Human-Computer Interaction
IMDb Usability Testing

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Introduction

Human-Computer Interaction (HCI) is a modern discipline that has grown exponentially since the introduction of computers into the normal, everyday life of humans. There is an obvious gap that needs to be bridged between humans' requirements and how computers can be used as tools to solve these. By improving the HCI of new and existing products we can make this gap seamless, thereby maximising comfort and efficiency for the user, both for physical aspects and psychological processes.

This study was an evaluation of an existing website, which is the first step in a two-stage process of finding usability problems and prototyping an improved website design.

The objective was to evaluate the website against the general design principles of HCI (such as those outlined by Don Norman or Nielsen's Ten Usability Heuristics). In order to minimise personal bias a small study was designed in which a user sample was given a short set of tasks to complete, with their times to complete the task recorded, followed by a questionnaire.

IMDb

The website evaluated was the popular movie database IMDb (Internet Movie Database). The website compiles a substantial amount of data relating to movies such as cast, production crews, plot summaries, trivia and a review system that is highly respected in the critique universe. Due to the broad demographics of film watchers, the typical user could be of any age from around ten onwards (depending on an individual's ability to use a computer), male or female and from a range of professions but specifically students. This evaluation discusses the positive, and more importantly the negative aspects of the user interface to better understand the gap between the user and their experience.

Participants

The user sample consisted of n=8 students from Loughborough University who were convenience sampled from the Loughborough University Library. All participants were between the age of 17-25 with a mixture of male and females who were either undergraduates or postgraduates.

Method

A test account was created for the study so that we could use some functions of the website that are only available to users (leaving reviews and keeping a 'Watchlist', analogous to a playlist).

All the participants carried out the study on the same make and model of computers and monitors so that they would have as consistent an experience as possible. The screen sizes and resolution were the same for each participant, meaning they would all see the same amount of content at once, and would have the same amount of content 'above the fold' (visible on the page before scrolling down). This was an important variable to control as analysis by Nielsen Norman Group suggests that what content is above the fold affects interaction with a website (Nielsen, 2010; Schade, 2015). In order to minimise any extraneous variables from different browsers displaying content differently, all of the user sample carried out the tasks on a maximised window of the same browser, Google Chrome. Chrome was chosen as it was the most popular desktop browser used between September 2014 and September 2015, with a user base consisting of 52.52% of desktop browser users (StatCounter Global Stats, 2015).

Three tasks were decided on to emulate typical usage of the IMDb website: leaving a review of a TV series, finding how highly a film is ranked, and adding a number of films to a Watchlist.

The participants were filmed carrying out the tasks, such that their hands (operating the mouse and keyboard) and the screen were in frame. They were also timed in completing their task to give a quantitative, albeit simplistic, measure of usability.

Each task was given the same starting point, the IMDb homepage, and all were given a specific endpoint, which let the users know when they had finished their task and allowed the researchers to have a precise start and endpoint for timing, helping consistency between researchers as well as between trials.

Equipment

- Computer
  - Running Windows 7
  - Monitor of 1920x1080 resolution
  - Connected to the internet
  - With a copy of Google Chrome
- Stopwatch
- Video Camera

Procedure

A procedure was created for all of the researchers to follow, which consisted of the following:

- Open Google Chrome and maximise window
- Navigate to imdb.com and log in to test account
- Ensure that watchlist and viewed film history are empty
- Present participant with consent & instruction sheet (see *Appendices A & B*) and ask them to fill them out if they are comfortable
- Answer any of their questions that don't directly aid in their task
- Start filming with the screen and desk area in frame
- Ask participant to adjust the environment to their personal preference
- Ask participant to read task 1, then begin when ready
  - Start timer
  - Stop timer once user clicks into review text area
- Ask participant to read task 2, then begin when ready
  - Start timer
  - Stop timer once user states the correct number
- Ask participant to read task 3, then begin when ready
  - Start timer
  - Stop timer once user loads the watchlist page
- Stop filming
- Present participant with questionnaire (see *Appendix C*)
- Thank participant for their time and help

Results

Below are the results for the trial that was undertaken on the IMDB website. Each participant completed a questionnaire to provide feedback on the ease, frustration and appeal of the website. We also recorded other metrics such as how frequently the participants use the website, whether they wear lenses and the time taken for each task, along with their comments.

P#	Frequency of Use	Lenses	Ease 1 (%)	Ease 2 (%)	Ease 3 (%)	Frust. 1 (%)	Frust. 2 (%)	Frust. 3 (%)	Aesthetic Appeal (%)	Time 1 (s)	Time 2 (s)	Time 3 (s)
1	Multiple /wk	N	91.78%	68.49%	91.10%	0.68%	36.30%	0.68%	33.56%	22	53	29
2	1 /wk	N	0.68%	2.05%	80.82%	95.89%	94.52%	24.66%	33.56%	DNF	DNF	42
3	Never	N	70.55%	56.85%	43.84%	30.14%	36.30%	33.56%	49.32%	90	110	205
4	Never	N	70.55%	2.05%	100.00%	11.64%	97.95%	0.68%	72.60%	58	163	50
5	Never	Y	60.96%	60.27%	60.27%	71.23%	74.66%	28.77%	51.37%	46	52	48
6	Never	N	33.56%	13.70%	87.67%	70.55%	90.41%	30.82%	34.25%	84	109	24
7	Never	Y	61.36%	17.42%	89.39%	39.39%	100.00%	24.24%	51.52%	39	41	44
8	1 /month	N	72.73%	27.27%	53.79%	25.00%	65.15%	29.55%	70.45%	24.46	42	39

Figure 1 - Table of results

As seen in figure 1, the evaluation of aesthetic appeal ranged between 34% and 73%. The participants who were more frustrated appear to rate this lower, but any causality and directionality here are undetermined. Regardless, there does appear to be scope for improvement of the visuals.

