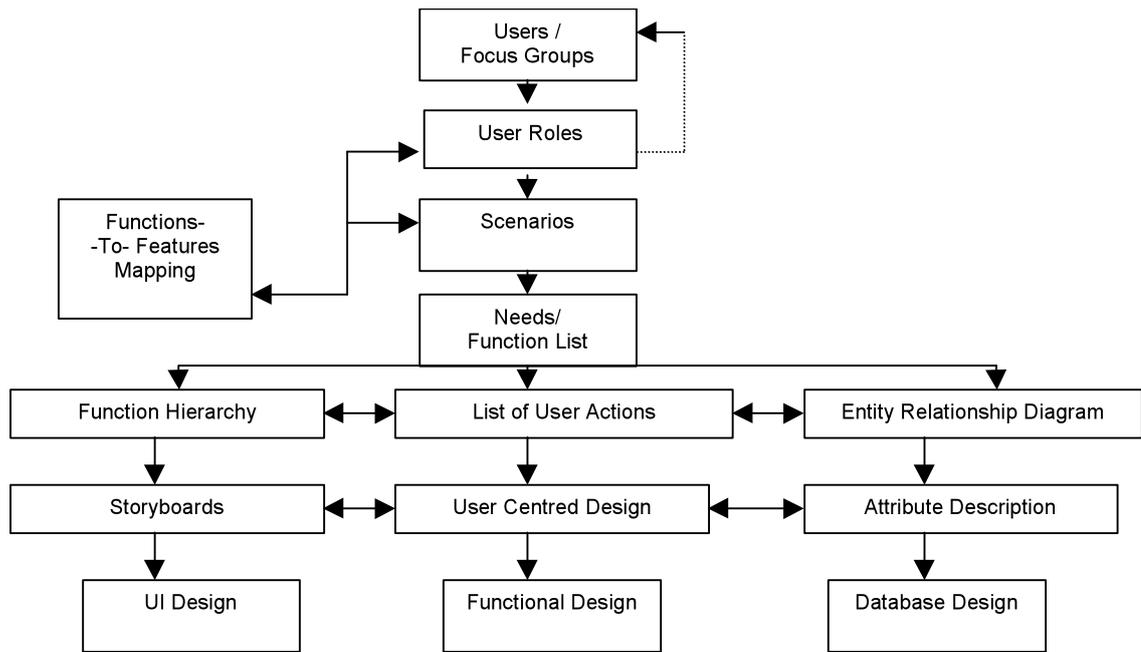
**Figure 1: Scenario - Based User Needs Analysis**

It is important to understand that this method works because these simulations are not 'smoke and mirrors' demonstrations.   They are early prototypes, which will appear to function as the final service and have been produced by a team who understand Internet technology and its limitations. This approach has been used by our teams in all areas of Internet service design and in areas of complexity or uncertainty, such as the creation of user interface designs for wireless enabled mobile Internet devices, we have found this to be particularly successful.

An example of a simulation is pictured in Figure 2.



**Figure 2: Simulation of a mobile Internet enabled PDA**

*Viewing any Internet service from the perspective of the end user*

**Thinking about how people think**

Designing Internet services with high usability and accessibility requires that we understand how our end users view the world and more importantly how these views affect their behaviour. This is best explained by an example.

When a phone rings, we instinctively know that if we pick it up the ringing will stop and that if we place the handset to our ear we will almost certainly receive some communication associated with why the phone was ringing. Also, if we speak into the microphone we will be able to communicate a response to the caller.

When we use the telephone we do not consciously consider any of these things as they are in effect intuitive and are based on experiences that we have learnt and modified over a long period of time. Our reactions are triggered by both auditory and visual cues.
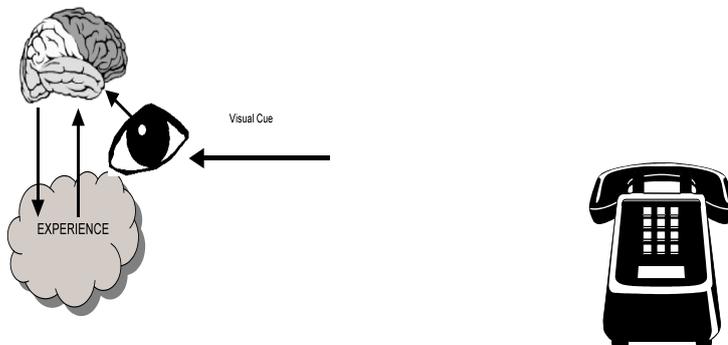


**Figure 3: Thinking about how people think**

If we use this knowledge of how our users react to the world when designing Internet services, then we should be trying to provide visual and perhaps auditory cues, which would then call upon users' experiences and allow them to use an interface in an intuitive way. Interaction with services designed in this way will feel natural and, at best, actually pleasant. In an ideal situation our users should not need any knowledge of the technology when using a new service; its use should be obvious.

