

A Qualitative Evaluation of The European Library

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Abstract

Evaluation of digital libraries assesses their effectiveness, quality and overall impact. In this paper we describe a qualitative evaluation of “The European Library” carried out by six highly qualified evaluators from the area of computer and library science. The findings -mainly usability issues- are presented along the ITF model and suggestions are given to overcome these findings.

Categories and Subject Descriptors

H.3 [Information Storage and Retrieval]: H.3.1 Content Analysis and Indexing; H.3.3 Information Search and Retrieval; H.3.4 Systems and Software; H.3.7 Digital Libraries;

General Terms

Measurement, Performance, Experimentation, Usability

Keywords

Qualitative Evaluation, Digital Libraries, The European Library

1 Introduction

The wealth of information sources and the proliferation of internet resources have created a rich ecology of information. This often chaotic state takes several forms. Even in the cases of organized information corpora under the auspices of an expert information agency, such as a library, the increased heterogeneity in various levels discourages users to explore them in full length. Questions of performance and effectiveness also arise, increasing the levels of users’ uncertainty and decreasing the exploitation of proper information seeking strategies. One of the proposed solutions to this problematic state is federated search. Federated search (also known as meta-search or cross-searching) allows users to search over a -virtually infinite- range of heterogeneous resources. The merging of these resources is transparent to the users and helps them override long-term memory problems on product/system labelling, topic specialization and coverage. Instead they are able to perform searches based solely on their primary information needs and given knowledge state. Federated search paradigms come from the meta-search engine world, where users are able to conduct the same query in many search engines through a common interface, but similar cases are found also in the DL development field [Schatz *et al.* 1999].

However federated search applications are not accepted without any consideration. Librarians often express their concerns about the trade-offs between the easiness to search over multiple resources and the insurance of quality of search tasks. Librarians have questioned many facets of the meta-search process. The merging and de-duplication of results is one of the main concerns. Other evaluation areas, such as usability, have identified problems regarding search progress feedback, results display (mainly sorting), navigation, resource selection and interface design [Elliot, 2004; Randall, 2006]. Furthermore, meta-search applications alternate a significant part of user interaction with library resources and services. These applications support behaviours that are developed on simplified modes of access in internet resources and simulate the library world to the Google paradigm, pushing libraries to change and to adopt other fundamental services, such as training [Cox, 2006]. However the easiness of such applications is a target outcome. Losau notes

that an ideal information service in the academic environment should combine “*the ease of handling and the robustness and performance of Google-like services but with the relevance and proven (“certified”) quality of content as it is traditionally made available through libraries*” [2004].

The European Library¹ is a project that offers free access to the resources of the forty seven European national libraries. TEL’s aim is similar to the one expressed above. TEL provides a common access point to over 150 million entries, which come from the catalogues of the national libraries, but -as a manifestation of future aims- provides also access to selected digitized resources of cultural importance. The two years long TelPlus project² aims to OCR more than twenty million pages of content in many languages and to provide them through a common interface.

TEL provides not only core digital library services, like search and browse, but supports user interaction with functionalities that enhance information life-cycle, such as connection with other information systems. TEL has initiated a cooperative relationship with DELOS NoE, which is structured into four Tasks. The four tasks investigate several aspects of the integration of DELOS expertise with TEL infrastructure. The ultimate aim is the improvement of TEL services and the advancement of DELOS expertise. The four tasks include the validation and refinement of the digital library reference model through interaction with TEL (task 1), the assessment of multi-lingual information access in TEL (task 2), the exploration of the personalization functionalities of TEL (task 3) and improvement of user interface design (task 4). Under the forth task, the DELOS WorkPackage 7 team has undergone an evaluation campaign in order to provide on the areas of design, navigation and visualization.

2 Search Tasks

In order to perform an evaluation as realistic as possible when assessing the functionalities within TEL, we used a specific framework describing the work-task situations [Hansen & Karlgren, 2005]. We designed an enhanced contextual framework description called SDWS (Simulated Domain and Work-Task Scenario).