The first data analysed was the time spent on each task. The data suggests that task 2 was the most difficult with users spending an average of 81 seconds on the task, compared to 52 seconds for task 1 and 60 seconds for task 2 (*Figure 2*). One user was unable to complete this task, as well as task 1. The median user took a similar amount of time for tasks 1 and 3, while task 2 took longer. Task 2 also appears to be heavily skewed, as the gap between lower quartile and median are very small compared to the median-upper quartile gap. This suggests that for the users who did not complete the task in a minimal time took a lot longer to find what they were looking for. This matches up with the researcher's' observations that some participants were confused by the number of pieces of information on the page that could be considered a 'rank', as well as a participant's comment that they "did not realise how the ranking system work". All of the participants completed task 3 in a similar time except for one outlier. This was down to differences in approach: everyone else found the films first and then added them to their Watchlist, while he went to the Watchlist link and tried to add films from there, which led him through some time-consuming actions.
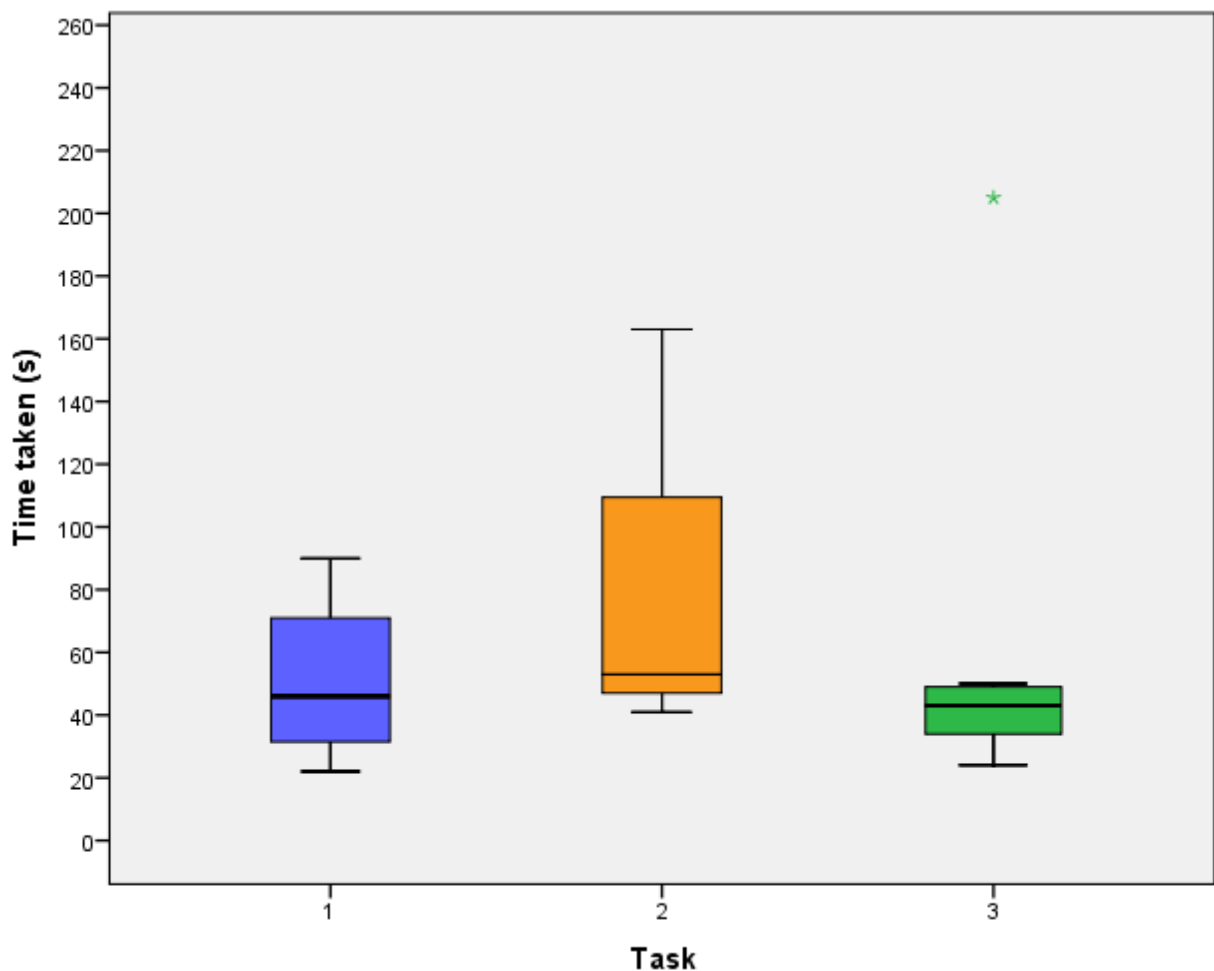

