

# **“FLASH, SPLASH & CRASH”: HUMAN FACTORS AND THE IMPLEMENTATION OF INNOVATIVE WEB TECHNOLOGIES**

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This paper is based upon the results of a heuristic evaluation of early design concepts for a new Royal Mail Web site. The design concepts consisted of static page mock-ups incorporating innovative Web technologies as implemented in existing Web sites. The acceptability of these design features in light of the particular constraints imposed by the Web is discussed. It is argued that reliance on innovative technologies is likely to exclude a proportion of potential customers. The paper concludes that Web designers should strive for simplicity rather than innovation, thereby making their sites accessible to the widest possible audience while still fostering positive customer perceptions.

## **Introduction**

The World Wide Web ('Web') is increasingly regarded by corporations as an important point of contact with customers, as well as a potentially valuable sales channel. Royal Mail has had a presence on the Web since 1995, providing customers with information about its range of products and services. This original site was seen as outdated, however, and new designs incorporating innovative Web technologies were being considered.

The principal business objectives of the new site were:

- To allow customers to learn about and purchase Royal Mail products and services.
- To exploit the opportunities of the Web and provide new ways for customers around the world to interact with Royal Mail.
- To foster positive customer perceptions about Royal Mail.

Human factors involvement was sought to evaluate the design concepts for the new Royal Mail site. The principal objective of the evaluation was to assess the 'acceptability' of the innovative technologies against established usability principles and design guidelines.

## **Design Concepts**

The concepts proposed by the design team consisted of a series of static, non-functional page mock-ups illustrating the proposed 'look and feel' of the site (see Figure 1 below for an example). These designs were based upon the use of innovative Web technologies already implemented in a sample of existing Web sites.

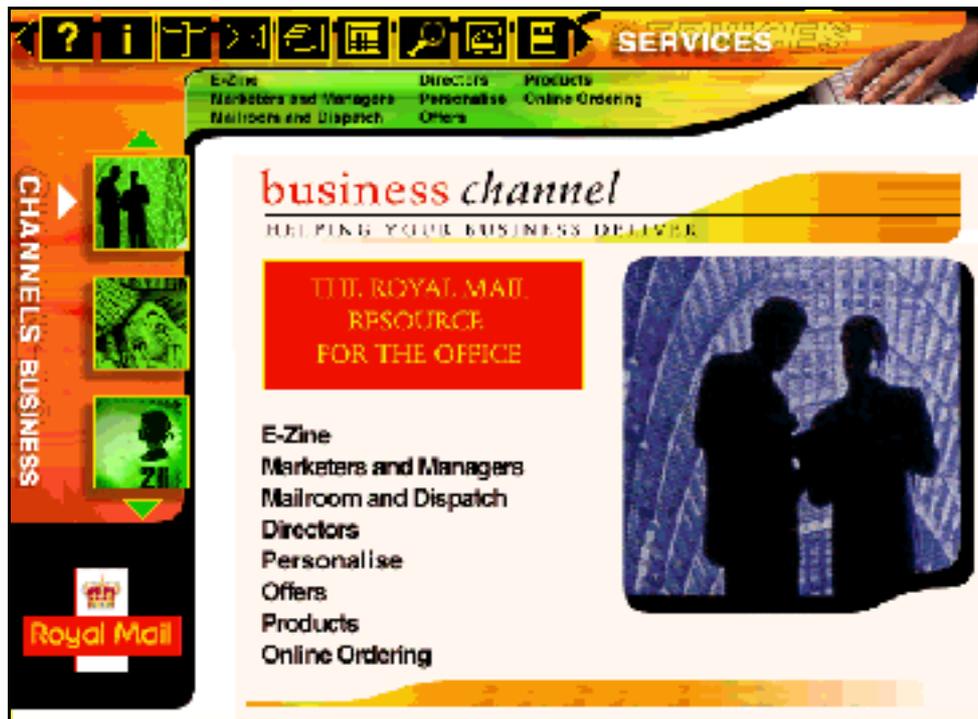


Figure 1. Mock-up of Web page for new Royal Mail site

The key features of the design concepts included:

- The display of an animated 'Splash' screen welcoming visitors to the site but providing no content in its own right (somewhat like a book cover).
- The use of horizontal 'Channels' and vertical 'Services' toolbar structures to support navigation around the site.
- The use of the 'Flash' plug-in extending the functionality of the Web browser by supporting the use of animated graphics, including 'mouse-over' animations and text fields, within the site.
- The use of 'frames', or separate page areas, housing distinct content and navigation functions.
- The display of page content in additional fixed width 'pop-up' Web browser windows.

A heuristic evaluation of existing sites was performed to assess the potential impact of these design features on the usability of the proposed Royal Mail site.

## Usability

The usability of each of a sample of existing Web sites was evaluated with particular regard to the implementation of the key design features described above. Issues were classified as either enhancing [key: 3], or reducing [5] the usability of each site. A sample of the issues identified for each design feature are listed in Table 1. below.

