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# Results of the project ergonomics of reading

- Publications / Projets de recherche - Anciens projets - Ergonomie de lecture et feuilletage du livre électronique. -

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**This questioning raises research issues in the fields of cognition, psychosensory analysis, digital documents structure and presentation, competitive environments in the value chain and distribution of written documents. We have followed two research dimensions, corresponding with the two teams having brought to fruition the project:**

**characterization of the action of page turning in a traditional book which will serve as basis for the implementation of automated page turning (ENST Bretagne, more precisely: Frédéric Miras' thesis),**

**concerning interaction between men and machine, the definition of critical points in the interaction with an electronic book through a functional analysis of traditional and electronic books (GRESICO).**

**These two dimensions converge towards a specification of the intelligent and user-friendly e-book, whose functionalities, if not its architecture, we already suggest establishing.**

To come with a characteristic of the notion of page turning, we have developed a certain number of models, based on typology, on user profiles and on the examination of different pre-existing models, like the one on which the norm XSL-FO is based. We suggest carrying out a field study to consolidate our hypotheses. The models description as well as the results of the field study will be part of Frédéric Miras' thesis.

In the framework of this thesis, we will develop a software prototype implementing the action of page turning as well.

Among the models of the traditional book we have studied, is the one of ergonomics. It is based on the results of the work of the GRESICO team which was a "case-by-case-review" of standard functions of the classic book that electronic books try to meet. The functional analysis carried out by this team has allowed to underline critical variables which could be tested through a computer product in order to see if it satisfies the requirements of the identity "book". Thereby, we hope to evaluate other functions in addition to the three ones perceived as critical, and other finalized or prototype-stage computer solutions as well.

Parallel to this analysis, the team of GRESICO has processed an experiment which results indicate that the Pocket PC support used allows the carrying out of important functions when reading a short text: normal reading time and coherent understanding of the semantic content. Nevertheless, it was observed that on the items assimilated during memorization, means reformulated during the recall, performance is disturbed by the presence of the electronic support in the visual field, while a somewhat facilitating effect is observed when it comes to a paper book.

These results could give the impression to be anecdotal, if one would not emphasize that cognitive methods of assimilation are crucial in acquisition. Thus, they reveal an appropriation of the conceptual content, because rephrased with the own words of the individual. Thus, walking around with an electronic school bag does not represent the same thing, on a cognitive point of view, as walking around with a physical one.

To reduce this disturbing effect of the presence of multiple textual contents on the same support, it would surely be necessary to develop ergonomic recommendations, such as considering the electronic support as a library and not as a book (in other words change the metaphor). A visualization of the content of this library on the interface would

constitute an important element. In addition, for each textual e-content, the identity of this specific content would have to be marked as well during its cognitive processing. This could be realized, for instance, through automated reading by voice synthesis of the title of the book opened by the reader. The correlations found between the intellectual treatment of textual content and the subjective evaluation of supports by readers illustrate the importance to consider the e-book as a whole, forming an own identity.

This leads us up to take particularly into consideration the interest the development of an "electronic paper" can represent, as it is already the case in certain laboratories in the United States.

### **Ulterior perspectives**

Nowadays, few laboratories in France are interested in e-books and in the use of pocket computers, whereas it turns out more and more that it is a very promising market segment which notably interests especially the Breton industrial network as ICT.

The university ENST Bretagne, through this project of other funding around the same thematic, claims to becoming an excellence centre in the domain of digital edition and of processing electronic documents, a field whose importance does not cease to increase thanks to the dazzling explosion of the Internet and new ICT. Divers educational projects as well as industrial and scientific partnerships are in formation.

Additionally, through this study, GRESICO has been able to initiate a research dimension which surpasses electronic reading to focus on the interaction with mobile phones with complex functions. This research has contributed as well to the definition of the educational project for the special foeld of the professional master course "Documents and Information and Communication Technologies", a program which will open at the UBS in September 2004 and which will profit from the supervision of GRESICO laboratory.