Figure 2 - Time taken to complete each task for those who finished them

The majority (62.5%) of the participants had never previously used the site and so would be expected to struggle more with using it. This is corroborated by *Figure 3*, which shows that the people who had never used the site before took longer across all the tasks. The performance of these participants in particular should highlight any design problems with the website as they will not yet have learnt how to avoid them. Surprisingly, participant 2 (*Figure 1*) stated that they use IMDb once per week, but was unable to complete the first 2 tasks. This will have skewed the data to make those tasks seem faster to complete.
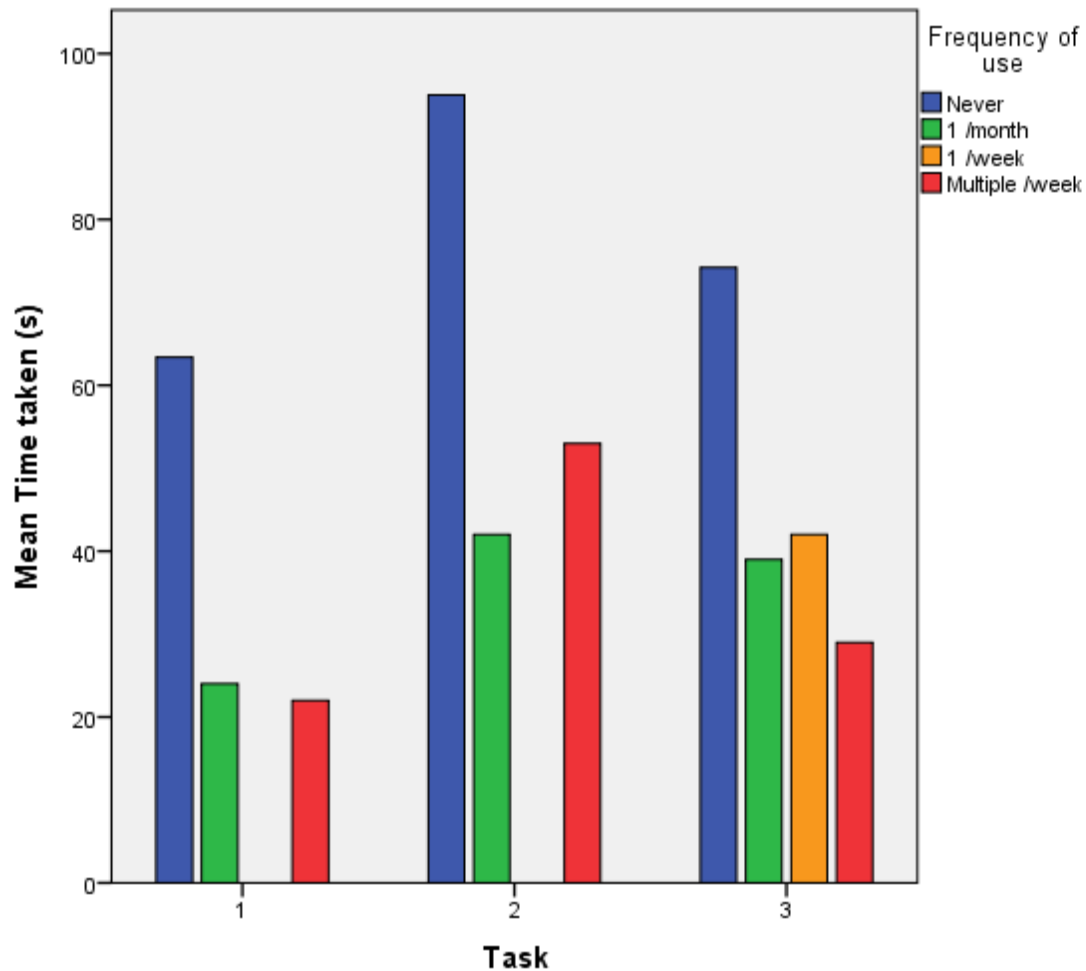

Figure 3 - Time taken to complete each task by frequency of use

Along with the frequency of use, the participants were asked if they wear lenses. The majority (75%) of participants do not. The difference in ease of use (54-58%) and frustration (56-43%) between these groups was negligible, which along with largely overlapping distributions suggested that this was not a confounding factor.
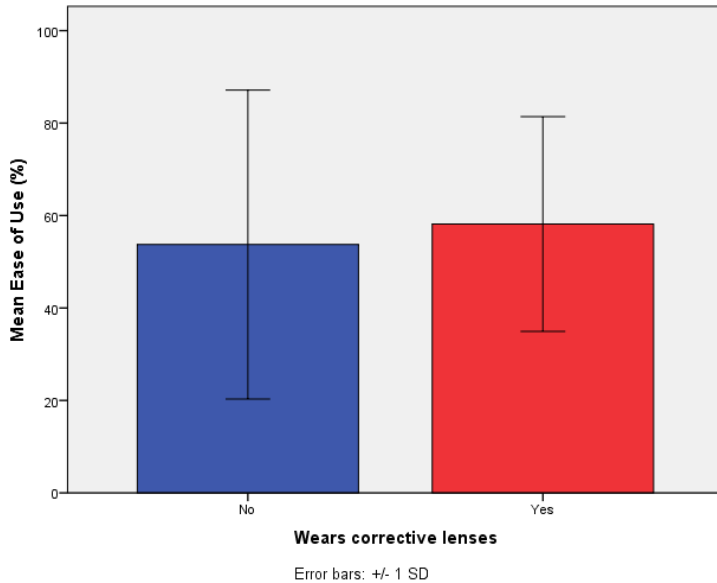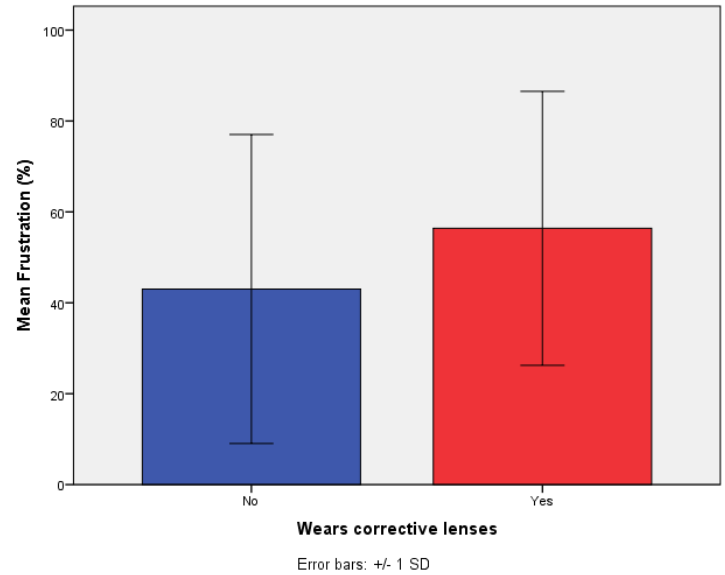

