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TENCompetence

Building the European Network for Lifelong Competence Development

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D5.2 LearnWeb2.0 system evaluation results

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Duration: 4 years

ILABS

Version 1.0

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# Project Deliverable Report

**D5.2 LearnWeb2.0 system evaluation results**

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</table>

**Abstract (for dissemination)**

This document is organized as an introductory text that refers to the IDs as separate documents.
The IDs of type “report” are referenced as pdf file stored in DSpace,
The IDs of type “prototype” are here described and contain a reference to DSpace for the sources and to an URL for the executables.
The rest of this document is organized by chronological order of internal deliverables.
Each WP5 partner has been involved taking into account his skills and his expertises and a great collaboration has been carried out.

**Keywords List**

WPS, deliverable, evaluation, LearnWeb2.0, roadmap, scenarios, requirements, core services, specification, metadata
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1 Introduction (ILABS)

This deliverable aggregates the following internal deliverables (as described in DIP-3 version 1.1, page 41):

- ID5.7 – LearnWeb2.0 tool v1 (formerly: KRSM web tool - final release)
- ID5.10 – LearnWeb2.0 second cycle evaluation outcomes
- ID5.11 – Updated roadmap as outcome of task 1 running till month 30
- ID5.12 – Interaction models and requirements for a knowledge sharing scenario
- ID5.14 – Core services requirements v1
- ID5.18 – Metadata editor and repository service.

This document is organized as an introductory text that refers to the IDs as separate documents with the following format:

- The IDs of type “report” are referenced as pdf file stored in DSpace,
- The IDs of type “prototype” are here described and contain a reference to:
  - DSpace for the sources
  - URL for the executables.

The rest of this document is organized by chronological order of internal deliverables.
2 ID5.12 – Interaction models and requirements (ALTRANSDB)

2.1 Abstract
This section explains the work done in the document ID5.12. The aim of WP5 during the last periods and the DIP3 is to stimulate the knowledge management, providing the proper models to allow the Knowledge Management as the bottom-level of the TENCompetence services.

For this purpose, before defining the services, a design process of three phases (ID5.12: chapter I) were defined: the next image explains the roadmap and the efforts in the different phases in the design process (see section 1.2 of ID5.12), starting with the benchmarking (phase 1), selecting the proper tools to be used into the system. The next phase is the production of scenarios (phase 2) focused of triggering the participation of the users in knowledge sharing and finally the aggregation (phase 3) of this tools in a Web2.0 tool.
Extending this three design phases, the core services (see section 3 of this document, ID5.14: Core services requirements) are focused on supporting this Web2.0 systems. Once the design process was defined, this document explains in the next sections the models followed during the whole DIP3 and the definition scenarios and requirements (ID5.12: chapter 3) as a proof of concept of the Knowledge Sharing (ID5.12: chapter 2). Analyzing the scenarios and the functional and non-functional requirements was possible to extract the needed models to stimulate the knowledge sharing (ID5.12: chapter 4), explaining the issues (Usefulness, Reliability and Stimulation) and the concepts: providing two separated spaces, one for users and another for resources. In fact, this document is the core of the further implementations in WP5 during the DIP3.

2.2 Relation with others IDs

As is explained in the last section, ID5.12 is the core of the further implementations of WP5. The models and requirements created for the DIP3 extends the proposals of the last year (See D5.2) and provides the basis for ID5.14 (Core Services Requirements), the real functional core of the implementation of the Knowledge tools.

2.3 Location

http://hdl.handle.net/1820/1298
3 ID5.14 – Core services requirements v1 (UHANN)

In this section the document ID5.14 is presented, which gives a detailed overview over the core services requirements for the LearnWeb2.0 system - formerly KRSM (Knowledge Resources Sharing and Management system).

3.1 Abstract
ID5.14 describes in detail the core services of LearnWeb2.0 system, focusing on its main features:

- Exploit Web2.0 existing tools
- Satisfying pedagogical needs
- Offering an interactive user interface
- Offering base services for other tools (from other WPs).

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1 INTRODUCTION
2 EXISTING TOOLS
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3 INTEGRATION OF THE TOOLS
4 CORE SERVICES: DESIGN SPECIFICATIONS
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7 APPENDIX A - LIST OF KNOWLEDGE OBJECTS
8 APPENDIX B - WEB-SERVICES EXPOSED BY KRSERVER
9 APPENDIX C - KRSM ACCESS-API-LITE
10 APPENDIX D - KRSM MANAGEMENT-API-LITE

After the introduction in section 1, a number of tools are deep evaluated and classified with respect to pedagogical needs in section 2. As well a tool map is presented, along with a benchmarking method for tools selection. Finally in section 3 a selection of the
most suitable tools is performed. The technical specification including entities selection and detailed metadata design are discussed in section 4. The software architecture and the functionalities of the LearnWeb2.0 system as well as the core functionality are presented in section 4.2 and 4.3 respectively. The architecture allows for a flexible interoperability and a scalable re-use of designed modules. The document is concluded within the section 5. The design details like knowledge objects design, exposed web services and the API fill up the appendix A, B, C and D.

