Functionality and usability in design for eStatements in eBanking services

Catherine Weir [a,*], Iain McKay [b], Mervyn Jack [a]

[a] *Centre for Communication Interface Research, The University of Edinburgh, The Kings Buildings, Edinburgh, Scotland, UK*
[b] *Graham Technology plc, India of Inchinnan, Renfrewshire, Scotland, UK*

Abstract

The current Internet Banking (eBanking) marketplace is highly functionally convergent. Electronic statement (eStatement) functionality is an area of potential competitive advantage. This paper describes an experiment in which a group of bank customers ($N = 182$) undertook information retrieval tasks using three variants of eStatements functionality incorporated into a working eBanking prototype. The experiment examined how the eStatements service design could influence a customer's desire to switch from paper statements to online delivery. Three different levels of functionality were assessed for usability and for their impact on the customer's willingness to switch from paper to eStatements. The methodology of the experimental approach utilised in this research is described. The results provide detailed data to inform the interface design and business case for eStatements. Usability and propensity to switch away from paper were significantly correlated. The data confirm that provision of a functionally sophisticated search engine offers high usability perceptions and scope for significant levels of switching from paper to online statements with associated costs savings.
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1. Introduction

This paper will begin by reviewing the academic literature relating to usability engineering and the Internet (Web), particularly as it relates to eCommerce, Internet Banking (eBanking) and the design of electronic statements (eStatements). Theories regarding the adoption of technology are considered and we also investigate how usability engineering can be used to inform the business case for design of new functionality in an online service.

Current eBanking services offer remote account management facilities to customers who register for online access. eBanking offers customers the convenience of performing transactions outside normal opening hours, without physically visiting the branch. Banking services online are highly functionally convergent due to the nature of general banking activities (Schubert and Dettling, 2002). Some usability studies of eBanking services have been published, however as it is a relatively new field there is much scope for further research. eBanking design issues discussed in the literature include: privacy, security, error handling, trust, interface design (i.e. Jayawardhena and Foley, 2000; Weir et al., 2006) and eBanking adoption (Tan and Teo, 2000; Centeno, 2004; Lai and Li, 2005). This paper presents an approach to the design of eStatements incorporating usability engineering and adoption indicators in the presentation of a robust business case. The relationship between usability and functionality in eBanking confirms other work in the usability field and extends approaches to evaluate how usability and functionality can impact customer behaviour in selecting to use an online service (Dillon and Morris, 1999).

The aim of the research reported here was to examine different levels of functionality for an eStatements interface, and to evaluate the resulting user interfaces in terms of usability and customers preferences for choosing

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* Corresponding author. Tel.: +441316502801.
E-mail addresses: cath@ccir.ed.ac.uk (C. Weir), maj@ccir.ed.ac.uk (M. Jack).

electronic delivery over paper statements (by post). The dependent variable investigated in the study was the functionality provided by the interface. Functionality was hypothesized to have a direct impact on usability. The study also investigated how differing levels of functionality related to a customers' behavioural intention to the service. Three contrasting user-interface design variants were compared in the experimental work described here. The first interface (A) took the 'sheet' metaphor that derived from traditional paper statements and provided a linear archive of backdated statement sheets; the second (B) employed a 'Simple Search' engine with a choice of one from three alternative search strategies to access the statement archive; the third interface (C) employed a more flexible 'Advanced Search' engine offering any combination of four search strategies to access the archived data.

This paper presents the results of a large-scale usability experiment involving these three interfaces, conducted under controlled conditions. In the experiment, all three alternative interface designs for eStatements were compared by a representative sample of 182 customers. Fully functional software was developed to represent the three different eStatement interfaces: Data Only (matching the paper-based mode), Simple Search with radio buttons to select one from three strategies (Date, Sheet, Amount) and an advanced search with checkboxes to select up to four search strategies (Date, Amount, Type, Particulars keyword search). The participants in the experiment were recruited as being representative of current and potential members of the target market for the sponsoring Bank's eBanking service. They were all 'Internet-savvy' customers of the Bank, with wide ranges of experience with the Internet and eBanking services.

1.1. Usability engineering and the Web

Usability engineering aims to ensure quality in use for the intended user of a finished product (Gould, 1988). It is a process rooted in traditional engineering disciplines (Faulkner, 2000) providing techniques to support resource management in system design and development (Whiteside et al., 1988). The aim is to design and engineer the best solution for an individual system by centring the process on the user and their task (Nielsen, 1993a). Direct experience is key to the process (Karat, 1988). Questions about interface artefacts from navigation design to visual characteristics are posed, and the need for improvements isolated in advance to provide feedback for the development of the final interface (Hartson, 1998). The evaluation process aims to predict and explain consumer attitudes and behaviours (Howell, 1985). It is usually the user interface that is the focus of evaluation (Dix et al., 2004; Shneiderman and Plaisant, 2004). Usability engineering is an established practise in software development and has also been used effectively to inform the design of Websites (i.e. Spool et al., 1997) and eBanking applications (Weir et al., 2006).

Usability is defined as 'the efficiency, effectiveness and satisfaction with which specified users can achieve specified goals in particular environments' (ISO, 1998); other similar definitions exist (i.e. Shackel, 1990). The definitions of usability suggest that the concept is multi-dimensional. Often compromises are made, trading off the different goals in order to achieve a usable product. Thus efficiency, effectiveness and satisfaction are all typically measured separately in usability evaluation (Frøkjær et al., 2000). In many situations, including eBanking services, error prevention and recovery are important. Self-service applications need to guide customers in performing transactions error-free, or risk spiralling costs when assistance is required from a human contact point, e.g. over the phone (Gopalakrisnan et al., 2003).

In the experiments described here, usability was measured using a combination of task completion (effectiveness), error rates, task search logs (efficiency), attitude questionnaires (satisfaction), qualitative 'think aloud' comments and researcher observations (Shneiderman, 1987). In a final stage of the experimental evaluation a structured interview was also completed.

The attitude questionnaire comprised a set of 28 statements, relating to common usability issues, tailored to Web interaction and including aspects specific to eBanking and eStatements (Weir et al., 2006). These included appealing design, layout, content structure, navigation, emotional responses and utility perceptions (Baeker et al., 1995; Nah and Davis, 2002). The statements were based on concepts typically associated with usability issues in various GUI and Web applications, such as whether customers felt in control of the service (Whiteside et al., 1988). In addition to traditional usability characteristics, this attitude questionnaire also focused on utility (usefulness) attributes, broadening the scope of the usability measurement compared to some definitions. The usability attitude questionnaire allowed for an overall measure of interface usability to be computed and compared for the various functionality options as well as uncovering specific areas in each interface where usability could be improved (Agarwal and Venkatesh, 2002).

Controlled experiments provide accurate, balanced assessments of usability issues and are not dependent on preferences of any individual (Gould, 1995). Hypothesis significance testing using analysis of variance methods (ANOVA) can be used to determine how various controlled factors have attributed to performance and satisfaction measures (Landauer, 1988). For robust statistical testing, large numbers are needed in each key demographic group, i.e. differing ages or genders. Experiment procedure is standardised: each participant receives minimal instruction and is treated in a similar way, allowing between-subject comparisons to be made (Whiteside et al., 1988). A limitation of the experimental approach is that the situation and environment only approximate reality; in our studies we tried to simulate natural settings to offset the laboratory's artificiality (Baeker et al., 1995).