For each scenario, we designed a two level description framework. The scenarios were derived and designed from real-life work-task situations and is similar to the simulated work-tasks described by Brajnic *et al.* [1996] and Borlund [2000]. However, our tasks try to incorporate slightly more natural search task situations. Basically, the SDWS has two main sections with two subsections each:

General descriptions:

Domain:

Work task:

Situational description:

Topic:

Search task:

The two-level scenario and description were designed as follows: the first level contains a short description of the domain and of general work-tasks or routines usually performed within this domain. The second level contains a situational description including the topic of the query and a search task description. In this way, the scenarios would allow the participant a broader understanding of the actual information-seeking situation, as well as they relate that to the system and its functionalities at hand. The following three task topics were designed and one was chosen and used by the expert evaluators of the TEL system:

Task a) General descriptions:

Domain: Historic research

¹ <http://www.theeuropeanlibrary.org/>

² <http://www.theeuropeanlibrary.org/portal/organisation/cooperation/telplus/>

Work task: Research on the historic events such as crusades in Europe.

Situational description:

Topic: Historic crusades (first to fourth)

Search task: Textual and visual information on the historic crusades (first to fourth), including contemporary reports, but not novels or fiction.

Task b) General descriptions:

Domain: Historic research

Work task: Find information about pilgrim paths in Europe, maybe also forgotten paths, in order to explore them paths and sites.

Situational description:

Topic: Pilgrim paths

Search task: Search for textual and visual information about pilgrim paths in Europe, especially the Jacobus path, but beginning from Northern Europe. Find interesting paths and cities along the ways.

Task c) General descriptions:

Domain: Prehistoric religions in Europe

Work tasks: Exploration of prehistoric matrilineal religious symbols and artefacts that have been “integrated” into Christian symbolism and artefacts in European countries.

Situational description:

Topic: Black Madonnas in Europe

Search task: I am going to travel through mid-Europe next summer and would like to read some books and see other material about Black Madonnas.

3 Evaluations and Findings

The findings of our qualitative evaluation of the TEL website are structured according to the criteria of the Interaction Triptych Framework [Tsakonas & Papatheodorou, 2006]. While ITF is not developed for this purpose, its simple, yet comprehensive substance allowed a summarization of the findings. ITF assumes that the main digital library constructs (namely users, system and content) develop a dialectic relationship. Three evaluation categories are defined on the axes that are created while the constructs interact, which are usefulness, usability and performance. Each category of ITF aggregates a set of attributes (Fig. 1). While this is a top-down approach, we used also a bottom-up approach to investigate the technical abilities of TEL. The functionalities that TEL provides, such as linking with other services or sharing results, are essential for the enhancement of information life-cycle.

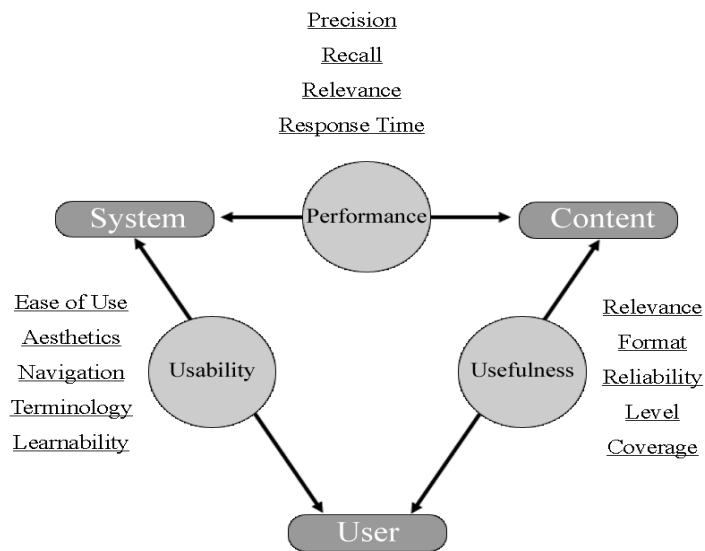


Figure 1: Interaction Triptych Framework

Usefulness

Since the providers of TEL are the national libraries reliability of the content is considered satisfactory. The main items are bibliographic references, but also complete items including maps, paintings, old books and other national items. These items are specially placed under the category “Treasures”. In some cases thumbnails attached to bibliographic records permit users to see the item, even so not in a full format. Example records are in the Atlases collection of the Koninklijke Bibliotheek, NL. TEL can be used to search for references with specific topics or task, but it seems best suited for known-item search, based on title and/or author search.

In the following we structure the findings by each main section or web page of the TEL interface (version 1.5) - *search page, collections, result page, favorites, user guide and collections-* following the ITF structure.

