A survey of Web designers and developers (Knight and Jefsioutine 2002) revealed that attitudes to usability were often misguided and that this went some way to explaining the low take up of usability services in the design sector. Furthermore, literature reviews suggested that usability methods were not perceived as particularly usable. Therefore, we set about developing methodologies that would be more sympathetic to the concerns and needs of designers and business.

Jordan (2000) argues for design research to move beyond usability and to embrace a holistic view of people and products. He contends that in assisting in the design of pleasurable products this ‘new human factors’ adds value for users and manufacturers. He illustrates the evolution of people’s relationship with products based on Maslow’s hierarchy of needs. Bonaface (2002) develops the hierarchal model with safety and well-being, at ground level, moving up to functionality and then usability, leading up to the apex of pleasure.

Jordan (2000) expands the concept of pleasure in terms of four component parts: ‘Socio-Pleasure’ which comes from interaction with others or from a product that represents a social grouping; ‘Psycho-Pleasure’ from the satisfaction felt when a task is successfully completed or from a product that makes a task more pleasurable and is closely related to product usability; ‘Physio-Pleasure’ is derived from the senses; and ‘Ideo-Pleasure’, the most abstract, is derived from entities such as books, art and music or the values that a product embodies.

Dejean (2002) points out that the concept of pleasure is by no means a simple one, and that apparently unpleasant things such as difficulty, challenge and fatigue can all be pleasurable in certain contexts. He also argues that products that appear to be easy to use can stigmatise the user and make it less marketable. Thus a product that is difficult to use could increase pleasure, if for example, mastering it raises the user’s self esteem. Similarly, Jones et al (1994) describe engaged learning tasks as ‘challenging, authentic, and multidisciplinary. Such tasks are typically complex and involve sustained amounts of time… and are authentic’.

Traditional usability testing and user-centred design do not focus on these complex aspects of the user experience. The authors have therefore developed an Experience Design Framework (EDF) to provide design and evaluative tools specifically aimed at providing a holistic understanding of the user experience. The EDF integrates the key principles for designing for usability developed by Gould and Lewis (1985), but integrates recent advances in understanding the user experience including Rothstein’s (2002) elements and Fiore’s (2003) dimensions of the user experience.

The EDF has been applied to a number of internal and external products and has been refined through practice. As an approach it has also flagged up areas of weakness in available methodology and has been useful in directing our research. This paper describes the development of one such methodology from its theoretical basis to its application to practice and refinement. Finally, areas for further research that have become apparent through the application of the EDF in practice are outlined. The paper also discusses the implications of dual funding on directing research agendas.
Abstract
User-Lab provides user centred design services and carries out academic research. This paper describes the development of the Experience Design Framework (EDF) resulting from the interaction between the Lab’s academic and commercial activities. The authors identified a range of negative attitudes to usability suggesting many practitioners did not perceive methods as relevant or useful. The EDF evolved out of an attempt to find methods that were more sympathetic to the concerns and needs of designers and business. The EDF broadens the focus of methods from usability to include accessibility, engagability and benefit. It is based on the idea that this can be achieved by using a variety of research methods within a user-centred design approach. By considering the factors affecting an experience, (who, why, when, where, what, how and with what?), and all dimensions of experiencing (visceral, behavioural, cognitive and social), the EDF can be used to direct requirements research, focus creativity, aid decision making and support a more holistic approach to design. The model has been used to shape services and training in user-centred design, and has been applied to a number of development projects.

Introduction
User-Lab is a usability laboratory based in the Birmingham Institute of Art and Design. It provides commercial user-centred design (UCD) services and carries out academic research. When the lab was launched in 2001, the research focus was on understanding what usability meant in the context of an art and design faculty and the extent to which traditional approaches to usability were relevant and sufficient.

At the time, much of the media attention was highly critical of usability. The authors began to notice that a lot of the criticisms were based on assumptions about usability that they did not share, a trend noticed by Shedroff (2001:110), usability “has become somewhat hackneyed, though nonetheless important; and in some cases, its proponents have misstated and misused the concerns, processes, and the results of usability to such an extent that its reputation has been tarnished.” A survey of web professionals (Knight and Jefsioutine 2002) revealed that usability was seen as being dominated by a few self-appointed experts. Many felt that usability was just a matter of common sense and was about applying rules and guidelines. Usability was seen as problem focussed rather than being good at finding solutions.

