

Introduction to usability for Information Professional

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"Usability" is a huge area. In academia, there are university departments dedicated to studying 'Human-Computer Interaction' and there are nearly a million URLs containing the term 'usability'. This paper will give a general introduction to the subject as it relates to online applications and web sites.

What is usability?

Most of us know what usability is because we have substantial experience of *unusable* web sites that frustrate us and do not meet our requirements. For a more formal definition, Jakob Nielsen is one of the more approachable writers on the subject. He defines usability in five stages: Learnability, Efficiency, Memorability, Errors and Satisfaction¹. In summary, he says that a usable web site is one where:

- it is easy and quick to do whatever it is that the user came to the web site to do (a.k.a. their 'task')
- it is easy to remember how to use it for future visits
- the user doesn't make many mistakes when they use the site, and any mistakes are easy to recover from
- the user gets subjective satisfaction from using the site.

Usability needs to be addressed alongside content, because, even if a web site is very easy to use, it won't be useful unless it contains the information that users require. Usability techniques are also used to help clarify content requirements.

Usability and accessibility are closely linked, though accessibility is more of a technical and ethical guidance framework for ensuring that all users can access the content of a site. In practice, an accessible site may tick all the boxes in terms of the guidelines, but it may still be unusable because of the way the navigation is set up, for example, or because it doesn't meet users' content requirements.

Why is it important?

Readers of this paper are likely to be experienced internet users, and each one of us can tell stories of websites which have frustrated and irritated us. Jared Spool researched the question "What percentage of the time are visitors successful at achieving their goals on the best-designed Web sites?", and the answer was 42%². This means that more than half of visitors to the *most usable* websites go away disappointed. And, what's more, 40% of visitors do not return to a site when their first visit was a "negative experience"³.

The implications of this are keenly felt in the e-commerce and private sector where poor usability results in lost revenue. However, for the producers of sites that may not exist with the main intention of turning a profit, the impact of poor usability can be harder to quantify and therefore easier to ignore. But, ultimately, the same principles apply for all web site producers:

- If your intended users have difficulty using your site, they will go elsewhere.
 - If you are the sole supplier of the information that's on your site, they may persevere, but their trust and perception of your organisation will diminish⁴.
- You have (or will have) invested time and/or money in making your resources available online, so you want your customers to use them.
- Your customers' needs are central to the service you provide.

Additionally, with the advent of online information provision, the interface between the information provider and user has changed dramatically. Collections and resources are often laid bare to the user through the website and the Information Professional has little or no control (or even knowledge) of how successfully it is used. Within this context, usability becomes critical, as the web interface is frequently substituted for the reference interview. Instead of ensuring that users get the best information by providing it to them,

Information Professionals must instead ensure that users can get easily to the appropriate information unaided by providing them with an interface that they find intuitive, effective and efficient.

There are two other points worth considering when making an early appraisal of whether usability is worth investing time and, potentially, money in. Firstly, a web producer who has not undertaken any usability analysis of his or her site often believes that it is easy to use. This is because they spend a lot of time using it, they understand the terminology used, they know where the key information is, and, as a result of this familiarity, they are not able to see how other users could find it difficult to use. This doesn't imply that the interface is 'wrong' or 'bad', but it is a reflection of the producer's mind, not the customer's. If the producer agrees that customers' needs are central to the service, it follows that the interface should be user-centred.

Secondly, usability can be very cheap to do, much cheaper than any of the other aspects of web development. If at all possible, it makes sense to bring in a third party with expertise in the area to undertake usability activities, as the independence, skills and experience they bring will result in more and better quality results and, particularly, data interpretation and recommendations. However, significant improvements in usability can be achieved by individuals who are committed to understanding the usability of their sites who have done some reading on how to employ usability techniques. This is because any well-intentioned, open-minded interaction with users will be useful in understanding how the site can be modelled more closely to their requirements and perceptions, whether this be through user testing, requirements gathering or even through informal chats with users.

If all the above reasons are still not sufficient to convince managers to take usability seriously, they may be more impressed by the Standish Group research which found that user involvement is the most important element in delivering a successful project - more important than getting executive management support, financial issues or any of the other potential pitfalls that can blight a project⁵.

