INTERACTIVE SYSTEMS 3 (Resit)

Sample Solutions

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1.

a) a) Why is it hard to exploit external consistency as a means of helping the users of mass market web sites?

[4 marks]

[Seen problem]
It is hard to ensure external consistency because of the range and diversity of interaction techniques being applied across many mass-market web sites (1 mark). The pressures to innovate (1 mark) and the emergence of new technologies (1 mark) can also persuade rivals to update their site design on a regular basis. Techniques such as style sheets that separate form from content also reduce the costs associated with making changes to the appearance of many web sites (1 mark). Companies may choose to focus on particular areas within the mass market, for example on older consumers. The diversity of the potential users also implies that any such focus is unlikely to coincide for different companies (1 mark). In other words, there may be pressures to differentiate a web-presence that outweigh the perceived arguments in favour of external consistency (1 mark).

b) What effects can prolonged download times have on the usability of a web-based form?

[5 marks]

[Seen problem]
Prolonged delays can have a range of effects depending both on the nature of the delay and the expertise/background of the user (1 mark). The predictability of the delay is an important factor (1 mark). For instance, if a site is known to regularly support slow connections or if the site designer provides the user with some warning about a likely delay (see below) as is the case in many payment-processing systems then users can adjust their behaviour accordingly (1 mark). In other words, they know that they may have to wait and can get on with other tasks (1 mark). If, however, the delay was to be unpredictable then this can have a vast range of adverse effects. For instance, users may feel frustrated by the lack of response and may, therefore, abandon the transaction (1 mark). This can have undesirable consequences because it can be difficult to determine whether or not the transaction has been completed; hence many e-commerce sites warn customers not to hit the stop or back buttons before a form has been confirmed (2 marks). Alternatively, users may attempt to fill in the form a second time if they believe that the first attempt has been unsuccessful. This can introduce duplicate records into a database if care is not taken in the validation of data entry (1 mark). For operations that are not idempotent then there can be further adverse side effects (1 mark).

c) Describe two techniques that might be used to improve the usability of the interface described in part b) assuming that it is impossible to reduce the delays.

[6 marks]

[Seen/Unseen problem]
The previous answer has already alluded to some of the solutions here – this is deliberate because I'm hoping that they will use the answer from part b) to support their solution to part c). Firstly, designers can warn users if a form-based transaction is likely to take a long time to complete (1 mark). This warning can be associated with particular actions so that users can choose alternate approaches to avoid the delay. For instance, sites such as eBay allow a rapid search based only on item titles or a more prolonged search based on titles and page descriptions (1 mark). By offering users the choice between fast and simple of slower and more complex then the user can in some sense control the delay that they experience (1 mark). An

alternate approach is to provide an animation progress bar to illustrate that the client has not crashed – this is commonly used in, for instance, macromedia based applets (1 mark). Similarly, as suggested above, designers can provide users with a warning about the probable extent of a delay (1 mark). This is dangerous and unreliable given the unpredictable nature of delays created by network loading and by the difficulty of anticipating both the physical and logical location of the end users (1 mark). Designers might include additional information in situations where operations are not idempotent. This is important in transaction processing systems where users could inadvertently order several different products by reissuing the form (1 mark). This is not an exhaustive answer and other design techniques will be assessed when the answers are marked.

d) Write a brief technical report describing the problems of remote usability testing for a web-based e-commerce site that will be used to sell domestic appliances such as kettles, fridges and cookers. Describe three different ways of overcoming some of these problems. [10 marks]

[Unseen problem]

This is an open-ended question designed to provide the more able students with the opportunity to show what they have learned. It should also be possible for resit students to do relatively well here.

Remote usability testing creates numerous problems. These stem from the potential audience for mass-market e-commerce sites. The end-users can be in many different locations (1 mark). Geographical distribution is compounded by a host of additional factors. The end users may have a diverse range of infrastructures (1 mark). They may also have very different levels of expertise in the use of web-based applications (1 mark).

If we were to test the usability of a web site under laboratory conditions then the results from such a study might not generalise to the eventual environments where users will ultimately access the site (1 mark). The geographical distribution of end-users implies that it can be difficult for them to access sources of help that are often provided in lab-based studies (1 mark). They, typically, will not have access to written documentation in their own location (1 mark). They may also be subject to distractions and other forms of interruption that are difficult to simulate in experimental conditions (1 mark).

Remote usability testing is also complicated because of the diverse technical infrastructure that is available to many end-users. This includes the network connectivity ranging from elderly modems through to high-bandwidth land-based connections. However, it may increasingly include users who have access using wireless devices either via WiFi or G3 variants (1 mark). These issues have not been widely explored in a mass-market context given the relatively poor uptake of WAP. However, the use of such systems introduces new problems in terms of network coverage that may eventually have to be considered.

The different levels of expertise that end-users possess also complicate remote usability testing. It is difficult to profile the end-users of mass-market applications. Hence, it is difficult to identify an appropriate population to study. This is further complicated by the role of 'peer assisted learning' that continues to typify much web-based interaction – local experts can either help or hinder users who seek assistance with web-based transactions (1 mark).

There are many solutions to each of these problems. For example, NIST have developed a range of tools that are intended to support remote usability testing by simulating the impact of retrieval delays (1 mark). These tools measure network latencies from a range of different physical and logical locations so that they can then later be reproduced in a lab-based usability study. Similarly, the problems of assessing the diversity of end-user interactions can be addressed through the use of beta-testing (1 mark). Of course, the release of beta-versions may only serve to attract early adopters. They are likely to be more robust than the eventual users (1 mark). However, this can be useful for eliciting feedback after initial deployment. Focus groups and chat rooms can then be established to provide more sustained validation and feedback as wider groups of users come on-line with the site (1 mark). Finally, log based techniques provide essential information after the deployment of e-commerce web sites (1 mark). These logs are of limited value because they only record gross metrics for interaction over time (1 mark). However, they can show if large

numbers of users abandon retrieval of particular pages. They can also be used to calculate the ratio of sales to 'hits', however, the presence of robots and crawlers will dilute this ratio (1 mark).

To summarise, I would advocate a mixed approach. Initially, heuristic evaluation and lab based studies can be used with the NIST tools.   As the product nears deployment I would begin beta-testing with a restricted number of customers who may have to be provided with incentives and support to provide feedback on the design.   I would then use a range of post-deployment tools including chat rooms and log analysis to provide further information about any potential problems with the design (1 mark for clear summary).