Main entry page³ (Figure 2):

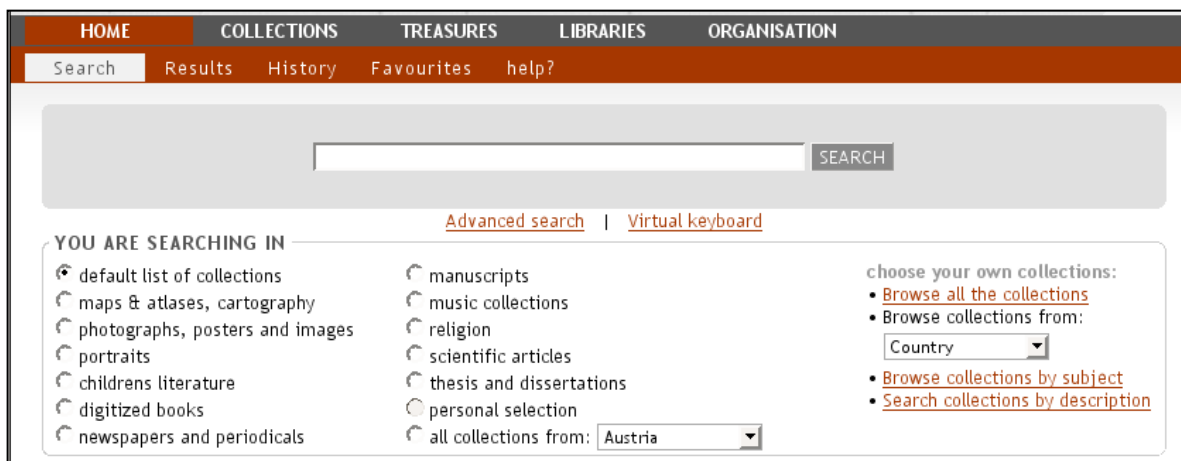


Figure 2: Main search panel

a) Usability

Regarding the usability of the main webpage, the evaluators found some issues that might confuse the users:

³ <http://www.theeuropeanlibrary.org/portal/index.html>

- *Terminology*
 - “Default list of collections” does not state which collections are selected to be searched. Actually all proposed collections are not identifiable. (F:3)⁴
 - The “Collection selection” (right) in the “You are search in” box may inflict irritations. There the terms “search” and “browse” are used in this search box. (F:1)
 - The term “collection” is not stated in all shown collections, like “religion”. Does it mean “collections about religion”? There is apparently a mix between themes and media types. (F:1)
- *Navigation*
 - After activating the advanced search, the link still shows the same link description and when a user needs to return to the simple search, he needs to click on “advanced search”. (F:2)

b) Functionalities

- The “personal selection” is not clickable and it is not stated how to edit a personal selection. (F:2)
- Virtual Keyboard: The purpose of the virtual keyboard is not clear. The web page is usually not used with pen input or touch screens, where this functionality is necessary. Also main keys like the “Backspace” or “Enter” key do not work properly and can not be activated. Only the help page states, that it is necessary to enter special characters of other languages. (F:2)
- It is not possible to select more than two collections like religion and portraits in the selection on this page.(F:2)

Result page (Figure 3):

The screenshot shows a search interface with a navigation bar (HOME, COLLECTIONS, TREASURES, LIBRARIES, ORGANISATION) and a search bar. Below the search bar, there are search options and a list of matches for the query "madonna". The search results are displayed in a table with columns for the collection name, the number of objects, and a "See online" button.

Collection	Number of Objects	Action
Online books, images, maps, music...	307	See online
UK British Library integrated catalogue	1000	See online
DE Online catalogue of the German National Library	906	See online
PT Collections from the National Library of Portugal	30	See online
NL General Catalogue Koninklijke Bibliotheek	276	See online
FI HELKA - Union catalogue of all Helsinki University libraries	153	See online
CH HELVETICAT : the catalogue of the Swiss National Library	aborted	See online

The search results list includes the following items:

- Dekameron** by Giovanni Boccaccio. Document type: hangfelvétel, elbeszélés(ek) | Language: hun, ita. See online
- Dekameron** by Giovanni Boccaccio. Document type: hangfelvétel, elbeszélés(ek) | Language: hun. See online
- Dekameron** by Giovanni Boccaccio. Document type: hangfelvétel, elbeszélés(ek) | Language: hun. See online
- Madonna a szerzetessel** by Északolasz festő, 18. sz. See online
- Madonna a szerzetessel** by Északolasz festő, 18. sz. See online
- Madonna gotizáló baldachinnal (magyar, 1840 körül)** by Munkács-Selesztó Vasöntöde. See online
- Madonna a kis Jézussal** by Olasz festő, 18.század. See online
- Madonna gotizáló baldachinnal (magyar, 1840 körül)** by Munkács-Selesztó Vasöntöde. See online