Generally this link between actions and visual cues is known as 'affordance'.

**A method for checking affordance – 'Greeking'**

This methodology enables a diagnosis of whether the design of an interface is intuitive. Text on a web page or interface is replaced by 'Greek' (or more accurately, 'dog latin', e.g *ipso lorem*) and users are asked what they understand about aspects of the interface. This is typically used as part of an iterative design process. Once early structures for the interface have been determined, a set of different layout options can be greeked and given to users for feedback. This is a way of tapping into the fundamental affordances of an interface before content is laid on top.

**Understanding the User**

When designing services we should attempt to answer the following questions:

• Who is the user?
• Why is this person coming to our service?
• What are their expectations?
• What are their goals?
• Where have they come from and where will they go to next?

Additionally:

• Have we taken account of special considerations such as their age and gender and the conditions under which they will use the product or service?
• What do we know about their experience or inexperience of the Internet?

**A Qualitative Approach**

Our customer experience team employs mainly qualitative methods, because these have consistently produced the richest and most accurate data. Quantitative studies can be very valuable in early analysis to get an initial understanding of a user population. This approach is especially useful where the segmentation of the user group is not known and it assists with later sampling to ensure the most appropriate population is used to acquire test participants. The greatest risks with such broad quantitative surveys arise when they are used to inform the design stage of a novel technology product or service. Individuals answering surveys have a strong tendency to generalise their views to what they believe will fit with their perception of the wider population.

This phenomenon is one that the majority of usability practitioners are familiar with and is the major reason for BT adopting qualitative and especially observational techniques. Quite simply, people are the worst predictors of their own behaviour and cannot be relied upon in a survey to give responses that can be used to make design decisions.

This also applies to an extent to some focus groups, where as well as the known risks of polarisation and 'group think', there is a strong tendency for participants in such groups to come up with feature-rich wish-lists. These have little foundation in how they actually run their lives, or what they really need. Whilst an experienced facilitator can control polarisation and group-think, the wish-list phenomenon is more difficult to control.

This of course is not to say that focus groups are without worth, but they must be used at the right time, in the right way and for the right reasons. In BT we tend to use 'experi-groups'; a hybrid of focus groups and user trials, as these have been shown to be more predictive than focus group alone.

**Accessibility**

It is important that web pages can be used by both consumer and business 'text to speech' screen readers to support users with impaired vision. Designing for the elderly or arthritic by providing web links with a large 'click area' for 'wobbly' mice also provides enormous benefit for these users. Other considerations, such as making a site compatible with keyboard shortcuts, using high contrast and legible fonts and conducting inclusive usability testing will all aid accessibility.

A problem often overlooked in web design is the design of interfaces for colour-blind users. Approximately one in twelve males are colour-blind and BT has produced colour conversion charts so that web designers can address this, ensuring that sites can be used by all.

The relevant accessibility standards are:

- US Government Section 508 standard
- Bobby AAA standards
- W3C International guidance
- UK Government website guidelines

(see *References* for detail)