Figure 4a - Ease of use for lens wearer

Figure 4b - Frustration of lens wearers

Figure 5 displays the results of the three tasks in relation to ease of use. As shown, task 2 was the most difficult for the participants with a mean score of 31%. The easiest of the tasks was task 3, which may be due to the participant becoming accustomed to the website after performing the first two tasks.
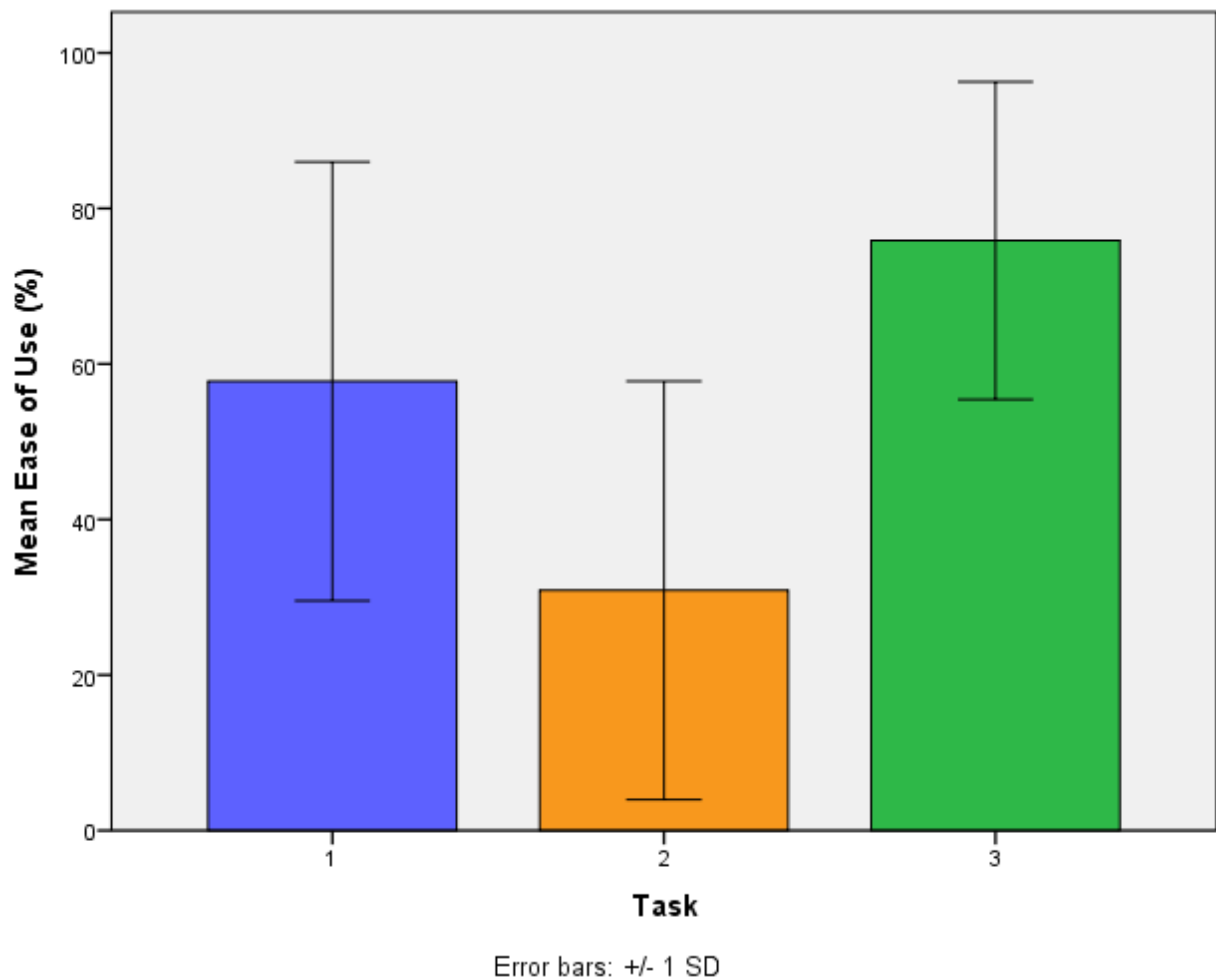