Figure 3: Search result page

⁴ Number of evaluators, who found this.

a) Usability

- *Navigation*
 - The search result shows a “Jump to Page” command, but the interface does not show anywhere how many pages the results have, nor is there any indication of the sort order of the results. Therefore any jumping to different pages is random. (F:3)
 - The top right “next” button on the result list fails to indicate anything happening, until the results suddenly change a few seconds later. The busy indicator appears on the other side of the screen where it will be missed by most users. (F:1)
 - The “next” and “previous” buttons seem to start a new search, as indicated by the search indicator “stop the search” on the right, instead of browsing through the result list. The user does not want to stop the search, but just go next or previous. (F:1)
 - The user may use intuitively the back button, when looking at details from the result list. But nothing happens on the first click and on the second click all search is lost, because the user is directed to the main search page instead to the result list. (F:1)
 - With the query “madonna”, and then selected the German national library, a click on a detail jumped back to the TEL collection and showed no details. (F:1)
- *Ease of use*
 - If a result is not available after a search in the first collection in the collection list on the left side, then the result screen shows “0 results”. This indicates an empty result, even if there are more results in other collections. (F:1)
 - For some results no details show up and there is no indication, that there is none. There is also no error message. Query example: “Dekameron”, first hit. (F:2)
 - When online documents are available for viewing, there is nothing to indicate the file size or expected download time. (F:1)
 - It is also not possible to open results details in separate windows or browser tabs, which could make comparison possible. This is a common method of search engine users, who first open any interesting results from a result list and then look through the opened results. The interface allows only viewing a single result then forces the user to go back to the result list to view another one. (F:1)
 - It is not possible to identify already seen documents on the result list. Only by looking at the details there it is visible that the option “save in favorites” has been grayed out. (F:1)
 - When a user wants to change the collection selection in the result list, when he changes it and stores it, then he needs to repeat the search, since he has moved back to the home page again. Here the personal selection is now activated, which can be easily overseen. (F:1)
- *Terminology*
 - The “see online” link (service box), which is attached to every record in some cases, is repeated with no signs of differentiation. It needs proper labeling, because the one refers to a document delivery service of a national library, while the second one refers to the online version of the same record. (F:1)

b) Performance

- *Precision*
 - It is difficult to assess what search results are relevant. The displayed bibliographic information does not indicate how the results are relevant to my query (query example “Madonna”). (F:2)
 - Boolean Search: The Boolean query is automatically changed, e.g. given “crusades” OR “kreuzzüge” is mapped to “crusades or kreuzzüge” as string query, which will not yield any result. The above query can be specified using the advanced search, but this is not obvious. Also, since a textual representation of the advanced query is shown during the

search, it seems natural for a user to try to directly specify a similar query with the simple interface.

- Limit the search by “search within these results” starts a new search, so no filter is available. (F:1)
- *Recall*
 - In regard to results ranking there seems to be no sorting order of the results. This makes it very hard to find the relevant documents. Also it is not possible to change the order, e.g. to alphabetical by title or author name. Also a comparison between the British Library and TEL with the same query gave the same number of results, but with different order. (F:1)
- *Response time*
 - In general TEL takes more time to search the collections than the respective national libraries catalogues. For example a search in the Integrated Catalogue of the British library of the term “usability” took 4,06 seconds to produce results. In the same case, with search range limited to the collections of the British Library, took 22,06 seconds. TEL searched also in other BL services, like “Serials and Periodicals”, “Document Supply” and so on. (F:1)

Search History page⁵

- *Ease of use*
 - Here the list of queries is shown and can be selected by a radio button to repeat the search. A delete button and the number of found results would be helpful in order to determine the right query strategy. (F:1)
 - The radio buttons along with the reset button implicate the reset/delete of exactly one entry. (F:1)

Favorites page⁶

- Saving search results as favorites does not in fact “save them”, but only keeps them for a single session, which can be lost easily by clicking on the wrong links. Closing the browser loses all “saved” results, unless the user goes to the “favorites menu” and then individually saves each stored result again. (F:1)
- It is not possible to do anything with saved favorites. They can not be annotated, tagged, sorted, categorized or printed/saved to disk as a whole. (F:1)
- Only 10 favorites per session are storable, which severely limits the usefulness of the functionality. (F:1)
- Clicking on an item in the favorite list opens the details at the bottom of the list instead of near the item that was clicked on. (F:1)

