Personal Glossaries On The WWW: An Exploratory Study

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ABSTRACT

We examine basic issues of glossary tools as part of a suite of annotational tools to help users make meaning from documents from unfamiliar realms of discourse. We specifically evaluated the performance of glossary tools for reading medical information about common diseases by users with no formal medical education.

We developed both automatic and an editable glossary tools. Both of them extracted definitions from the text of articles. Only the editable glossary tool allowed users to add, delete, and change entries.

Both tools were evaluated to find out how useful they were to users reading technical articles online. The analytical results showed that user performance improved without increasing total reading time. The glossary tools were effective and pleasing to users at no decrease in efficiency. This experiment points the way for longer-term studies with adaptable tools, particularly to help users unfamiliar with technical documents. We also discuss the rôle of glossaries as part of a suite of annotational tools to help users make personal (and therefore meaningful) hypertextual document collections.

Categories and Subject Descriptors

H.5.4 [**Hypertext/Hypermedia**]: User issues; K.8 [**Personal Computing**]; H.5.1 [**Multimedia Information Systems**]: Evaluation/methodology

General Terms: Human Factors, Experimentation

Keywords: Hyperlinked glossaries, Annotation support, User interfaces, Evaluation experiment

1. INTRODUCTION

In this article we consider issues of how to best adapt familiar features from traditional media to hypertext form to enhance or improve users' experiences. Many readers of discursive texts annotate paper copies of such texts with their own notes [3, 4, 5]. Readers of such texts are frequently confronted with unfamiliar or ambiguous vocabulary. As a result of which it is common for some of these readers to attach glosses (and other notes) to the printed text to focus their mind and remind them of the meaning of their words during their next reading [5].

Where the notes are about the definition of terms used in the text they are called glosses [3]. These glosses are restricted to one copy in each work. We contend that as with shared annotation, making shared glossaries useful is more a matter of human factors than technological sophistication. Glossary entries have meaning that cannot be separated easily from the context in which they were created [6].

Here we concentrate on a basic determination of users needs[†]. We experimented to learn if users were better off with glossary tools incorporated into browsers or not. We also tried to determine if it was better for users to have glossaries with entries that they could update or static lists.

2. DESIGN

We expect that by using glossary tools readers will be able to understand texts better and discover associations between concepts that they would not have been able to without such tools.

We developed our prototype user interfaces following lessons revealed in earlier experiments [1, 7, 8]. Extensive searches in multiple databases turned up no recent research about human factors of on-line or electronic glossary use.

We used three interfaces within a web browser in our tests:

1. one interface had no special features (and is not shown here);
2. one interface presented a glossary containing pre-defined terms (which is similar to Fig. 1 but without the toolbar at the bottom);
3. finally an interface much like the previous one but that allows users to update the glossary (shown in Fig. 1).

The interface for the user-updateable glossary tool (shown in Fig. 1) is divided into four sections:

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[†]This is a condensed version of the full (hypertext) article which will be available from ⟨`URL:http://www.cs.dal.ca/~jamie/DocEng04/`⟩, at least until it is available from the ACM.

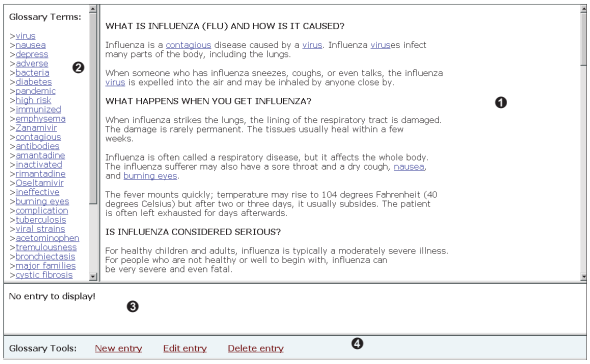

Figure 1: Updatable Glossary Interface (with labels)

❶ The main text is displayed in the largest division, which is located in the upper right.

❷ A list of glossary terms is provided in the left-hand division, while glossary entries are displayed in the bottom division.

❸ Glossary terms in the main text are underlined and clicking on these underlined terms displays the corresponding glossary entries in the first of the bottom divisions (the lower division will be discussed shortly). Glossary entries can also be accessed by clicking on the terms listed in the left-hand division.

❹ The toolbar, at the bottom of the window, is available only in the user-updateable interface. This toolbar allows users to modify or delete exiting entries and to add new entries to the glossary.

3. METHOD

We tried to simulate a real-world condition in which people would want to understand a text with unfamiliar terms. We asked experimental participants to read online articles about diseases with the goal of understanding their severity and treatment options. Participants were told to imagine that they, or a child in their care, had recently been diagnosed with the condition as motivation to understand the text.

The choice of health conditions, and whether participants began with a glossary or not (and which glossary they used) was randomly assigned.

The experiment was a mixed design: the comparison between the glossary and non-glossary treatment was within-subjects (in which every participant acted as their own control), but the comparison between the two glossary tools was between-subjects. In addition to acting as a control for the no-glossary condition, the use of two types of glossary tools allowed us to make crude comparisons between them although we do not report on differences between the types of glossary tools here.