## *Involving end users and clients in the design process*

### A different approach

User Centred Design and traditional software engineering take very different approaches to computer system design. Traditionally software developers have treated each phase of the software design life cycle as an independent part of software development, which must be completely satisfied before moving on to the next phase. This is often referred to as the 'classic life cycle', 'waterfall' or 'linear sequential' model, as illustrated in Figure 4.
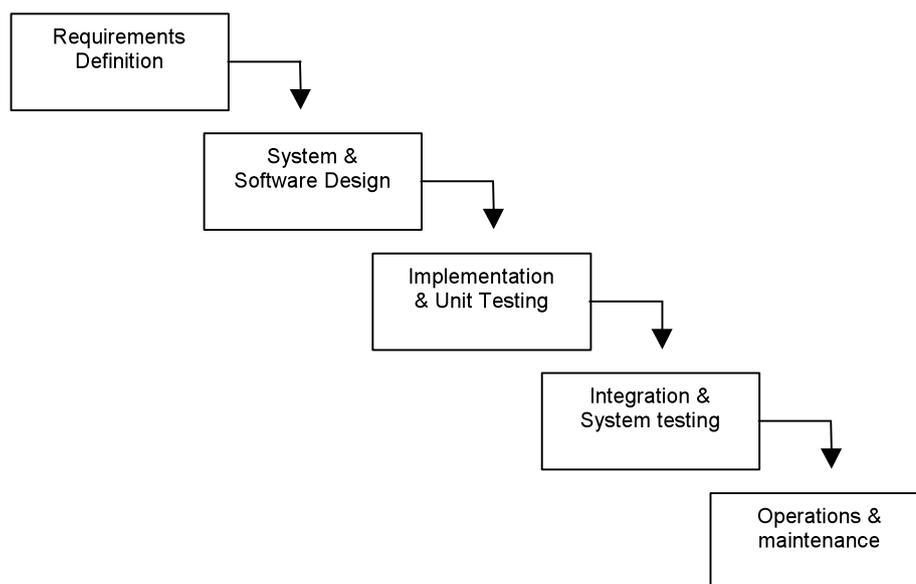
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┌──────────────┐
│ Requirements │
│ Definition   │
└──────────────┘
        ┌──────────────┐
        │ System &     │
        │ Software Design│
        └──────────────┘
                ┌──────────────┐
                │ Implementation│
                │ & Unit Testing│
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                        │ Integration &│
                        │ System testing│
                        └──────────────┘
                                ┌──────────────┐
                                │ Operations & │
                                │ maintenance  │
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**Figure 4: The Classic Design Life Cycle**

The essential difference between the "classic life cycle" and user centred design is that the design and development is based on the premise that users should be involved in all stages throughout the design life cycle. This is a highly iterative process which allows designers to use prototypes to gather user feedback and to make design improvements rapidly.
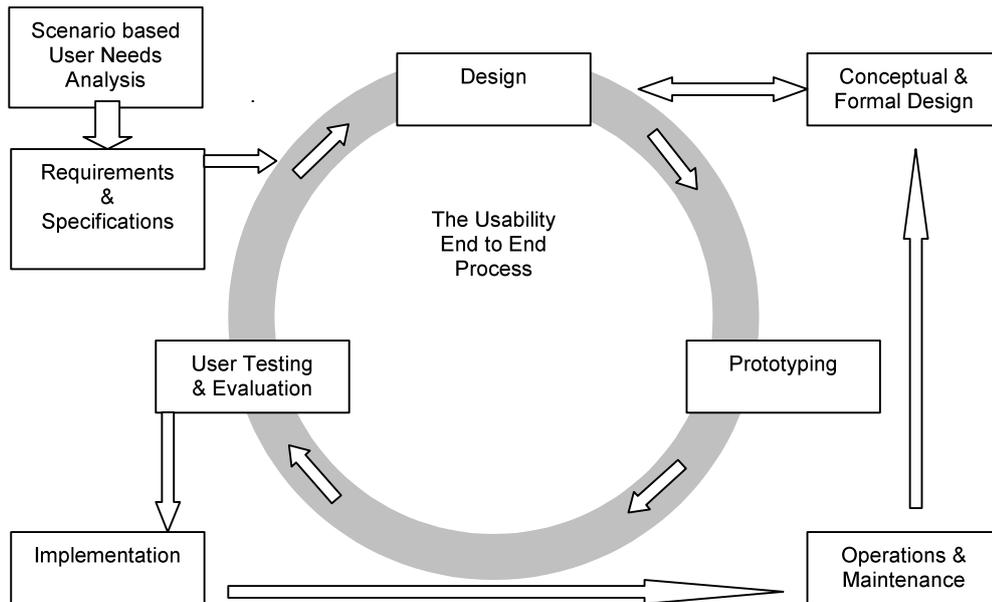
**Figure 5: The Internet Service Development Process**

Combining the scenario based user needs analysis (SUNA) requirements capture process, mentioned previously, with our user centred design and development system provides a core for our overall development process, as shown in Figure 5.

Following the implementation phase the Internet service moves into our 'operations and maintenance' (O&M) system where day to day support is provided if necessary. Feedback gathered during this time is relayed back into the overall design process so that any issues raised 'in the field' can be rectified in subsequent releases.

We have found that in the early stages of the O&M phase there is great value in observing users in their own environment using new services. We use a technique known as 'video diaries'.

**Video Diaries**

These are a blend of contextual enquiry and ethnographic method often known as 'hanging out'.