It was felt that these attitudes contributed to the low take up of UCD identified in the literature (eg. Nielsen 1994; Landauer 1996). Säde points out that some of the large-scale UCD methods “do not suit the varied and fast paced consulting projects of a design firm”. (Säde, 2000:21). Nielsen suggests that one of the key reasons why usability engineering is not used
in practice is the perceived cost. He argues that a “discount usability engineering” approach can be highly effective and describes a set of “simpler usability methods” (Nielsen 1994:246-247). Eason and Harker (1988) found that, as well as perceived cost and duration, user-centred methods were not used because designers felt that useful information was not available when needed or was not relevant, and that methods did not fit in with their design philosophy.

The authors thus set about identifying a set of user-centred methods that would be cost effective, flexible enough to apply to any design lifecycle and, most importantly would be useful and relevant to the needs of the designer. Through a combination of literature reviews and application to practice, the authors identified different aspects of designing a user experience and the way in which these aspects can be drawn together to focus design research and practice. The Experience Design Framework is thus based on the principles of user-centred design and represents a way of using a range of methods to achieve a set of qualities that work at all dimensions of experience.

**User-centred design principles**

International Standards identify the following characteristics of a user-centred design process: “The active involvement of users and a clear understanding of user and task requirements; An appropriate allocation of function between users and technology; The iteration of design solutions; Multidisciplinary design.” (ISO 13407, 1999). Additionally, Gould and Lewis (1985) emphasise the importance of early and continual user testing, and integrating all aspects of usability.

These principles of UCD set out a clear approach around which to plan a design lifecycle, but they focus very much on design for usability. The EDF proposes that the same principles be applied to other qualities of experience.

**Qualities of an experience**

It was felt that one of the reasons UCD methods were seen as irrelevant and limited was that the traditional focus on usability does not capture other aspects of the user-experience. The EDF identifies a broader set of qualities that include usability and accessibility, as well as addressing the less tangible aspects of an experience, such as pleasure and engagement.

**Accessibility**

“The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect” Tim Berners-Lee, W3C (http://www.w3.org/WAI/)

The principle of the Web was that pages be designed to a standard such that they could be accessed by anyone. As the web has become more complex, so have the standards. Various guidelines have been produced to improve the accessibility of software (eg Web Content Accessibility Guidelines (WCAG), 1999), but in a survey of attitudes to accessibility amongst web designers, Knight and Jefsioutine (2003) found that interpreting guidelines was identified as a major barrier to implementing them. Furthermore, the UK’s Disability Rights Commission (2004) found that nearly half of the usability and accessibility problems on a survey of sites were not violations of any of the WCAG’s checkpoints. DiBlas et al (2004) argue that “W3C guidelines are not sufficient to ensure an efficient – even less satisfactory – Web experience.”
It is important that accessibility is seen as part of a holistic process rather than a series of checkpoints to cover. The EDF suggests that it be considered in all aspects of the process (including testing) and in all dimensions of experiencing (see dimensions below).

**Usability**

The benefits of usability are well documented (e.g., Bevan 2000). Usability is defined as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO 9241-11, 1998) and “the capability of the software product to be understood, learned, used and attractive to the user, when used under specified conditions.” (FDIS 9126-1, 2000). There are many usability tools available, though mostly aimed at evaluation rather than design. The EDF provides a framework for considering usability in a broader context.

Jordan (2000) argues that usability is no longer sufficient as a design goal. He argues that customers now expect products to be easy to use and claims that ‘usability has moved from what marketing people call a “satisfier” to being a “disatisfier”’. People no longer notice when a product is usable, just when it is difficult to use (Jordan, 2000: 3). Jordan argues that people want ‘products that bring not only functional benefits but also emotional ones (Jordan, 2002, 6).

**Engagability**

Shedroff (2001: 4) suggests an experience comprises of an attraction, an engagement and a conclusion. What attracts someone to a product could be a need to perform a task, an aesthetic quality, or an affordance. The engagement is then sustained over a period of time, beyond the initial attraction. Csikszentmihalyi (1991) describes the experience of optimal experience and flow:

“Concentration is so intense that there is no attention left over to think about anything irrelevant, or to worry about problems. Self-consciousness disappears, and the sense of timing becomes distorted.”

