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Usability Testing for Screen Design in Educational Websites

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USABILITY TESTING FOR SCREEN DESIGN IN EDUCATIONAL WEBSITES

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ABSTRACT:

Usage of the World Wide Web has become commonplace in recent years. Many Irish schools have access to it, ranging from one machine used by the teacher for sending and receiving e-mail, or downloading resources for use by teachers or pupils, to schools with Internet access on an entire network. It is clear that there will be further investment in the technology to make access to the Internet faster and cheaper for schools¹. This study does not address any of the strategic issues involved in these developments. Instead it looks at the website from the perspective of the child. It attempts to define for the would-be developer those elements that make sites attractive and those that make them unattractive. Armed with this information, the developer - whether a teacher, a professional webmaster, or a child – can then create a site which meets the needs of the target audience.

1 PURPOSE OF THE STUDY

The author teaches in a primary school in west Dublin. One of the projects of interest to the staff of this school is the provision of good source material for use by the children in the area of local history. There are already some very good books and illustrative materials available, and there is also the possibility of actually visiting some of the places of interest with a class. However, the materials have an adult audience in mind, and field trips, while desirable, are not always possible. Encyclopaedias and other reference materials by their nature deal with the wider world and are unsuitable, but using the web, a custom-built module on any element of local history can be produced for use in class. This has the added advantage of being adaptable and even being further developed by the children themselves.

Before embarking on such a work, it was thought useful to explore the elements of web page design, which appeal to the target audience in order to make the resource more valuable. The information gathered here will also be of use to any other teacher or class wishing to do a similar project in their own area. While the sites chosen were dealing in a broad sense with history/geography there is no reason to doubt that the results would also be true for any other area of the primary school curriculum.

¹ The recent Press release from the Irish Department of Education promises that every school will be connected to the Internet by July 1998. (Schools IT2000 – A Policy Framework for the New Millennium. An Roinn Oideachais. Government of Ireland 1997.

2 OVERVIEW OF THE METHODOLOGY

Ten web sites were chosen from various sources for use in the study (see Appendix). These included examples of simple sites and more complex ones using frames. The sites were downloaded to the school network on which the study was conducted. The children therefore only had access to the chosen sites.

A questionnaire was developed, based on the review of the literature. In the questionnaire, pupils from a sixth class were required to answer some questions about each site in turn. They were then asked to rate the site on a five-point scale, under the five headings identified in the literature review. From this, it was hoped that some consensus would emerge as to the preferred features. Reading ages for each child were also calculated, using the Cloze Reading Test. This was to find out if there might be any connection between reading ability and navigation ability.

The children in the study were given four sessions of training on the use of Internet sites and how to navigate through a site. This included learning how to navigate three sites not included in the study, followed by exploration of the ten chosen sites.

A pilot study was carried out with five children selected randomly from the class. These pupils were brought to the computer room for two one-hour sessions where they explored each site in turn and entered their impressions on the pilot questionnaire form. They were asked to write a comment on each site.

After the results of the pilot study were analysed, the questionnaire was altered and the full study implemented and analysed.

3 FINDINGS

The first clear finding was that there was a high level of unanimity about which of the ten sites were most preferred (The White House) and least preferred (Macroom). This was also borne out in the results of a smaller experiment where two teachers were asked to fill in the questionnaire. They also chose the same sites as preferred or otherwise. While the sample in the case of the teachers was too small to be statistically significant, the results were interesting and a comparative study with equal size sample groups might yield interesting facts.

However, the sites in between these two extremes did not enjoy the same level of unanimity. For example, although the Lucan site was in fifth place according to its mean aggregate score in section (b) it came second in the quiz, indicating that although it was not so popular, it was found to be easy to use.

Some sites received a high level of disagreement. For example the Macroom site tended to be either well liked or intensely disliked. There was a difference here between the boys and the girls (mean for boys=14, mean for girls=19). It was also the only site to use frames and was deemed by some to be difficult to get around. Another issue that arose with this site was the background colour (a textured green). Some of the respondents reported liking it while others definitely did not.