| Feature            | ✓   | ✗   |
|--------------------|---|---|
| Splash screen      | <ul style="list-style-type: none"> <li>- Effective communication of site content</li> <li>- Aesthetic appeal</li> </ul>   | <ul style="list-style-type: none"> <li>- Slower access to site content (redundant navigational step)</li> </ul>   |
| Toolbar structures | <ul style="list-style-type: none"> <li>- Saliency of navigation controls (intuitive location)</li> </ul>  | <ul style="list-style-type: none"> <li>- Poor link identification (labels) and differentiation (icons)</li> <li>- Lack of 'selection' and 'this page' feedback</li> </ul>                             |
| Frames             | <ul style="list-style-type: none"> <li>- Accessibility of navigation controls (can't be scrolled off page)</li> <li>- Consistency of page layouts</li> </ul>  | <ul style="list-style-type: none"> <li>- Increased navigational complexity</li> <li>- Present problems for bookmarking and printing of pages</li> <li>- Slower page download and rendering</li> </ul> |
| Flash animations   | <ul style="list-style-type: none"> <li>- Differentiation of links</li> <li>- Detailed description of links</li> <li>- Relatively fast download ('vector-based' graphics)</li> <li>- Aesthetic appeal</li> </ul> | <ul style="list-style-type: none"> <li>- Dynamic animations distracting</li> <li>- Critical information 'hidden' (i.e. only available on mouse-over)</li> </ul>                                       |
| Pop-up windows     | <ul style="list-style-type: none"> <li>- Entire page visible without scrolling</li> <li>- Continued display of 'parent' page</li> </ul>   | <ul style="list-style-type: none"> <li>- Loss of browser toolbar controls</li> <li>- Confusing (e.g. when original browser window obscured)</li> </ul>  |

Table 1. Usability issues identified during heuristic evaluation of sample Web sites [key: 3 = enhanced usability; 5 = reduced usability]

The implementation of each design feature had a dramatic impact upon the usability of the sample sites. The results of the heuristic evaluation were therefore used to inform a list of recommendations intended to guide designers in successfully implementing these features in the Royal Mail site.

The usability of the design features was also likely to depend upon the specific context of use. Users with relatively little Web experience, for example, were more likely to be confused by pop-up browser windows and mouse-over animation. Indeed, whatever their potential usability benefits, it was suggested that reliance on innovative Web technologies risked excluding a proportion of the potential user population.

## Accessibility

The major constraint of Web design is the variability of the potential task context and hence the difficulty in specifying user requirements. It is often impossible to predict *who* will visit a site, *why* they will go, and *how* they will get there (not to mention *what* they will do once there).

The Royal Mail site was intended to be accessible to the widest possible audience, whatever their user characteristics (e.g. philatelists vs. Royal Mail employees), task requirements (e.g. 'browsing' vs. 'searching'), or platform (e.g. hardware, software or system settings). It was argued that the difficulties inherent in making the site universally accessible were likely to be exacerbated by reliance on innovative technologies.

For example, potential Royal Mail customers may not have had access to plug-in technology such as Flash for any of a number of reasons:

- They may have been unwilling to download the plug-in just to view the contents of the site, particularly if they were using slow modem connections.
- They may have been viewing the site with a text only browser, or have disabled graphics in their browser settings, and consequently have had no requirement for 'animated graphics'.
- They may have experienced difficulties installing the plug-in. The installation process can be complicated, particularly when it starts to go 'wrong', as the following on-line 'troubleshooting' guide excerpt illustrates:  
"..If you can't find the file NPSPL32.DLL, click on "Start". Select "Find ... Files or Folders". Under "Name & Location", enter "NPSPL32.DLL" in the Named field. Make certain you have selected the upper root of your hard drive (C: in most cases)..."
- Their browser settings may have prevented them from installing the plug-in. Having 'Safety Settings' set to 'High' in Internet Explorer 3.02 (the default setting), for example, prevents Flash from being downloaded. Similarly, having 'JavaScript' disabled in Netscape 2.x interferes with the installation of the plug-in.
- They may have been using a platform which did not support the plug-in. For example, Mac users must have installed Netscape 3.x or above to use Flash.
- Their server 'firewall' may have prevented them from downloading Flash.
- They may have been unable to find the plug-in. Several sites, for example, directed users to a 'plug-in directory' page, leaving them to search for Flash from among the dozens of available plug-ins.

Not only could reliance on innovative technologies exclude potential customers, it could cause severe problems for customers who do manage to access the site content. The latest technologies are often unstable, unpredictable and inadequately tested. Downloading plug-ins, opening additional browser windows, running animations and rendering frames are all prone to draining system resources and crashing even (or especially) the most up-to-date browsers.

As one commentator notes: "*The problem with 'bleeding edge' technology is that the blood on the floor ends up being yours.*" (Bystrom, 1996).

## Conclusion

Innovative technologies have the *potential* to enhance Web site usability. The 'mouse-over' animations enabled by Flash, for example, can support users in identifying 'clickable' page areas (or links). While meeting the expectations of some customers, however, Web designs relying on innovative technologies are likely to exclude others.

One approach to resolving the tension between innovation and accessibility is **configurability**; tailoring a customer's experience of a site to suit their particular requirements. This approach has the advantage of allowing the site to exploit the latest technologies, while still leaving the content accessible to a wide range of potential customers. Such 'configuration' can be achieved in one of two ways:

– *Automatically*: by having the server determine the task context and act accordingly ('server-push'). For example, the server can detect which browser a customer is using and send only data appropriate to that platform.

– *Manually*: by allowing the customer to select the version most appropriate to their requirements ('client-pull'). For example, customers can be presented with options such as whether to view the site with or without frames, graphics, proprietary plug-ins etc.

Innovative technologies such as Flash, however, are essentially 'presentational' tools and as such stand at odds with the essential value of the Web as a universally accessible information system. Indeed, the original design of the Web and its underlying language (HTML) was based on encoding the *meaning* of information rather than its *presentation*.

An alternative approach to Web design is **simplicity**; avoiding innovative technologies and making the site content accessible to the widest possible audience. Simple sites are generally easier to use, more stable, less error-prone, more broadly compatible and easier to maintain.

*Royal Mail subsequently determined that the use of innovative technology in their Web site was inappropriate and inconsistent with customer perceptions of the corporate brand as a 'reliable', 'solid' and 'traditional'. The new site can be seen at < <http://www.royalmail.co.uk> >.*

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