3.2 Relation with others IDs
The core service requirements described in ID5.14 are designed with respect to interaction models and requirements developed within ID5.12. The services build the base for the LearnWeb2.0 tool – the web software for lifelong competence development, which is described in detail in the next section about ID5.7. The metadata model developed within ID5.14 is used within the repository service described Within ID5.18.

3.3 Location
http://dspace.ou.nl/handle/1820/1299
4 ID5.7 – LearnWeb2.0 tool (SU)

4.1 Description

LearnWeb2.0 is the new name of the former KRSM tool. The main difference is the completely new architecture (Figure 1) in web infrastructure. All processing is performed at server side and the client is merely a browser.

In the following figure the blue boxes refer to the main modules developed in WP5.

LearnWeb2.0 has the following main modules:

- LearnWeb2.0 web application (PHP) - for interactively manage knowledge resources;
- Web services (Java, REST) - for automatically manage knowledge resources;
- Fedora repository and services (described separately in ID5.18);
- Adapters: a set of drivers for managing Web 2.0 tools through APIs (Java);
- Identity managers: a set of tools for login/validation/authorization handling (Javascript, Rest-WS,…);
- Publishing managers: a set of tools for uploading management (Javascript).
4.1.1 Web application

The Web application is developed in PHP using the CakePHP framework. It is built on the Model-view-controller (MVC) design pattern and also uses advanced technologies such as XML, HTML, CSS2, Javascript and AJAX. The main functionalities include:

- Search for resources in the repository and Web 2.0 tools (YouTube, Flickr, GroupMe, etc.);
- Upload/publish resources to repository and directly to Web 2.0 tools (YouTube, Flickr, GroupMe, etc.);
- Preview resources together with tags, ratings and comments;
- Tag and rate resources, make comments;
- Maintain My Home Page for the users with My Profile, My Resources, My Tags, My Comments, etc.;
- Metadata editor;
- SSO user authentication for TENCompetence and Web 2.0 tools;
- etc.

4.1.2 Web services

The Web Services are developed in Java and the APIs for the services are modelled using the REpresentational State Transfer (REST) approach. The implemented web services (currently 44) are divided into two groups:

- Access-API-Lite (27 services)
- Management-API-Lite (17 services).

The Access-API-Lite services are used for retrieving information and metadata about:

- Resources;
- Categories;
- Users;
- Tags;
- Ratings;
- Comments;
- etc.

These services also implement integrated search for resources in the Fedora repository and in Web 2.0 tools using the corresponding adapters (drivers).

The Management-API-Lite services are used for creation and modification of resources, users, categories, tags, etc.

The Web services are used intensively by LearnWeb2.0 web application. They are published at a web server at Sofia University and can also be used for knowledge resource sharing and management by application developed by other WPs.
4.2 Sources

LearnWeb2.0 tool source
http://tencompetence.cvs.sourceforge.net/tencompetence/wp5/learnWeb/

The folder organization is as follows:

- **app** – the web application folder;
  - **config** - holds the (few) configuration files.
  - **controllers** - contains the application’s controllers and their components.
  - **locale** - stores string files for internationalization.
  - **models** - contains the application’s models, behaviors, and datasources.
  - **plugins** - contains plugin packages.
  - **tmp** - stores temporary data.
  - **vendors** - any third-party classes or libraries should be placed here.
  - **views** - presentational files are placed here: elements, error pages, helpers, layouts, and view files.
  - **webroot** - this folder should serve as the document root for the application.
    Folders here also serve as holding places for CSS stylesheets, images, and JavaScript files.

- **cake** – CakePHP files;
- **docs** – documentation files;
- **vendors** – third party classes and libraries.

Web Services source

Drivers


A frozen version of the above source is also available in DSpace at the following url:
http://hdl.handle.net/1820/1490
4.3 Executables

**LearnWeb2.0 web server**
http://phpcake.it.fmi.uni-sofia.bg/

**LearnWeb2.0 Web Services**
http://gaco.fmi.uni-sofia.bg:8080/FedoraKRSM/fedora/

This is the base URL for the service (it cannot be used directly). In order to use the services one must follow the URL syntax for the services, as described in the documentation.