General guidelines

Various organisations have published guidelines for improving usability and these can be useful for web producers who are new to the topic and appreciate a simple checklist to compare their site with or to work from initially. These are some of the easily understandable ones, which are nevertheless supported by research:

- Sun Microsystems' 'Writing for the Web' guidelines can be used to ensure that users can read content on a site with ease. <http://www.sun.com/980713/webwriting/>
- Stanford Web Credibility Research has produced ten guidelines to ensure that web sites are seen as credible and trustworthy. <http://www.webcredibility.org/guidelines/>
- The National Cancer Institute has lists of design guidelines, where each one is accompanied by an indication of the supporting research. <http://www.usability.gov/guidelines/index.html>
- The W3C Web Accessibility Initiative's guidelines are frequently relevant to usability as well as accessibility, and are the standards recommended by UK government. Ironically, however, they can be hard to understand. <http://www.w3.org/TR/WCAG10/full-checklist.html>

However, all web sites are different, and therein lie the severe limitations of relying on generic guidelines. Inevitably, at some point web producers have to get their hands dirty and involve their users.

Finding users

When doing any usability work with users, it may seem obvious to point out that the users should be representative of the target audience. In practice, a lot of developments and feedback mechanisms rely on informal groups of individuals who are known to the web manager, such as other managers and colleagues. It is essential to communicate with real users, as they are the only people who can reliably contribute the necessary data to enable a web site to meet their requirements. This is particularly true at the requirements gathering and specification stage.

If systems are being developed for in-house use, finding users is less of an issue. If users are external to the organisation, a little more effort may be needed. By far the easiest way of locating users is to go through communications previously received, such as emails, phone calls and visitors. Alternative sources can include professional and trade organisations, asking complementary organisations, posting to email lists, asking local colleges and schools, etc.. It may be necessary to encourage users to take part by paying them a fee or, for surveys, entering them into a draw for a prize.

The good news is that you only need between 5 and 10 users to get the majority of the relevant data you need¹⁴, so finding representative users need not be onerous. Once a relationship has been forged with users, this may prove fruitful for more than just usability testing.

Gathering users' requirements

Gathering users' requirements for a system is often seen as something that is done at the beginning of a project. While it is true that this is a critical time to document requirements, users' needs and expectations change and evolve (as do your competitors), so efforts to understand needs should be ongoing.

On many projects, the method of gathering of users' requirements for a system is often limited to a quick email around a few individuals and some high-level discussions with senior managers. Politically, consultation with managers can be important. Yet, these are rarely the end-users of the system, and it is with the real users that a website will succeed or flounder.

There are many ways to gather requirements from users, including surveys, interviews, focus groups and observation. Whichever is used, the most useful data will be gathered by documenting users' goals and how they go about achieving these goals⁷, and then seeing how the web site can or does help them achieve their goals. This is known as 'task analysis' and is seen by many usability professionals as the most important of all the usability techniques, for new or existing web sites, because it describes the reality of users' goals and activities - the context in which the online resource needs to function. On the flip side, asking users "what would you like to have on the web site" won't help you as what users say they require is not necessarily what they will use.

The different techniques each have benefits and pitfalls, but for any of them to be successful, they need to be done with representative users.

Survey

This is a popular method as it's the easiest way to get round a lot of users and it can be a quick and easy way to find out quantitative information, such as how often users estimate they use certain sorts of information. It's less useful for finding out qualitative information, such as users' goals and activities as the interpretation of survey questions and the analysis of results can lead to gulfs of misunderstanding. Even for quantitative surveys, questions have to be framed very carefully. For example, if you ask the question, 'Do you usually do a simple search on our site, or do you do an advanced search?', you are assuming the respondents know what you mean by these terms. Users may, in fact, believe that their searches are 'advanced' even though they don't use the Advanced Search feature. You don't need many misinterpretations of these questions to skew your results.

If surveys are run online, it's useful to be able to produce useful reports from the data without having to export it into another software package. Software such as BOS (www.survey.bris.ac.uk) can do this.