User Guide page⁷

- *Learnability*
 - The user guide is very helpful to beginners. But the example screen shots are sometimes too small and the underlying link does not show the examples screen shot, but links back to the main search page. (F:1)

Collection pages⁸

- *Ease of use*

⁵ http://www.theeuropeanlibrary.org/portal/search_history.html

⁶ http://www.theeuropeanlibrary.org/portal/search_favorites.html

⁷ http://www.theeuropeanlibrary.org/portal/organisation/services/userguide_de.html

⁸ http://www.theeuropeanlibrary.org/portal/collections_all.html

- The main selection page with all collections is too large and has too much information. Also, it is not possible to start a search from here, after collection selection. The user has to click on the save button, to start a search. (F:1)
- The list of national libraries in the Libraries and Treasure web pages do not allow quick browse of the participating libraries, though the list is organized in alphabetical order. (F:2)

Language issues

This is a separate group of findings that focuses on language issues of the user interface that might confuse the users:

- Different translations into other languages need to be corrected. For example in the Greek case, the term “browse” (in the “Collections” main category) has been translated twice, e. g. “Browse all collections” is translated as “Periigisi”, which means -freely- “Touring” and in “Browse collection by subject” as “Anazitisi”, which means “Search”. (F:2)
- Even though a different language than English is selected, the descriptions of libraries on the collection page or the treasure text are not all translated. (F:1)
- There are wrong shown umlaut in the translations. (F:1)

4 Discussion

The above findings need to be incorporated in the re-designing process and this section discusses the major issues to be solved. Also suggestions on how to proceed with the development of TEL are given from the experience gathered under the DELOS NoE. It has to be noted that TEL possesses the unique property of being able to apply to different circumstances. On one side a user can search for valuable information in a range of resources through a unified interface (an information search task), while at the same time he might visit TEL and explore digitized objects of historic and cultural importance (a leisure activity). This leads to increasing the complexity of visitors’ profiles, as the developers are not able to address their design to an audience with predetermined characteristics and aims.

We identified three major issues, namely usability, search and result functionality, and the language problem to be addressed.

The collection selection is usually the first important phase in a series of phases [Paepcke, 1996] and heavily depends on the current user task. For example in case of the “known-item search”, where exactly one document is searched, the whole collection should be used, maybe only separated by the user given language selection or media type. But on TEL website is not clear from the information provided on the search page, which collections are selected or which to select. Moving to more complex search tasks, the whole process of collection selection requires more attention, because it significantly influences the recall and precision of the search task.

Further classification or filter methods need to be given for collection selection to the user and the visualization of already selected collections needs to be improved. Browsing the collections, e.g. based on the Multi-Level-Hypertext [Agosti *et al.*, 1991], could help the user to decide which collections to use. Of course very good descriptions need to be given to the user to assist his decision and only a small abstract might not be enough to give the user the adequate information about the content. It is also possible to investigate automatic collection selection based on the given user query or further attributes.

Concerning query and search results, the query formulation is very unclear to the naive, but also to the experienced user. Trying to formulate a Boolean query in the simple search screen yields wrong interpretations of the Boolean expression. This can be covered partially by the advanced query form, but might irritate the user in the beginning of his search tasks. A clear help page and correct Boolean interpretation can certainly provide an effective query.