Returning to the White House site, it is interesting to note that when all the comments were coded from the comment section (c), no respondent awarded the site a value less than three. This could not be said about any other site. The only category in which this site did not get the highest mean result or score was for content, where the Egyptian site received 4.28 and

the Jamaican site got 4.08. The White House site received 4.04. This result is interesting. It could be argued that the title of the site conveys a level of intrinsic interest for the children which makes them more motivated than they would be in the case of a less well known topic.

In trying to understand why it is that the White House site was so favoured, one element can be observed. This is the only site of the ten, which uses the first person and addresses the children directly, using a character "Socks". While adults might find this kind of thing trivial or irrelevant, it may have helped some of the children to identify with the site and therefore to prefer it. Another site which did get some favourable attention (Jamaica) also had some interesting features such as sample translations of phrases.

Interesting results emerged in relation to age and gender. No significant trends were obvious in relation to chronological or reading age, but in relation to gender, boys preferred some sites, while girls preferred others. The Laura Ingalls Wilder site was significantly correlated with gender (preferred by the girls), both on the comments made and on the scores awarded. This is not surprising. However, no such correlation was found on any other site.

One simple finding is that a developer must be at least aware of the elements of design dealt with in this work as issues when embarking on a project. When the content is added to these design features, the resulting website will be more effective. The tendency can sometimes be to include all features available simply because they are there. However, when the White House site is examined, it will be noticed that it has a plain background and no sounds or scrolling text. It does not use frames. The fact that it has a text alternative was noticed only by some of the children who happened to try out the link. This feature would be very useful to those with limited computer resources. However, it did not feature in this study.

There is also an important interaction between content and usability. They do not exist separately. (Squires et al, 1996). So the task for the developer is to merge the two elements into an attractive, useful and educational tool for use by children.

4 GUIDELINES FOR DEVELOPERS

Technical Issues:

- Give meaningful, but short instructions.
- Provide easy navigational strategies, but allow for more advanced ones.
- Allow the user to return to homepage from every screen (no dead-ends).
- Use graphics sparingly and only when fully justified.
- Use standard fonts.
- Make sure all links work.
- Use plain backgrounds, or a small set of simple backgrounds, which do not interfere with the colour of the text.
- Ensure there is good contrast between text and background.
- If large graphics are essential, provide a thumbnail image which links to the full sized one.
- Ensure that the site is tested on many browsers.
- Only use features that enhance the product.
- Keep the interface simple.

Design Issues:

- Use meaningful titles and links.
- Use consistent layouts which help the user navigate through the site.
- Make the pages concise.

- Use friendly language and colours.
- Use icons that are recognisable and appropriate to the users and the subject.
- Keep the screens uncluttered and simple.

Content Issues:

- Make sure the content is authoritative.
- Keep sentences and paragraphs short.
- Focus on the target audience.
- Make the readability level suit the target audience.
- Update the product in response to changes or comments.
- Keep the content simple.

5 RECOMMENDATIONS

The main limitation was the necessity of using a virtual web. This meant that the children saw only some elements of each site and were unable to engage in real interactivity. Some of the sites invited feedback. This was not available to the children. Most of the sites had external links. These were not available unless they had been downloaded as in the case of the River Liffey site referred to in the Lucan Site.

The small population was a further limitation in the study. If a wider age group was included, the variances may be greater and interesting results might ensue.

Possibilities for Further Study

This study was conducted on a network without access to the Internet. Because of this, any element of interactivity with the creators of the websites was not feasible. Possibilities exist in this area to study these elements. Following from this limitation, there was no way of assessing how quickly or otherwise each of the chosen sites would load, if they were being downloaded from the Internet. This could have an effect on pupils' perceptions of how well a site performs. A study in this area would be useful.