Interview

Again, a representative sample of users need to be interviewed, and the aim of the interview should be to understand users' current goals and activities as relevant to the web site under study. Interviews are an excellent way of probing for more information, clarifying terms and identifying other issues that may be relevant. For a new development, the interview will particularly need to identify the environment in which the new site will need to function. For existing sites, this subject will still be relevant (particularly if it hasn't been investigated before), but the interview will also focus on how the site is used (or not!) to help the user achieve their goals. Interviewers need to be careful not to suggest answers to interviewees or to make assumptions about their requirements.

Focus groups

Gathering a representative group of users (or potential users) together can be quick way to get an understanding of their requirements. As in the interview, the moderator needs to be careful to not lead participants or to make assumptions. Moderators also need to ensure that all participants have the time and opportunity to voice their opinions, and this is a particular issue for groups of participants who may not feel comfortable or confident giving dissenting opinions. Representative groups can be hard to gather together at one time.

Observation

This is by far the most effective, yet, of course, the most expensive and time-consuming method. The observer spends some time in the user's environment noting activities and events. This gives a very real context and understanding of how the web site is likely to be used, or is currently used. In this situation, the

observer does not need to rely so heavily on users reporting accurate information about their goals and activities as these can actually be viewed and recorded.

Informal chats

For those on a tight budget, or who are dipping their toes into the idea of making their web site more user-centred, just having a few informal chats with users will prove useful and give an indication of the benefits that can be achieved by undertaking more in-depth usability work. Talking to users on an opportunistic basis, to discover how they use information and what for, or how they use an existing site will yield some excellent information. The feedback mechanisms on an existing site can also yield useful information, though neither of these methods are sufficiently robust to base decision-making upon.

For more information about techniques for gathering user requirements, try the advice from the User-Centred Requirements Handbook at <http://www.ejeisa.com/nectar/respect/5.3/414.htm>.

Developing prototypes

Like a building, the success of a web site depends on the strength of its foundations. Understanding users' requirements, goals and tasks, gives this essential base from which to formulate ideas about how a site can be arranged and what content should be included to meet those requirements. From this point, ideas can be worked up into prototypes of a new, usable design.

The leap from understanding users' needs and goals to creating a new architecture is a huge and difficult one, due to the complexities that are inherent in predicting new ways of doing things, which is basically what is happening when architectures are constructed. However, rather than worrying about how to construct a whole new system that will be usable and useful, it is much easier to construct some quick prototypes (which can be in html or on paper) of how the new site may work. These can be tested, iterated and retested with users in the same way that 'live' sites are tested.

It is likely that a graphic designer will be employed to create the new prototypes. If so, the designer should be fully versed in the W3C WAI guidelines⁸ and should have an understanding of, and empathy for, usable design. The government's Quality Framework for UK Government Website Design⁹ gives some good advice on how designers can be evaluated and how the commissioning process should work.

More information and an example of paper prototyping can be found in the IBM library, at <http://www-106.ibm.com/developerworks/web/library/us-paper/>.

User testing

User testing is an effective way to find out how usable an existing site or prototype is. The most common way to carry out a test is to ask a group of users to complete a set of tasks on the web site. This immediately raises the issue that the web site producer needs to know what tasks and goals users commonly want to complete on the site, which in turn demonstrates how usability techniques work together – the tasks identified in the requirements gathering phase can then be used to test against.

The importance of having valid tasks that users genuinely need to perform cannot be underestimated. After all, what is the value of testing to see if users can find the ISBN number of a book if they rarely want to do this? In addition to valid tasks which are specific to the web site, other generic tasks should be tested such as finding contact names and numbers, finding directions and finding help.

Critically, the actual content of the site should be tested, not just the design and navigation. So, for example, you may have key documents on the site that contain statistics that you know from the requirements gathering phase are important to users. In this case you should test how easily users can find the statistics rather than the document which contains them. Ultimately, it's the content within the pages that users want to reach, not the pages themselves.