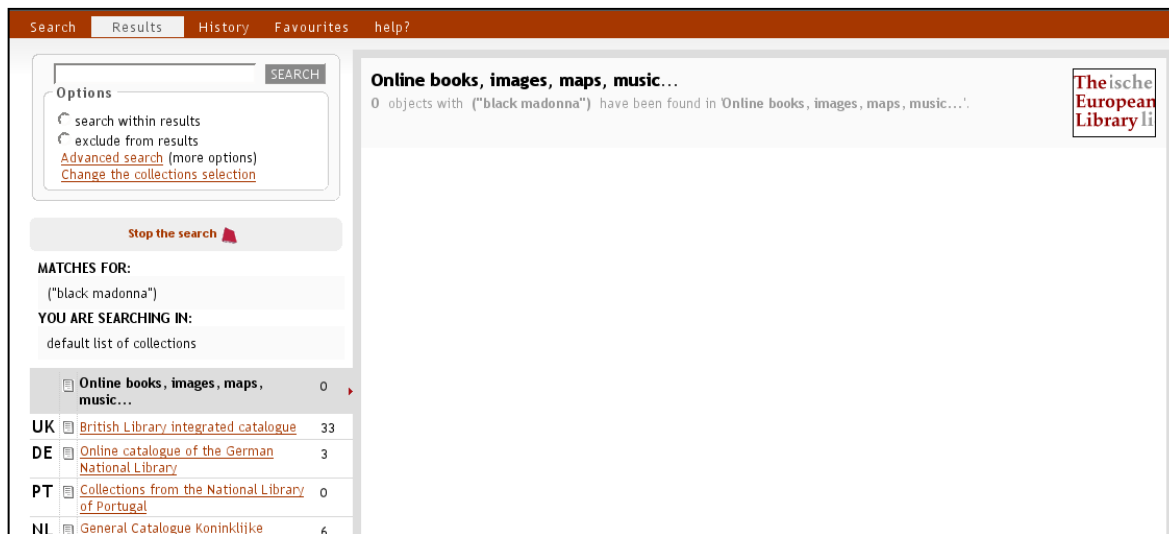


Figure 4: Search: 0 result in first collection

In regard to result presentation, if a query is executed, the visualization of the search process might be considered as “misleading”. It is not possible for the user to judge by the given result set relevant information, since there were sometimes document presented with no overlap with the query, not even on the detail level. The retrieval engine should be adopted to provide only relevant objects. Further if the first selected collection does not yield any results, the user is irritated, because the result list states zero results, even if the following collections gather documents (see Figure 4). The last main problem is concerned with duplicate documents from different collections.

A proposal to overcome these problems could be:

1. Gather the results as complete result list with duplicate detection.
2. Rank the result by any appropriate attribute, e.g. relevance or at least by alphabetical order (based on the title).
3. Use the collections as a filter to downsize the result list.
4. Show only results or present a filter based on the users preferred language.

The language issue is of course one of the major defiance for TEL. We can distinguish between the translation of the actual web site and the problem of searching in a multi-lingual corpus. Since TEL should be available for and is represented by all European countries, it should be completely translated. This does not only include the search and result pages, but also collection and treasure descriptions.

For the issue of query formulation and result presentation new techniques on automatic translation need to be addressed, as are worked out in task 2 of the TEL DELOS cooperation. Another suggestion could be to integrate the national librarians back into the system as possible translators, with all information competence in order to overcome the language issue for the users.

Comparison to older evaluation campaigns

Up to now the TEL development team has realized two evaluation campaigns (assisted by external co-operators). In both campaigns, a usability study and two questionnaire surveys, the subjects were end users, while in our study the data came from experts in digital libraries. It has to be noted that compared to the previous evaluations, the evaluators found significant progress and improvements. For example the supply of multiple options for collection selection or the removal of help functionalities from the main screen is based on user recommendations. The major design

interventions are based on findings of the usability evaluation of TEL, because other research methods, such as the questionnaire surveys, were not capable of transforming their findings into suggestions. However, this shows that TEL development team has used these findings and applied the recommendations in order to advance the design and user support.

The current evaluation aimed to expand the knowledge of the TEL team on design deficiencies. Despite expert evaluations, especially in HCI area, are classified under predictive evaluations [Hilbert and Redmiles, 2000] and are applied mainly in the starting phases of the design, we followed a reverse route and selected this method in order to extend the set of methods employed and give TEL team more findings and data to ground their design interventions. Expert reviews are able to provide data from the DL and the GUI experts' perspective, as well as to propose specific improvements and to predict their costs [Reeves, Apedoe and Woo, 2003]. The findings of the current evaluation are enlightening, but as literature suggests it might bring to light more than those actually exist. In fact, the results of our method are more than those mentioned in the previous evaluations. So the selection of method might highlighted more -potential- problems of the system, than the actual ones; those that are identified by the users and cause problems in their interaction.

5 Summary and Outlook

TEL is a self-sustained value in the information ecology. Few projects of this scope and scale exist and despite this first level realization, still remains a valid example that the vision for a universal digital library is feasible. As Arms [2005] questions, the issue for digital libraries is whether are “*self-sufficient islands or should we strive for a single global digital library*”. TEL is a service that incarnates this vision in the scale of European continent and further developments will enrich the information that is provided. From our point of view TEL can become the access point for all interested users in the rich data collections provided by European national libraries. Along with this content probably more information will be added, when museums, archives and other information agencies, e. g. repositories or film-archives, will join the idea of one access point to European heritage. TEL can become a competitor even to major global search engine companies, if this rich content can be accessed in a unified and easy to use way. To provide such a sophisticated service, major efforts have to be taken to enable on the one hand access to content and on the other to reflect diverse user needs, from leisure visitors to scientific searchers.

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