An Interface for Ontology Based Platform - the Evolution of the Ideas

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Abstract. The article presents main stages in the process of the development the user interface of the Share.TEC ontology based portal for teacher educators. The paper discusses how the various ideas were born, what types of challenges they provoke and different approaches to solve problems. The whole process of the dynamic progress and evolution of the first imaginations to its final version implemented in the prototype is described.

Keywords: user interface, ontology, metadata, educational resources, digital repositories

1 Introduction

The sharing of high quality digital resources and experience in the Teacher Education Community is the main objective of the EU project Share.TEC: Sharing Digital Resources in the Teaching Education Community [1]. Its goal is to establish a highly visible and functional portal [2] for Teacher Educators (TE) based on especially developed ontology. The Share.TEC system is designed to provide personalised access to a wide-range of TE content. Its goal is to help teachers and teachers' educators across Europe in searching and sharing the resources, opinion and experience.

The paper describes the process of developing the interface of Share.TEC portal. It is a representation of interaction between users and digital repository. The interface should provide flexible and powerful ways for representing Common Metadata Model (CMM) for TE resources classified by Teacher Education Ontology (TEO) [3]. In addition, through its interface Share.TEC system should ensure the most efficient and comprehensive search and reasoning abilities.

2 Ontology based user interface

One of the prerequisites for creation of good, functional and well designed user interface is a long process of research, consideration and generating ideas.

Successful realization and future use of the Share.TEC portal largely depends on the user interface.

During the process of development and design of the user interface the next main requirements [2] of the project proposal are followed:

- multilingual user interface
- clear to use and easy to navigate digital environment
- visual metadata search engine
- filtering, sorting, ratings, adding to favorites of search results
- adaptation of the user profile according to user's needs
- collaboration and community building

The key milestones in the development of the user interface were: to establish user requirements to the system depending of needs and characteristics of users group; to determine the main features and functionalities that have to be supported.

The Share.TEC portal user interface development goes through several stages:

- analysis of requirements
- functional specification - what functionality is important
- study of other similar systems
- generation of initial ideas how required functionalities to be represented in the user interface
- design of different interface elements – provides functionalities
- graphical representation of ideas
- development of the prototype and its testing
- redesign of the concepts

In the paper it is presented the progress of the development of the Share.TEC portal user interface following these stages.

Browsing ontology interface

The main factor affecting user interface development is that the Share.TEC system [2] is ontology-based. Therefore one of the primary system requirements was to have a possibility for graphically displayed browsing by ontology [4]. First of all several implementations for similar visualization were studied ([5], [6]). In order to match requirements to the metaphor of browsing educational resources classified according to the Teacher Education Ontology - TEO [7] (Figure 1a) we generated the first idea for the user interface – to represent browsing by tree (Figure 1b).
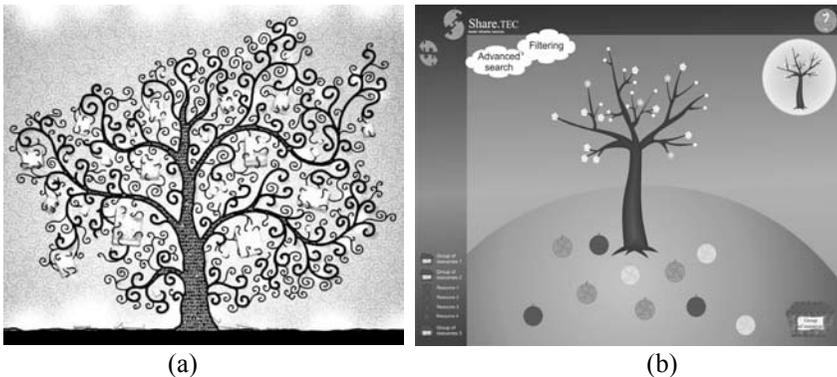

(a)   (b)

Fig. 1. The metaphor [4] and prototype of ontology browsing.

The logo of the project is represented by puzzle peaces divided apple and the structure of the ontology is usually associated with a tree, so the initial idea was to present browsing by ontology as a movement on the brunches of an apple tree, groups of resources was represented on the tree by apple flowers and the concrete resource – by apple fruit. As it is shown on the Figure 1(b) different colours of the apple fruit represented the different kind of resources. Blooming or not blooming flowers represented whole groups (visited or not) of resources corresponding to the ontology branches. Users were allowed to collect apples (resources) in baskets.