Several of the case studies in this book discuss issues around search effectiveness, and, if there is a search engine on the site, it should be evaluated alongside browsing to find out how successfully users find information, results are displayed and failed searches dealt with. The National Cancer Institute lists some of the search guidelines available, alongside an indication of the supporting evidence for each¹⁰. Jared Spool's articles on the research that User Interface Engineering have done on searching are also interesting, helpful and easy to read¹¹.

Once the tests are complete, the results can be collated and the problems can be graded according to the impact they have on users' abilities to complete their tasks. This grading will help the web producer to prioritise where the redevelopment should focus.

MIT libraries have carried out several usability tests and the documentation is indexed at <http://www.jkup.net/terms-studies.html>. A clip of a usability test can be seen at http://www.usabilitysciences.com/corp/media/sample_test.html. Much useful information about how to conduct tests and interpret the results can be found at www.usability.gov.

Some other techniques

Heuristic evaluation

Web producers who are in the early stages of understanding and improving the usability of their sites often find that a 'heuristic evaluation' is a useful starting point. Here, a review of the site against a checklist of usability guidelines¹² is undertaken by two or more expert evaluators, who may apply extra custom heuristics depending on the nature of the site. Their evaluations are combined to give an overview of how well the site meets the checklist, and recommendations are made to the web manager for improvement. Some samples from a heuristic review can be seen on the Human Factors International web site at <http://www.humanfactors.com/>.

Log analysis

Analysing search and other logs can give some useful ideas about what users are looking for and how they are behaving on the site. Logs should be able to tell the web producer the route that a user takes through pages, which search terms have been used, how long they remain on a page, if they download anything, if they move to another site from links provided, and from which page the user leaves the system. This data can be used to build hypotheses about user behaviour. For example, if the logs show that users are not accessing one page at all, this could be because they can't find it, or they are not interested in it or there is a technical problem reaching it. The web producer may then experiment by moving the section to a more visible part of the site, or by renaming the link to it, and then monitoring to see if the page receives more visits. Whilst these techniques are useful, they are no substitute for user consultation as they rely on a correct interpretation and solution being reached by the web producer, and they also give no information about users' tasks and goals. An example of log analysis for New Zealand Digital Library is available online¹³.

'Competitive' review

Looking over the web sites of organisations who provide similar or complementary information can give a web producer ideas of how they could evolve their site. Users can also be asked what they think of these sites, and this can be done by informal chats. If there is an opportunity for collaboration with complementary sites, the results of usability tests and evaluations can be shared (within the limits of the Data Protection Act). However, as each web site is different, there are clearly limitations to the usefulness of this technique.

In conclusion

There are various stages in the lifetime of a web site that user involvement should contribute to its development, from the planning stage onwards. It's never too late or too early to seek user involvement. However, it is a fallacy to suggest that user involvement starts at the planning stage and ends once a review of the service or project has been completed. Dynamism is fundamental to web sites, and even if the site doesn't change, the users' requirements certainly will.

The advent of Google changed the landscape of the web in terms of user interfaces. In user tests, the phrase 'Couldn't it be more like Google?' is frequently heard. The pressure is on for web sites to perform in an intuitive, simple and efficient way, and this pressure is not going to evaporate.

Usability is not an effective alternative to having a truly customer-centred culture within an organisation, and an organisation which is not genuinely customer-focussed is always going to struggle (and pay more!) to produce usable and well-received online offerings than an organisation which has a deep and intuitive understanding of its customers. Usability professionals are commonly asked to undertake usability activities on web sites which show such fundamental misunderstandings of their users as to make the process of user involvement almost farcical. Examples include web sites that disable the 'back' button, or use splash screens or long Flash introductions to users who are clearly looking for quick, precise information, possibly from slow internet connections. Jared Spool's article on 'How Usability-Focused Companies Think'¹⁴ gives some excellent examples of the personality traits of companies who have a truly customer-centred approach to their business.

However, the majority of web producers understand that providing an online service that meets user requirements is a matter of success or failure, and, whatever their budget, utilising the usability techniques mentioned above will prove critical in the drive for quality, effectiveness and efficiency.

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