Although this level of engagement may not be appropriate for all products, it is useful to consider the properties of an experience that make it engaging. Fiore (2003) suggests that an experience includes a number of dimensions: it is educative and memorable; whole, unique and non-reproducible; historical; meaningful/aesthetic; contextual; physical/sensual/embodied; and situated in time and space. Jones et al (1994) suggest that engaged learning tasks are ‘challenging, authentic, and multidisciplinary. Such tasks are typically complex and involve sustained amounts of time… and are authentic’. Quinn (1997) suggests that engagement in learning applications comes from two factors – ‘interactivity’ and ‘embeddedness’, where the user perceives that they have some control over the system, and it is relevant and meaningful to them.

**Benefit**

According to Csikszentmihalyi, an optimal experience is so gratifying that “people are willing to do it for its own sake, with little concern for what they will get out of it.” (Csikszentmihalyi, 1991). One might assume that what they are getting is some degree of pleasure. Jordan (2002) makes a case for pleasure as the ultimate quality of the user experience, but Dejean (2002) points out that pleasure is a complex concept. Apparently unpleasant aspects of the
user experience, such as difficulty, challenge and fatigue can all be pleasurable in certain contexts.

Liu (2003) describes qualities of ‘psychosomatic soundness’, which refers to the degree to which a product contributes to the ‘wholesomeness’ or well-being of a person (from “harmful” to “healthful”) and the degree to which it is ethical (“bad/wrong” to “good/right”). Knight (2004) too, argues for a re-consideration of the ethics of human computer interaction design. The EDF uses the term benefit to include such concepts as ethics, psychosomatic soundness, pleasure and self-actualisation.

The EDF makes explicit the four qualities of accessibility, usability, engagability and benefit. Widening the focus of UCD research to include these qualities necessitates the consideration of all dimensions of experiencing.

**Dimensions of experience**

Usability research has traditionally focussed on cognitive and behavioural factors. McDonagh-Philp and Lebbon (2000: 38) suggest that emphasis must change ‘from hard functionality, to soft functionality’. Rather than focussing on what a product does and how, the focus is on less tangible aspects like emotional associations, familiarity, aesthetics and taste. Fiore’s (2003) framework of experience considers physical, emotional and intellectual aspects. Similarly, Norman (2003) describes ‘Visceral’, ‘Behavioural’ and ‘Reflective’ Design. He points out that these three levels of experience interact with each other. Spillers (2004) suggests, for example, that a new icon on a screen could arouse a state of curiosity or annoyance, producing a change in the user’s emotional state “which can either propel the user toward a feeling of satisfaction (success) or disappointment (failure)”.

Jordan (2000) develops Tiger’s concept of pleasure, and describes four ways in which pleasure can be experienced: ‘Physio-Pleasure’, ‘Pyscho-Pleasure’, ‘Ideo-Pleasure’ and ‘Socio-Pleasure’. The EDF uses Norman’s (2003) classification but adds Jordan’s (2000) social dimension. The EDF, therefore, directs design to the visceral, behavioural, reflective and social dimensions of experience. Furthermore, it suggests that they be considered in the context of the design qualities. For example, considering accessibility in each dimension may suggest focussing on issues of legibility or volume (visceral), cognitive overload or learning disabilities (reflective), keyboard alternatives to using a mouse, or shortcuts (behavioural) and issues of social and cultural inclusion (social).

**Effectors**

A user experience can be influenced by a range of factors, so as well as considering the qualities and dimensions of experience, it is important to be aware of the factors affecting an experience. Rothstein (2002) proposes the a(x4) model in which designers consider activity, artefacts, atmosphere and actors to focus design research. Ortony et al (1998:63) present a cognitive model comprising ‘events, agents and objects’ . The EDF suggests four domains: ‘who and why’, ‘what and how’, ‘when and where’ and ‘with what’.

**Who and why**

In order to be user-centred it is necessary to identify who the users are and what motivates them to use a product. It is important to include all users and stakeholders, however limited
their involvement with a product might be. Users of a software system, for example, might include people that buy it, use it at home or at work, communicate through it, people who sell it, or sell on it, administrate it, repair it, install it or support it (eg. Hackos and Redish, 1998: 28).

When the focus of user-centred design goes beyond usability, it becomes necessary to collect data that pertain to the qualities and dimensions of the EDF. This might include: Demographics (such as age, gender, ethnic origin); Behaviour and skills (such as computer literacy, typing skills, embedded knowledge of a task or system); Knowledge and experience (such as novice or domain expert); Personal characteristics and motivations (such as personality, learning style, attitude, aspirations, values and beliefs); and Physical characteristics (such as dexterity, physical disabilities, height).

