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Help in the Search for Information in Hypermedia Documents

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Abstract: This paper presents a system of help for the exploitation of hypermedia documents. It was derived from a common type of educational CD-ROM in which we added search and note-taking tools. The evolving note-taking system interacts continuously with the document being explored, and allows the user to keep the explored sections in mind. A study on usability of the search tools showed that the students prefer the index or the table of contents and neglected the cross-reference links. The activity of note-taking at every stage of their search favored their planning of the search.

Introduction

The consultation of hypermedia documents can be easy and satisfying when it is simply a question of discovering an individual item of content, it can prove to be more complex when it is a question of in-depth research in the context of one particular project. In a previous study (Beaufils, 1998), we sought to identify certain difficulties encountered by secondary school students using a typical hypermedia (the CD-Rom encyclopedia which deals with ancient Greece) in order to respond to a series of questions on larger themes.

In this paper, we describe a prototype which includes specific tools for information seeking in a hypermedia; then we discuss the results of several investigations on the usability and the usage of these tools.

A prototype for information seeking

Although it conserved the content, the structure and the index of the original CD-ROM, the prototype includes several new tools for searching, selecting and note-taking.

The search tools, such as the index or semantic cross-references, function by interacting with the table of contents. Colored highlighting allows the student to use these tools in order to situate the pages that have been found within the hierarchical plan. Users also have the option of placing the headings of all the pages which interest them in their own personal area. The personal area can be divided into several compartments, allowing the students to organize the material they had selected into such categories as: pages to visit, pages already visited, pages corresponding to themes existing in the document, or pages corresponding to themes resulting from their personal research plans.

This workspace is intended to function by interacting with the selection system. Several different types of notes can feature on it: preparatory notes (clues, bookmarks, personal knowledge), personal comments and pieces of information gathered during the consultation. The notepad is structured by topics defined by the user. She can put together the heading of a page, some excerpts of a page and also personal comments, arrange them under a named topic or move them to another topic.

The usage of the search and note-taking tools

The study involved six students, all volunteers aged 16 and 17 coming from a high school in the suburb of Paris. Students spent three sessions working on three questions: (1) the image and place of women in Greece, (2) the importance of the body in Greek civilization, (3) the good and bad aspects of Athenian democracy.

In numerous cases, the students only used one search tool during any one session. They were tempted to repeat, in a somewhat systematic fashion, the strategies that had already succeeded, as Weyer has previously noticed about dynamic books (Weyer 1982). The index and the table of contents were the most commonly used tools. The index was often selected as the first tool and generally enabled a highly exhaustive search. The readability of the table of contents ensures the fruitfulness of searches conducted using this tool (Dee-Lucas, 1996). Few attempts to extend the search using semantic cross-references were noted, mostly during the last session. Linear exploration was only used by students as a complement of other consultation methods. The number of pertinent pages found during the three sessions was high (85% or higher) which shows the effectiveness of the strategies followed, whatever tools were used.

All the students used the selection tool but they usually inserted the page headings in a single compartment, limiting this tool to its "storage" function. The putting aside of page headings helped in consulting these pages and reduced the risk of forgetting about them. The loss of pertinent pages was moderate (less than 30% for the two first questions), which attests to a satisfactory command of the operations of consultation and exploitation. In few cases, the possibility of creating categories within the selection gave rise to diverse strategies: planning which sections to consult or structuring those categories that had already been consulted.

The number of notes produced by the students at the beginning of the session ranged between three and around ten. These notes essentially designated sections to explore. We noticed the strong influence the preliminary planning had on the search for information and on the organization of the final response. The production of an initial structured plan led to a precise but inflexible representation of the goal to be attained. During their consultations, students may discover pieces of information that do not figure in their preliminary evaluation of the question. Such discoveries can lead to modifications in the final plan with respect to the initial plan. Over the course of 75 operations of note-taking recorded, 17 corresponded to an event leading to a noticeable modification of the final plan. Our observations show that in the majority of cases, the representation of the response did not develop in any notable fashion. One might suppose that the more elaborate the representation, the harder the subject will try to preserve it intact (Rouet & Tricot, 1998).

Closing remarks

We observed that the activity of note-taking performed by the students at every stage of their search for information (evaluation, selection and treatment) unquestionably favored how they managed the search and the planning: (1) the initial notes stimulate the process of evaluating the task, giving the students points of reference and freeing their memories from certain work; (2) the workspace the students are able to use must be unified but with the constant possibility of being reorganized; its function is to put three types of notes in relation with each other: the preliminary search plan, a selection of pertinent pages, and a selection of information gathered from these pages; (3) some aspects of the process of note-taking are neither spontaneous nor common, thus it is desirable to give the students specific advice at the beginning of the session or to expose them to some prior training.

By using search mechanisms that are relatively independent of content, associated with an open, flexible and evolving note-taking system, students can have the possibility of constructing a personalized hypermedia system within the document they are exploring. We are now studying how such tools can be adapted to facilitate similar activities with web resources.

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