Error bars: +/- 1 SD

Figure 5 - Ease of use for each task

To contrast to the ease of use, we also asked the participant to rate the tasks based on how frustrating they were (*Figure 6*). This data has a near inverse correlation with that collected in the ease of use section. These charts show that task 2 was the most difficult and frustrating while task 3 was the easiest and least frustrating. This corresponds well with the researcher's' observations that participants were confused during task 2 and (with the exception of the one outlier) always appeared to know what they were doing during task 3.
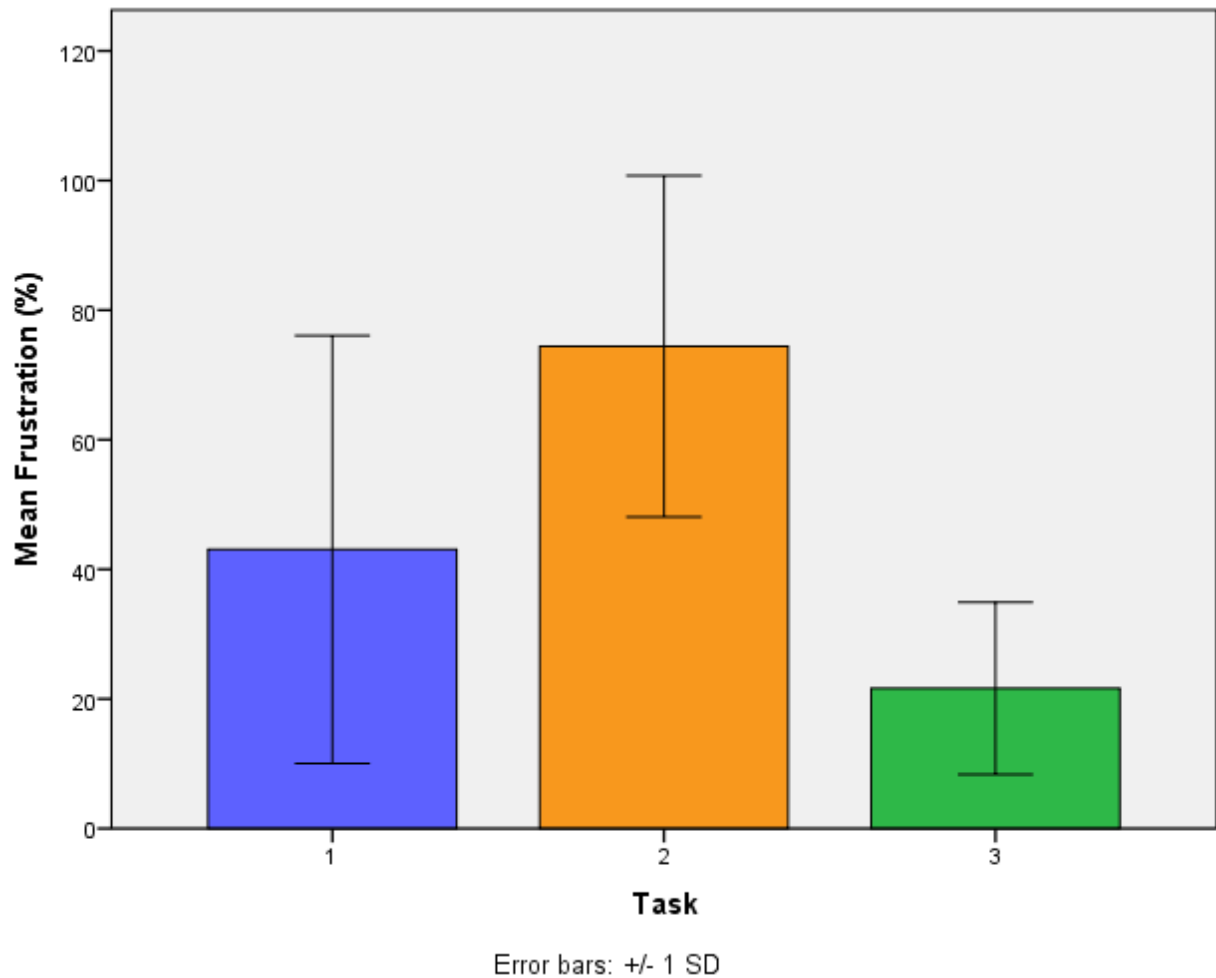
Figure 6 - Frustration for each task

Evaluation

In order to evaluate the IMDb website with regards to its usability, certain design principles can be used as a measure to check against the primary data collected, and to direct the website's future improvements. The five parameters have been selected from three sets of interface design principles. These include Shneiderman's 'Eight Golden Rules of Interface Design (Shneiderman, n.d.), Jakob Nielsen's '10 Usability Heuristics for User Interface Design' (Nielsen, 1995) and Don Norman's Design Principles (Norman, 2002). The parameters were chosen because they have been consistent throughout all three sets of the principles and therefore can be seen to be the most important and have the most universal application to interface evaluation.

The parameters are as follows:
1. *Consistency -* operations must be highly standardised throughout so that the user's mental model of use persists throughout their experience

2. *Feedback and knowledge of error -* The user must be able to see what effect their input has had on the system, particularly for errors. Feedback and error warning can come in many forms within the interface, mainly visual and auditory.

3. *Visibility and aesthetics -* An interface must be aesthetically appealing to the intended user to attract their attention and focus it to important areas of the page. Visibility can also show a hierarchy on the page; more bold and colourful elements are meant to be important whereas faded or monotone sections are seen as less important.