The testing and study of users' opinions shows that this manner of presentation may be attractive but it is not effective and efficient enough. This fact provoked the generation of new concept for user interface implemented into the first prototype of the Share.TEC portal [8], mostly text based.

Searching & Filtering based on Ontology Interface

In the text-based interface of Share.TEC portal the process of resource selection passes via searching, filtering and text-based browsing of the Share.TEC digital repository.

In that version of the interface the user can filter the resources by keywords, title, author and other branches of the TEO (Figure 2). The interface gives a possibility to the registered user to keep different filters in user profile and to access *My filters* at any time.
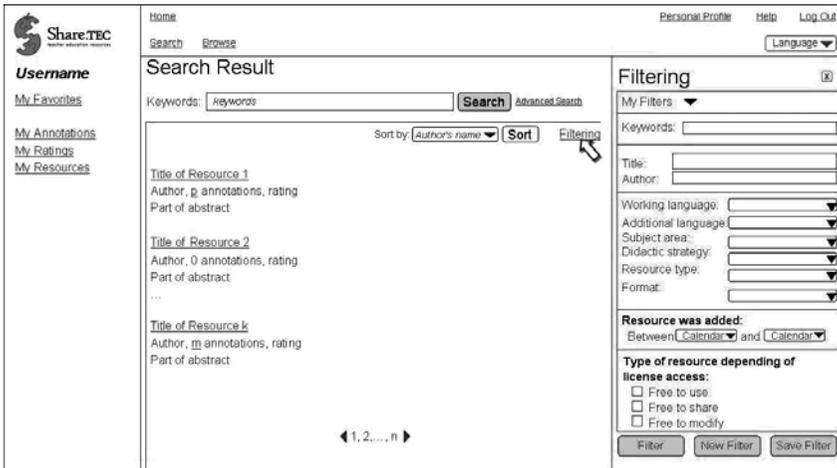

Fig. 2. Filtering.

The system keeps the user behaviour data which are generated from the raw user statistics or their aggregated version. In this case through the interface it should be presented different status of the resources in the digital repository for each registered user, namely:

- *selected* resource: in the text-based interface version of the Share.TEC system in My Favorites could be viewed resources collected from browsing, searching, filtering and sorting

- *examined* but not selected resources
- *new resource in the preferred areas* – published after last logout for registered used – defined automatically by the system by analyzing data about user behaviour and his/her preferences this is a part of adaptability of the system
- *other* – usually the biggest part of materials

After testing of the prototype of the Share.TEC portal, with the text-based interface implemented the appropriate presentation of the searching results become a priority.

Powerful user-friendly Interface based on Ontology

Although the first idea for gpaphical-based user interface (presenting the ontology by an apple tree), the study on the users' feelings show that they like presentation of different resources by different objects in different colours:

- as a blossom in specific colour – for unchecked resources
- as green and red apples (metaphor from project logo) for selected and rejected resources

After a small international pilot experiment on the use ot the next version – text-based interface, the users reported that they need more attractive and powerful way of presentation of the searching results. That is why new research was performed concerned to finding an user-friendly powerful way of presentation of the available metadata. The approach applied in I2G Intergeo [10] was found as appropriate for redesign of Share.TEC portal interface. In the next version it is planned the visualization of the found results to be as follow (see Table 1).

Table 1. Vizualisation of the list of resources.

Title	Language	Annotation		Author	Date
		Classification	Pedagogical description		
Limited field – if the title is to long separate on different rows	*Language of metedata*	*List of most important for user parts of the classification; Small icons with a letter corresponding to the group; different color icons for classification and pedagogical description*		*Limited field – too long text is separated on different rows*	
Title of resource ☆☆☆ **Rating of resource (stars)**	**Abbreviation of language (BG, EN, ...)**	Ⓛ **TEO classification**	Ⓟ **Digital content type**	**Author names**	**Date of publication or last actualization**

3 Conclusions

The discussion in the paper shows that the development of the interface for searching based on an ontology is an open research question.

Appropriateness and friendliness of the interface of the Share.TEC portal was tested with teachers and teachers' educators in partners' countries. Preliminary analysis of the feedback collected shows that users accept proposed solution. Detailed results from user evaluation will be presented in a next paper. Users' recommendations and conclusions derived from them will be applied in the next version of the interface.

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