Here are some working examples:
http://gaco.fmi.uni-sofia.bg:8080/FedoraKRSM/fedora/resources
http://gaco.fmi.uni-sofia.bg:8080/FedoraKRSM/fedora/resource:1
http://gaco.fmi.uni-sofia.bg:8080/FedoraKRSM/fedora/users
http://gaco.fmi.uni-sofia.bg:8080/FedoraKRSM/fedora/categories
(Consult the documentation to use the services)

**LearnWeb2.0 Web Services executable**

4.4 Documentation

**LearnWeb2.0 User Guide**
http://hdl.handle.net/1820/1471

**LearnWeb2.0 Repository and Web Services Technical Documentation**
http://hdl.handle.net/1820/1471
(same as above because it is a zip file including 3 documents)

4.5 Installation kit

The installation kit includes the following components:
- Installation manual
- Installation of base infrastructure (Fedora, Java, Php, Tomcat, …)
- Installation of web application (Php pages)
- Installation of web services (war file).

The installation kit has not been submitted to DSpace because its size is 32 MB

**LearnWeb2.0 installation kit is available at:**
http://e-learning.fmi.uni-sofia.bg/Installation_kit.zip (32 MB)
4.6 Bugzilla

The Bugzilla report has been created with the name: "LearnWeb 2.0"
This is the link to Bugzilla: http://wush.net/bugzilla/rulem/
5 ID5.18 – Metadata editor and repository service (SU)

5.1 Description

LearnWeb2.0 uses a Fedora digital repository [1] to store knowledge resources (i.e. metadata in Dublin Core (http://www.dublincore.org), the URL of the resource or the content of the resource). The Fedora repository system is an open source, digital object repository system using public APIs exposed as web services. Fedora also supports definition of flexible digital object models, relationships between objects, metadata in Dublin Core, and has many other useful features. LearnWeb2.0 extends the standard Dublin Core metadata by providing additional author-oriented and user-oriented information:

- owner/publisher
- list of categories
- list of tags
- list of comments
- ratings of resources
- ratings of comments
- popularity of resources.

This is achieved by designing and implementing a Digital Object Model in Fedora. Each LearnWeb2.0 object is represented as a digital object in Fedora with corresponding data-streams. The relations between the objects are represented and implemented by defining appropriate Fedora relationships. A number of methods are also defined for extracting information about the objects by creating several Behaviour Definition Objects and Behaviour Mechanism Objects. These methods are exposed by Fedora as web services. LearnWeb2.0 web services make extensive use of all these services together with the Fedora APIs.

The Metadata editor is designed to edit/update the Dublin Core metadata that is stored for each resource in the Fedora repository. The editor is a web based application written in PHP using the CakePHP framework. It uses the web services exposed by LearnWeb2.0 and is integrated in the LearnWeb2.0 tool.

The metadata for the resources is based on the Dublin Core metadata standard. The standard defines a simple yet effective element set for describing a wide range of networked resources. The Dublin Core standard includes two levels: Simple and Qualified. LearnWeb2.0 uses the Simple Dublin Core which comprises the following fifteen elements:

- Title
- Subject
- Description
- Type
- Source
5.2 Sources

Metadata editor
http://tencompetence.cvs.sourceforge.net/tencompetence/wp5/learnWeb/

(The Metadata editor is integrated in LearnWeb2.0 Web application: controller Resources, view edit_metadata)

Fedora repository
http://www.fedora.info/download/

5.3 Executables

Metadata editor
http://phpcake.it.fmi.uni-sofia.bg/

The Metadata editor can be accessed by visiting My HomePage, logging in, opening My Resources and clicking on Edit Metadata link for a resource.

Fedora repository and services
http://fedora.it.fmi.uni-sofia.bg:8080/fedora/

This is the base URL for the service (it cannot be used directly). In order to use the services one must follow the URL syntax for the services, as described in the documentation.

Here are some working examples:
http://fedora.it.fmi.uni-sofia.bg:8080/fedora/get/resource:1
http://fedora.it.fmi.uni-sofia.bg:8080/fedora/get/resource:1/DC
http://fedora.it.fmi.uni-sofia.bg:8080/fedora/get/category:21

LearnWeb2.0 uses resource metadata for searching/discovering resources and for proper view/manipulation of the resources.
http://fedora.it.fmi.uni-sofia.bg:8080/fedora/search
http://fedora.it.fmi.uni-sofia.bg:8080/fedora/risearch
(Consult Fedora documentation to use the services)

5.4 Documentation

LearnWeb2.0 User Guide (Section 6. Metadata Editor)
http://hdl.handle.net/1820/1471

LearnWeb2.0 Repository and Web Services Technical Documentation
http://hdl.handle.net/1820/1471
(same as above because it is a zip file including 3 documents)

Fedora Installation Guide
http://hdl.handle.net/1820/1471
(same as above because it is a zip file including 3 documents)

Fedora System Documentation
http://www.fedora.info/download/2.2.1/userdocs/
6 ID5.10 – LearnWeb2.0 second cycle evaluation (FBM-UPF)

In this section we present the document ID5.10 which includes the main second cycle evaluations results of the LearnWeb 2.0 tool.