4. *Flexibility of use and advantages to frequent users -* An effective interface can have multiple ways of approaching the same goal depending on preference and experience with the interface, which means shortcuts can be utilised by experienced users.

5. *Affordance -* Don Norman specifically refers to affordance as 'an attribute of an object that allows people to know how to use it' (Norman, 2002) He refers to a simple example of affordance to be the sign of a mouse signaling clicking behaviour. This can also be closely linked to the desired 'match between system and the real world' suggested by Jakob Nielsen (Nielsen, 1995) which states that information should follow the form of user's expectations.

Problems found with the website

To access many aspects of a film's profile the user is required to scroll down to the bottom of the page and select specific information my reading in subsequent title of different sections. There is a 'Quick Links' section on the right of the page (shown in *Figure 7*) which gives links to lower sections of the page, however none of the participants used this feature. This is possibly due to its lack of dominance on the page and its position amongst adverts on the page, which are typically overlooked.
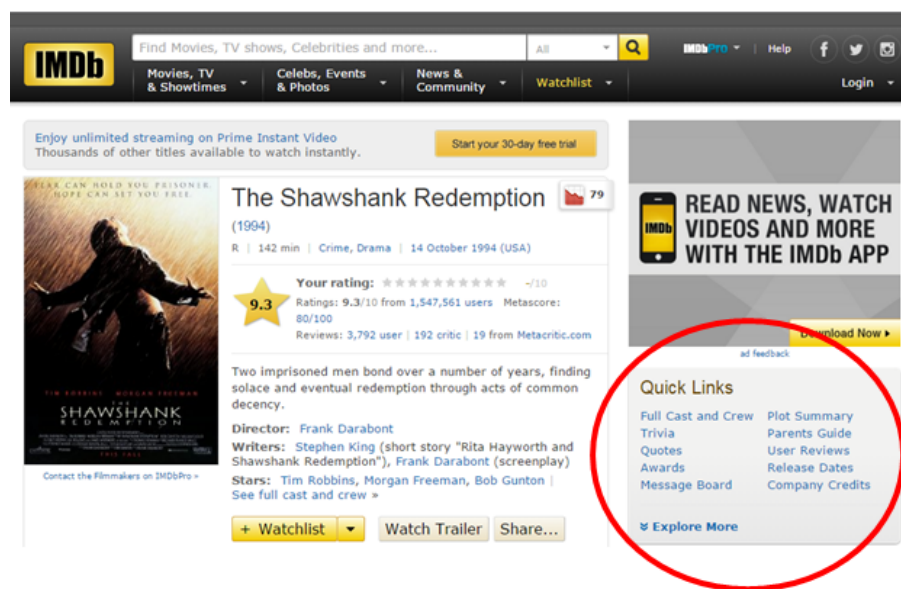

Figure 7 - "Quick Links" shortcuts on a film's profile page

The vast amounts of text based information concurrently available to the user on the screen reduces the signal-to-noise ratio if the user is searching for something specific. This makes navigation difficult, and information is more likely to be overlooked when filtering out unwanted material, potentially leading to user dissatisfaction and a negative experience. This was seen when users would have the rank information on the screen but were unable to find it.

Many of the participants were confused by the inconsistency of layout in leaving a review. As seen in *Figure 7* (to the right of the star) there is a section of other people's reviews, and the ability to rate the film, but you cannot leave your own review without scrolling down on that page or on another page dedicated to that film's user reviews.

One participant had distinct trouble with leaving a review. Whilst they were able to locate the reviews section, they had an issue finding the specific button or link to click in order to access the review leaving page. There were two options for this task: a 'Review this title' link directly below existing user reviews and a 'Write Review' button located under the 'Contribute to This Page' section meaning there is a conflict between different sections within the pages organisational structure and a possible misunderstanding of the pages hierarchy of importance.
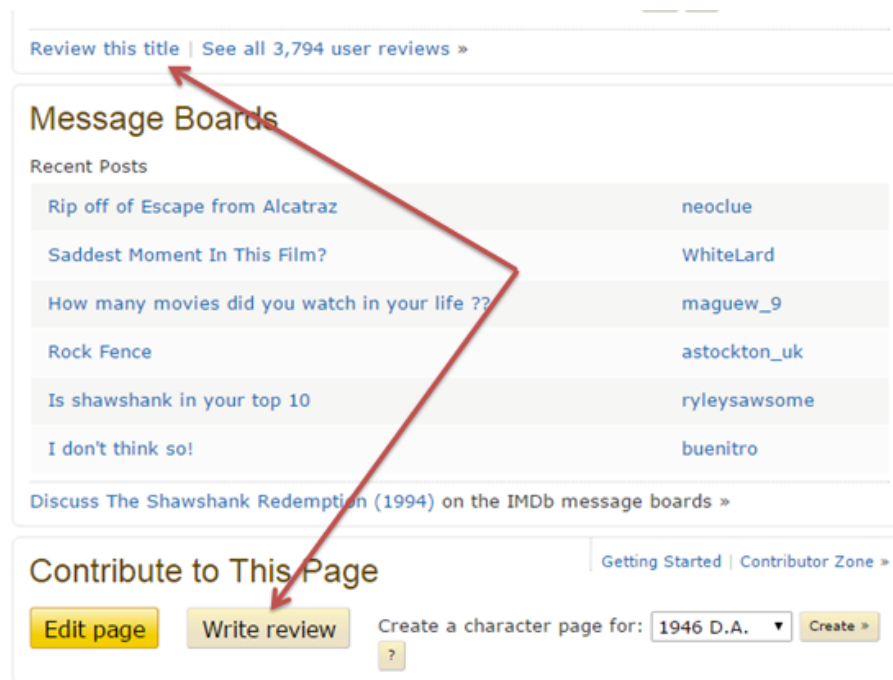