3.1 Experimental Tasks

When the participants had completed reading the articles and answering the questions about them, they were asked to complete a questionnaire measuring their subjective appreciation of the glossary tool they were given to use. A debriefing session followed where participants were asked to express any comments about their performance during the study. The debriefing allowed participants to openly express their views on the software and describe what areas they felt required improvement. It also proved useful in the collection of subjective data from the participants.

3.2 Participants and Materials

Forty participants from various backgrounds took part in the study. All participants were familiar with the use of computers and as such, represented the target audience for the glossary tool. Self-selection bias was not expected. Therefore, the presence of any skewing due to selection bias is not expected in the results.

The articles used for the study discussed asthma, bronchitis and influenza. These are health conditions that affect a considerable part of the general population. A large number of individuals may therefore be interested in reading about these conditions. It is likely, however, that these individuals are not familiar with the specific details presented in the articles chosen. This would give the participants incentive to read the articles with greater attention to detail.

3.3 Sketch of Experimental Protocol

- Every participant completed two sessions.
- Each session began with participants answering questions about a health condition they would shortly be reading about.
- The participants then read a text about the condition in a web browser which had been set up with optimal window width and font size (although participants were free to configure it to their preference).
- The web browser was configured with one of the three interfaces.
- In the second session, participants were exposed to a different interface and article. If they had a glossary interface in the first session then they had no glossary in the second, and vice versa. The choice of which glossary interface they were exposed to was random.
- At the end of each session participants answered a different set of questions about the health conditions they had just read about.

4. RESULTS AND DISCUSSION

Most users expressed satisfaction with the tools. The majority of users also said that they would like to have such a tool available when working with unfamiliar topics.

Speed and performance on the tests given to users were used as measures of the usefulness of the glossary tools. These measures were compared for each glossary tool in order to determine which of the two had been more useful to the users.

4.1 Increased Comprehension (effectiveness)

The purpose of our glossary tools is to increase users' understanding of the text that they are reading. The results in Table 1 show that there was a significant improvement

		Range	Mean	SD	Mode
No	Before Reading	11 – 78%	55%	17%	44%
Glossary	After Reading	0 – 100%	60%	17%	60%
Simple	Before Reading	0 – 90%	45%	22%	56%
Glossary	After Reading	40 – 100%	78%	16%	80%
Updatable	Before Reading	22 – 67%	44%	13%	44%
Glossary	After Reading	70 – 100%	83%	12%	70%

Table 1: Comprehension Levels (%)

	Range	Mean	SD
No Glossary	131.9 – 501.4	267.4	95.4
Either Glossary	70.1 – 476.5	255.1	96.4

Table 2: Time To Read Text (in seconds)

	Range	Mean	SD
No Glossary	302.6 – 778.8	549.0	114.1
Either Glossary	306.2 – 880.2	603.0	131.4

Table 3: Seconds To Read Text & Answer Questions

in comprehension scores of users with a glossary tool than without one ($t = 5.505, df = 39, p < 0.05$) under all conditions.

4.2 Speed of Performance (efficiency)

Efficiency data is summarized in Tables 2 and 3. The users' mean speed of 603.01 seconds for the *entire* session while using the glossary tool was slower than their own mean speed of 548.99 seconds without a glossary tool ($t = 2.550, df = 39, p < 0.05$). However no difference was found between the mean lengths of duration participants needed to read articles with or without glossaries ($t = -.648, df = 39, p < 0.05$).

The mean time of 187.69 seconds to answer questions after reading an article with a glossary tool is slower than the mean time of 139.69 seconds to answer questions after reading an article without a glossary tool ($t = 4.522, df = 39, p < 0.05$).

5. FUTURE RESEARCH DIRECTIONS

The two major types of on-line glossary tool are those that are tied to a specific document, and those for use with every document a user might encounter. A distinction can also be made between shared and personal glossaries, but because of the well-known usability issues with shared hypertext links (see e.g. Reference [2]) we do not discuss such options here. We suggest that future research should be about the human factors of the personal type. There are still several basic features of glossary use that need to be understood if we are to create a tools that can truly augment human abilities. In particular we need to determine what happens when readers use an updateable glossary for a long time.

We suspect that users spent more time answering the questions when they knew the answers instead of simply stating that they did not know. A further analysis, and future experiments, may consider the length of responses to the comprehension questions.

6. SUMMARY

We conducted an exploratory study to evaluate some factors relating to the suitability of integrated hypertextual glossaries for reading unfamiliar technical texts. Ours was a preliminary experiment investigating the importance of various factors on the usability of hypertextual glossaries. We found that glossaries do indeed increase users understanding of texts. We found, in contrast to some earlier work [7], no evidence that glossaries impeded users in anyway.

If our supposition that personal glossaries can help individuals (and co-operating groups of people) to make sense of texts, but that are unsuited for sharing with others, then there is a great opportunity for such tools in e-books and Web browsers. The results of our experiment indicate that our prototypes are good models for tied versions of such products. There is clearly much need for further research and product development in this area.

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