What and how
This refers to the tasks or activities that will be supported, influenced or affected by the product, and how users carry out these tasks. Tasks are typically mapped from a behavioural perspective or cognitive dimension. Liddle (1996) suggests “The most important component to design properly is... the user’s conceptual model. Everything else should be subordinated to making that model clear, obvious, and substantial”(Liddle, 1996:21). The EDF suggests that activities be considered in all dimensions. For example, an airhostess may be performing a complex emotional task (customer relations) as well as checking in baggage (eg Hochschild, 1983).

When and where
The role of context in understanding tasks was emphasised by Suchman's (1987), notion of ‘situated actions’. Context is, of course, more than physical environment and should be considered in terms of the dimensions: the reflective – what is the user’s current frame of mind? What ideological factors will influence their experience? What are the visceral aspects of the environment – are there loud distracting noises around, or reflections on the screen, and what emotional state is the user in? What other behaviours are they performing? What is the social context –is the product being used with friends, or to communicate? Each of these contextual factors may influence the accessibility, usability, engagability and benefit of the product.

With what
This refers to objects, artefacts or tools that are being used or influencing use. Considered in the context of qualities and dimensions, brainstorming, for example, might suggest that a haptic interface or 3D glasses (visceral) may improve engagability when viewing a virtual museum object or flag up that knowledge of certain software tools (reflective) may create expectations that reduce the usability of a new interface.

Methods & Tools
Product design, HCI and human factors research are awash with methods that can be used to support user-centred design. Jordan (2000), for example describes a collection of empirical and non-empirical methods suitable for the ‘new human factors approach’ to designing pleasurable products.
Rather than prescribing a process or a set of key methods, the EDF suggests that it is the objective of the methods that is important and that a range of tools and techniques can be employed provided they cover four basic purposes of observing/exploring, participation/empathy, communicating/modelling, testing/evaluation. Furthermore, by applying these methods in the context of the dimensions, qualities and effectors, a better understanding of the user experience as a whole can be achieved.

Observation and Exploration
These methods are about finding out and can be drawn from demography, ethnography, market research, psychology and HCI. They include methods like, surveys, interviews, questionnaires, focus groups, task analysis, field observation, affinity diagramming, laddering and experience diaries. The EDF indicates the kind of information that should be sought, such as the range of user characteristics described earlier.

Communicating and modelling
These methods serve to communicate the research data, design requirements and ideas to a multidisciplinary team who may not have a common vocabulary. Such methods include user profiles and personas, use cases or task scenarios, scenario-based design, mood boards, written briefs and specifications, storyboarding, and prototypes. Again, the EDF helps to focus the information that is communicated on issues pertinent to the whole user experience.

Participation & empathy
These methods represent an approach aimed at gaining a deeper understanding and empathy for users, socio-political and quality of life issues. This includes immersive methods such participant-observation, where the observer participates in the activity or culture they are observing and the “eat your own dog food” where the designer becomes a user. Other methods such as participatory design advocate designing with users rather than for them (see Schuler & Namioka, 1993).

Testing & evaluating
Gould and Lewis (1985) recommend iterative design based on empirical testing. Methods include usability testing through controlled observation and measurement. Evaluative tools such as heuristics are often used, but evidence suggests that they are no substitute for testing real users (eg Lee et al, 1984). The EDF broadens the test and evaluative criteria from the traditional focus on cognitive and behavioural measures, like the time taken to complete a task or the number of errors or deviations from a critical path, to include methods such as transcript analysis, attitude measurement and emotional response.

User-Lab has used the EDF to adapt and focus methods for requirements research, brief development, ideation, and testing, and has developed a range of services and training based on this research. The EDF has been particularly useful in aiding decision making in design and in designing user-testing scenarios.
**Conclusions**

Every design problem is different and so it is necessary to deploy a range of research methods to support the work of the digital media designer. If these methods are focused around qualities, dimensions and effectors of the user experience, they provide a richer understanding of users from which the designer can create usable and desirable products.

The EDF was created in response to the needs of clients and has generated academic research, which has fed back into the design of services. The EDF has been applied to a number of internal and external products and has been refined through practice. As an approach it has also flagged up areas of weakness in available methodology, which is directing our current research, such as the development of tools for understanding users’ emotional responses to products. Although designed primarily for digital media product design, we are currently investigating its application to other areas of product design. The development of the EDF illustrates the way in which research and commercial activities at User-Lab compliment each other, both in directing agendas and in focusing activity.

**References**


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