Figure 8 - Two methods of accessing the review page

Whilst the two options can be seen as a flexibility mechanism for experienced users, the close proximity and similar description of each function can make the process more difficult as there is now a conflict between which pathway to take, rather than a clear cut action for an intended reaction. This was demonstrated by a particular subject who hovered over the 'Review this title link' before changing their mind to select the 'Write Review' button. This change of mind may have been influenced by the greater affordance of a button than a link.

Positive aspects of the website

The website generally displayed a good degree of flexibility in navigation as all of the tasks have multiple ways of achieving the desired outcome. This was confirmed in the research as all of the participants were able to find a film's profile without prior use of the web page. For example, *Figure 9* shows that in order to find a film's rank it can be located on a list of rankings, or it can be found on the film's profile, meaning the user has multiple options of how they achieve the task.
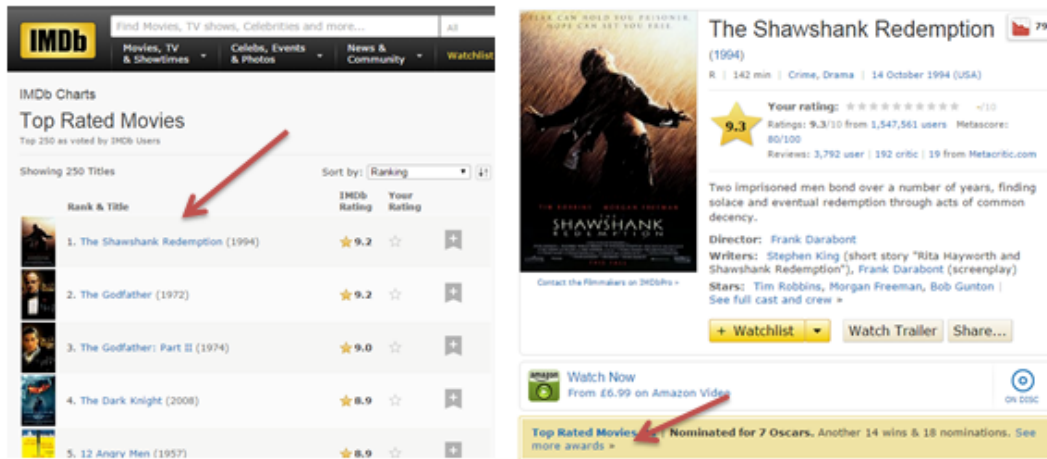

Figure 9 - Two methods of identifying a films rank

The film and programme individual profiles showed a very high level of consistency as the details were laid out in a hierarchical order from film-specifics like release dates, to the cast members and storyline and onto FAQs and the review section. This makes navigating individual profiles easy for experienced users.

The layout of each page follows a similar theme of lightly shaded sections parallel to one another holding information of different sub themes.This organised method of sectioning information on the page not only aids the digestion of information, but also signals to the user the breakdown of the themes on the page.

This high level of consistency was demonstrated to be valid for real world use by the execution of Task 3. Once each of the participants had determined how to add the first film to their watchlist, there were no hesitations or errors made in adding the second and third as they repeated the same series of actions.

The film profile pages selectively uses graphics and images to focus attention, such as the rating star, film cover and watchlist icon, which are all brightly coloured on a relatively monochromatic background (shown in *Figure 10* below). This gives the user a starting point to guide their attention and could help them decide on their next action. This method makes good use of the visibility principle to focus the user on key information that they are likely to be looking for.

Figure 10 - Features on a film's profile page

Visually the the film profile pages have some useful feedback mechanisms. Firstly, most of the active buttons on the page, when hovered over, develop a yellow outline to instruct to the user it has been selected. This is evident throughout the page and even the logo developed a darker tone to show it is an active link. A more developed example would be the feedback from adding an item to the watchlist. Once selected, multiple green ticks (one temporary and one permanent) occur which gives the user an even clearer understanding that selection has been made and there would now be items in their watchlist (see F*igure 11*).
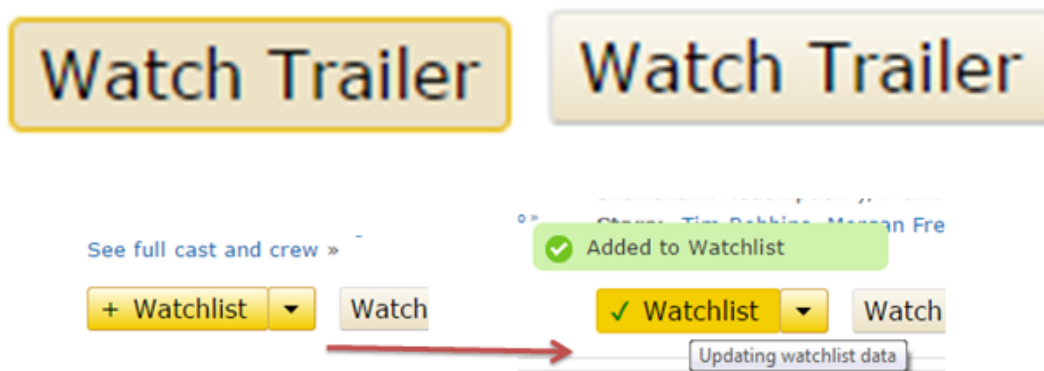
Figure 11 - Showing the highlighted feature when the arrow is hovering over the top (top) and the permanent green tick as a feedback feature (bottom)