The process involves the usability researcher spending time in the environment of the participant and recording significant events as they arise. It has been found to be particularly useful in the identification of user/technology issues that take more than a few hours to discover.

BT researchers have been known to camp in participants' back gardens during this procedure (with their permission of course!). The footage from such video diaries is extremely powerful and has been known to convince even the most hardened cynic of the value of using user centred design.

As part of this process it is essential that the team 'watch' the initial use of the service by the user, as they discover its functions.

**Unwrapping or 'out of the box' testing**

This is a technique founded on the principles of contextual enquiry. One of the most critical periods in a user's experience is their very first usage of a product or service. However, capturing that moment is usually only done retrospectively and often at a time when users may have a declining memory of the event if it was more than a few days before.

Unwrapping trials often involve the recruitment of users at the point of purchase. Researchers then accompany them home to observe their first usage of the product or service, covering issues such as packaging, user guide effectiveness and installation through to first usage. Surprisingly, the majority of users are only too happy for this intrusion.

For the usability professional, it is an invaluable opportunity to observe users first hand with a product in their 'own' environment. This not only makes users more relaxed, it also highlights environmental issues that are not found when using a formal usability testing suite.

## *Considering the whole customer experience, end to end*

Recent BT consumer research has shown the close relationship between customer satisfaction and intent to re-purchase. It also indicates the link to 'willingness to recommend to others'. This demonstrates the need to either delight our customers or at least to exceed their expectations, something which can only be achieved if the whole service experience is considered.

The essential elements of this Internet experience are:

- Service discovery
- Registration
- Service initialisation / installation
- Support
- Upgrades

**Table 1. The Relationship between Customer Satisfaction and Purchasing.**

(BT consumer research, 2001)

| | Customer Perception | Intent to Re-Purchase | Willing to Recommend |
|---|---|---|---|
| A | Exceeded my expectations – I am delighted | 90% | 96% |
| B | Expectations exceeded – I am pleased | 56% | 71% |
| C | Neutral – I am satisfied | 12% | 19% |
| D | Failed to meet my expectations – I am unhappy | 3% | 10% |
| E | Failed to meet my expectations & a very poor experience – I am outraged | 7% | 7% |

Although many businesses now understand the importance of offering a complete 'customer experience', there are still some who believe that putting the customer at the centre of design is 'pandering' to customer desires at a cost which delivers little or no return. For those who

have such doubts, Table 1 is clear evidence of the massive impact customer satisfaction can have on revenues. It shows that there is a strong correlation between attitudes and behaviours. Customers who are dissatisfied do not just passively feel annoyed or grumble, they vote with their feet.

It is only by focusing totally on customers and their needs that businesses can even begin to achieve the 'Holy Grail' of a delighted Internet service customer. All of this is possible, but only with the right teams, the right approach and the right attitude in service design and development.

## References

**Affordance** – see JJ Gibson

**Bobby AAA Standards** (1999), WAI Content Accessibility Guidelines.
(www.w3.org/TR/WAI/WEBCONTENT)

**Designing for the colour blind** (www.btexact.com/ideas/whitepapers?doc=42266)

**JJ Gibson** (1979), The Ecological Approach to Visual Perception.

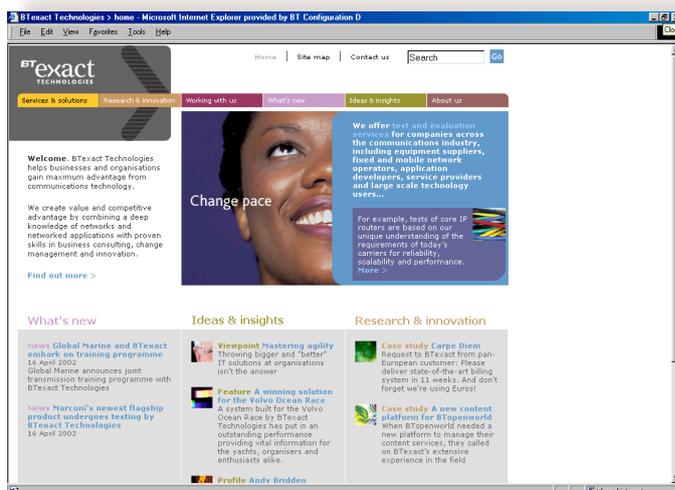**UK Government website guidelines,** via office of the e-envoy (www.e-envoy.gov.uk/)

**US Government Section 508 standard**, (1998), Opening doors to IT. (www.section508.gov)

**W3C International guidance** (www.w3.org)

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