The sample used in this study was small. Future study could include examining sites over wider population with wider range of ages, using different schools and different pupil profiles, including special needs children. Some measure of home access to the Internet would also be useful.

The measures used to evaluate each site element could also be altered. It may be possible to generate element-specific measures which would give a more focused result of the influence of each specific element on usability.

Access to a fully equipped usability lab would be another possibility for any further study. This involves a quiet room with no distractions, complete with a one-way mirror to an observation room next door. It would also include camera equipment to record the entire procedure.

Longitudinal studies might yield some useful information as they measure the interaction over time and would capture details of children becoming bored with elements of a site.

This work represents a substantial beginning in the area of website design for primary children in Ireland. It has proved to be informative, both in its design and results. The fact that one site was so universally liked by all respondents indicates that there are features which appeal to children which should be incorporated into any possible site. One of these is the use of a mythical character to guide the children through the site. This helped to engage the children and kept them motivated even if the subject was not always interesting to them.

Perhaps the most important feature for the target audience is simplicity. This means that it is not necessary to include all the latest technological features in order to capture the children's attention. In fact, the site which had most of these features (Macroom) failed to get high scores and even proved too difficult for some children. On the other hand, the most popular site was quite simple and easy to follow. A designer must at all times be aware of the target audience, keeping text short and layout simple. If these guidelines are followed, web sites can be used to great effect in primary school classrooms.

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APPENDIX:

DESCRIPTION OF EACH SITE

Site 1 Aer Lingus

(<http://www.aerlingus.ie>)

This site was listed in a book published by Broadcom and aimed at Irish teachers (Hallissy & Hurley, 1996). It was chosen as it has short readable sections with numerous links and good pictures. It does not use tables or frames. The section concentrated on was the history of the airline and its current fleet.

Site 2 Swan River Settlement

(<http://malt.ed.ac.cowan.edu.au/students/moira/SwanRvr/index.htm>)

This site was chosen as it was created specially for use by children in Western Australia. It deals with a subject unknown to Irish children, but uses tables and colour to good effect as well as short text passages. It also used a dark background with bright writing.

Site 3 Jamaica

(<http://www.supersurf.com/>)

This site uses graphics as links. It was felt that it might score highly on graphics but low on content. It also contains translations of common phrases and even some Jamaican recipes.

Site 4 Lucan – A Virtual Tour

(<http://iol.ie/~scaine/lucansite/index.htm>)

This site was constructed specially for this dissertation, using the guidelines in the available literature. It uses numerous links as well as photographs and short text pieces about each section. The menus are constructed in table form.

Site 5 Macroom Site

(<http://homepages.iol.ie/~sweeneyd/index.htm>)

This site was produced for a school in Macroom Co. Cork. It is quite colourful and uses frames. There are also numerous photographs used within this site. Another interesting feature is that the entire site is available in Irish.

Site 6 Laura Ingalls Wilder

(http://ourworld.compuserve.com/homepages/p_greetham/ingalls/home.html)

This commercial site deals with the famous author of the “Little House on the Prairie” books. It includes biographies, photographs and a wealth of information. There is a section within the site, specifically for children. It was felt that it was important to include some commercial sites within the list.

Site 7 Martin Luther King

(<http://www.seattletimes.com/mlk/index.html>)

This site uses newspaper articles to give information about Martin Luther King Jr. It is a commercial site and is not specifically aimed at children.

Site 8 Egypt Page

(<http://touregypt.net/kids/History.htm>)

This site is designed specifically for children. The section available to the children in the study is on two distinct pages with limited internal links.

Site 9 Seven Wonders of the World

(<http://pharos.bu.edu/Egypt/Wonders/Home.html>)

This is an educational site, with good graphics and plenty of information about its subject.

Site 10 The White House

(<http://www.whitehouse.gov/WH/kids/html/home.html>)

The section chosen from this site is aimed at children. It has many photographs, many of which are links in themselves. It is introduced on the screen by the character “Socks”.