Possible improvements to the website

To increase the standard of feedback to the user, expandable sections could be used to hide non-critical information until it is requested. The highlighting of menu bars when the mouse hovers over them, and the presence of the typical inward facing arrows (that face downward when content is expanded) would suggest more information is available. This allows the user to see only the content they want, increasing the signal-to-noise ratio and making the information on the page more digestible and understandable. It could also have the benefit of compacting the information to fit above the fold, meaning that the user would not have to scroll to find the desired information, which the trials have shown to be an issue.

Semantically related information and links that users expect to be together should be grouped. This is particularly the case for reviews, where the disparate pieces of information are currently scattered across the page.

Some of the verbosity could be reduced by replacing titles with symbols, although implementation of this would depend on a natural mapping between the symbol and its meaning. Whilst symbols can make navigation for frequent users easier the more novice user may find them to be troublesome. Natural mapping is needed to make sure the chosen image or symbol matches the relevant information and sets out a naturally ordered hierarchy in order to make navigation effective for a first time user. For example, if a symbol was representing a frequently asked question page then a question mark may be used as a symbolic representation due to its universally recognised meaning.

Through user testing and comparison with design heuristics, a number of problems have been found with the IMDb website that have potential to be improved.

Word Count: 2977

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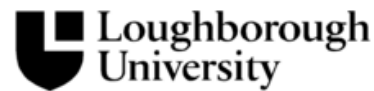Faculty.washington.edu. Available at:
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Appendix A - Participant Information Sheet

Loughborough University

Study of User Experience on IMDb
PARTICIPANT INFORMATION SHEET

The purpose of this study is to evaluate the user experience of the IMDb website in terms of 3 distinct tasks.

You will be asked to attempt the tasks below, and speak out loud any time the website makes it difficult to complete the task. Please attempt to use the site as you would in a real-life situation.

During this time the screen and your hands will be filmed.

If you have any questions, please ask now. Please note that we will not answer any questions that aid the completion of the tasks.

Please read the tasks below and sign the consent form if you are willing to continue.

Feel free to adjust the environment to something more comfortable (e.g. change screen height/angle, chair height etc).

The site will be logged into a test account.

Task 1 – Leave a review
- Ensure Google Chrome is open to http://www.imdb.com
- Go through the process of leaving a review for the TV show *Friends*
- The task is finished at the point that you click on the review text box

Navigate back to http://www.imdb.com on Google Chrome

Task 2 – Find a film's rank
- Films are ranked based on their IMDb rating
- Find what number rank *Kill Bill Vol. 01* is
- The task is finished at the point that you say the correct number out loud

Navigate back to http://www.imdb.com on Google Chrome

Task 3 – Add 3 films to your Watchlist
- IMDb allows you to group films together into what they call a 'Watchlist'
- In any order, add the following films to your Watchlist:
  - *The Lord of the Rings: The Fellowship of the Ring*
  - *Love Actually*
  - *Racing Stripes*
- Navigate to view your Watchlist
- The task is finished once your Watchlist is open

Appendix B - Consent Form

Loughborough University

INFORMED CONSENT FORM
(to be completed after Participant Information Sheet has been read)

The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethics Approvals (Human Participants) Sub-Committee.	Yes ☐	No ☐
I have read and understood the information sheet and this consent form.	Yes ☐	No ☐
I have had an opportunity to ask questions about my participation.	Yes ☐	No ☐
I understand that I am under no obligation to take part in the study.	Yes ☐	No ☐
I understand that I have the right to withdraw from this study at any stage for any reason, and that I will not be required to explain my reasons for withdrawing.	Yes ☐	No ☐
I understand that all the information I provide will be treated in strict confidence and will be kept anonymous and confidential to the researchers unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others.	Yes ☐	No ☐
I agree to participate in this study.	Yes ☐	No ☐
I agree that the video footage taken during this study can be stored for future research.	Yes ☐	No ☐
If No to above, I confirm that the video footage taken during this study can **only be** used for this study and should be disposed of upon completion of the research.	Yes ☐	No ☐

Your name   _____

Your signature   _____

Signature of investigator   _____

Date   _____

Appendix C - Questionnaire

Questionnaire

How frequently do you normally use the IMDb website?

Never	Once per year	Once per month	Once per week	Multiple times per week

Do you need corrective lenses?

Yes	No

Please mark along the line according to how easy to complete you found Task 1
Very difficult   Very Easy

Please mark along the line according to how easy to complete you found Task 2
Very difficult   Very Easy

Please mark along the line according to how easy to complete you found Task 3
Very difficult   Very Easy

Please mark along the line according to how frustrating you found Task 1
Not at all frustrating   Very frustrating

Please mark along the line according to how frustrating you found Task 2
Not at all frustrating   Very frustrating

Please mark along the line according to how frustrating you found Task 3
Not at all frustrating   Very frustrating

Please mark along the line according to how visually appealing you found the IMDb website
Not at all frustrating   Very frustrating

Any further comments? Feel free continue on the back of this page.