6.1 Abstract

ID5.10 describes the evaluation process of the LearnWeb 2.0, which have been organized in three different phases:

- Functionality proof carried out by real users
- Code quality evaluation carried out by developers, exchanging their role
- Improvements/enhancements identification.

The following table includes a shortened version of the main aspects of this evaluation process.

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The introduction provides an overview of the three main phases of the evaluation process: a functionality proof carried by real users, a code quality evaluation and an identification of the major improvements and enhancements for future versions. In the second section the main outcomes of a functional testing and the results of an evaluation experience with real users are detailed. The third section includes the results of the code quality analysis for each of the different scenarios. In section four the impact of the LearnWeb 2.0 in the panorama of the lifelong learning is articulated. Sections fifth and sixth include the description of the improvements and enhancements for the next release of the tool and the main conclusions of the evaluation. Finally, the questionnaires used during the evaluation with real users are included in the appendix in section seven.
6.2 Relation with others IDs
The evaluation process structure has been developed following the guidance provided in the TENCompetence Handbook (p. 66) and the D 4.1 Pilot Evaluation Plan (p. 116 and appendix 3). There was also considered for the development of each of the phases in the evaluation process the document with the first evaluation outcomes ID5.9: KRSM first cycle evaluation outcomes. Finally, the DIP-3 version 1.1 (p. 41) has provided the basis for defining the deliverable and describes the tasks of it.

6.3 Location
The deliverable “ID5.10 – LearnWeb2.0 second cycle evaluation” is available in DSpace at the following url:
http://hdl.handle.net/1820/1469
7 ID5.11 – Updated roadmap (ILABS)

7.1 Abstract


This roadmap is an evolution of the previous version (ID5.2), and takes into consideration all the innovations occurred in the last 13 months, with special focus on the two main concerns:

- The new approach addressed to knowledge discovery instead of search
- The new technology addressed to web interface instead of rich-client interface.

Table of Contents (shortened version)

1 INTRODUCTION
2 SUMMARY OF STATE OF THE ART IN THE FIELD
3 SUMMARY OF WP5 CONTRIBUTIONS
4 SUMMARY OF TRENDS IN THE FIELDS
5 PRIORITY RTD ACTIONS
6 CONCLUSION
7 APPENDIX A: DETAILED PLAN

After a brief introduction, this document presents a summary of the state of the art in the field of knowledge sharing and management, with a specific attention on knowledge repositories and Web2.0 phenomenon. Recent studies underline that there is a demand of new services, and an increasing need for distance education. As a consequence, it is necessary to provide tools that offer interactive experiences. In addition, globalization of communication, entertainment, and information provides a big quantity of resources to learners, creating a new and continually changing learning space. One of the main characteristics of the Web 2.0 era is that users add value to the knowledge development by actively contributing in its construction. We adopt this idea and define, as one of the main challenges of the project, to develop an “architecture of participation”.

The main contribution of WP5 to the research and technological development can be divided in two lines. The first line consists on a more theoretical study about the existing repository systems and web 2.0 tools in order to create an environment adapted to the life-long learners’ necessities. The second line corresponds to a more technical
contribution that has turned out in a tool called LearnWeb2.0 based on this first theoretical study.

The main trends devised in this roadmap are focused on the social aspect and the technological supporting framework, as the wide use of APIs for tools integration and the corresponding Single-Sign-On problem. Future directions will be addressed to semantic web, social relationship of knowledge resources and virtual world interfaces.

Several TENCompetence needs have been identified, with particular attention to the inter-WPs requirements.

A complete planning for next WP5 development is presented in this roadmap.

7.2 Relation with others IDs

The deliverable “ID5.11 – Updated roadmap” has a great impact on the future deliverables, because it defines the next steps of development, namely the version “v2” of the WP5 tool.

In particular, the involved IDs are:
- ID5.13 New interaction models and requirements for a knowledge sharing
- scenario v2
- ID5.15 Core- and additional services requirements v2
- ID5.16 Elaborated version of the LearnWeb2.0 tool (v2)
- ID5.17 LearnWeb2.0 tool v2 evaluation outcomes.

7.3 Location

The deliverable “ID5.11 – Updated roadmap” is available in DSpace at the following url: http://hdl.handle.net/1820/1291
8 Conclusion (ILABS)

This deliverable describes a very important phase of WP5 life: the metamorphosis from “rich-client search-oriented” to “pure-web discovery-oriented” tool.

Each WP5 partner has been involved taking into account his skills and his expertises and a great collaboration has been carried out.

The outcome of this phase is a new software having a great potential, although little striking. The impact of LearnWeb2.0 will be much more evident when hundreds of users will use it simultaneously, populating the knowledge resources with hundreds of rates/tags/comments.

Last but not least, we are facing towards new frontiers of knowledge sharing, exploring the most innovative horizons, like the virtual world communities.