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EAGLE
EnhAnced Government Learning

www.fp7-eagle.eu

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Objective 8.2 Technology-enhanced learning;

Target outcome c): Holistic learning solutions for managing, reaching
and engaging learners in the public administrations

Deliverable 9.6

EAGLE Topic Map (Final Version)

WP6 – OER SERVICES – OER Public Administration Services
Lead Participant: LIST

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Software Title	EAGLE Topic Map Tool
Version	Final
Release Date	2016-07-29
License	MPL-2.0
Languages	Go, HTML, Javascript

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1 Introduction

In small communities, public servants are often responsible for a broad range of tasks, they must be able to substitute each other, and to quickly familiarize themselves with new topics. Therefore, they need a broad knowledge of communal tasks and they have to be able to acquire new topics and deepen their knowledge of existing topics in cost and time efficient ways (“on the fly”).

Consider the following example. A public agent with a general knowledge of his/her work area is faced with a hitherto unknown case. **He/she is not familiar with the specific terms that would be needed to find the appropriate OERs by key term search.** Due to his/her general knowledge of the field, however, he/she is able to locate the point in the topic map, at which relevant OERs including contacts to other specialists can be found. By navigating to the relevant task, he/she avoids searching for results which are related to a given keyword but not relevant for his/her specific work topic.

The EAGLE Topic Map Tool helps employees in public administrations to quickly find Open Educational Resources (OERs) required for the task at hand and to familiarize themselves with new work areas. In general, topic maps are meant to serve a twofold purpose: they help users in their everyday work with the EAGLE platform by leading them directly to relevant OERs. At the same time, they provide a means for enhancing users’ knowledge of their work area. In principle, three usage scenarios can thus be distinguished:

1. **Topic maps provide a task-oriented and exploratory alternative search strategy to a purely term-oriented keyword search.** For the public agents, it is thus possible to navigate through the structure of communal tasks, which is familiar to them. In this way, they can locate relevant OERs , even if the corresponding search term is not known to them (exploratory search).
2. **Topic maps provide a way for new employees to familiarize themselves with their work area.** When taking up new tasks in a public agency, topic maps can help to gain an overview of the new work area. The linked OER, including example cases (e.g. argumentation maps) can then be used for further familiarization. The EAGLE Topic Map Tool visualizes the tasks of public communal agents on different levels of abstraction. It provides a way for the identification of topics, subtopics, and processes. The user can interactively navigate through these levels.
3. **Topic maps support public agents in dealing with cross-border issues.** As pointed out in the preceding paragraph, topic maps provide a means to locate relevant OERs without using keyword search. This can also be useful for public agents, who work on cross-border cases, have basic knowledge of the other country’s language and want to access OERs of the corresponding country. By following the topic map hierarchy, they are able to locate relevant OERs event without knowing the required keywords.

It thus helps municipal agents to locate themselves with their current task within a governmental topic landscape and to retrieve relevant OERs.

In general, it can be said that topic maps do not only provide a way to efficiently use EAGLE even when facing new tasks or when working in another language, but also as a means to help public agents familiarize themselves efficiently with new work areas.

It is the goal of Task 6.9 to develop the interactive EAGLE Topic Map Tool for the EAGLE platform. So far, the final version of the EAGLE Topic Map has been developed, and the tool has been integrated into the EAGLE Platform.

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To avoid misunderstandings, it was decided to use the term "topic map" rather than "process map", the latter of which was used in previous versions of this deliverable. While the term "process map" may be associated with actual process models, the term "topic map" (as suggested by the reviewers) seems more appropriate to understand the hierarchical structure of processes and subprocesses, which has been implemented as a hierarchical folder system.

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2 Overview of the current Prototype

The EAGLE Topic Map Tool is a WEB application with a three tiered architecture.

The design of the final version of the EAGLE Topic Map Tool has been adapted to the design of the EAGLE platform. Each topic and subtopic includes the information, how many OERs the user can find under the respective element (see Figure 1). With this feature, it is possible for the user to find out about the availability of Open Educational Resources (OERs) for a given topic.

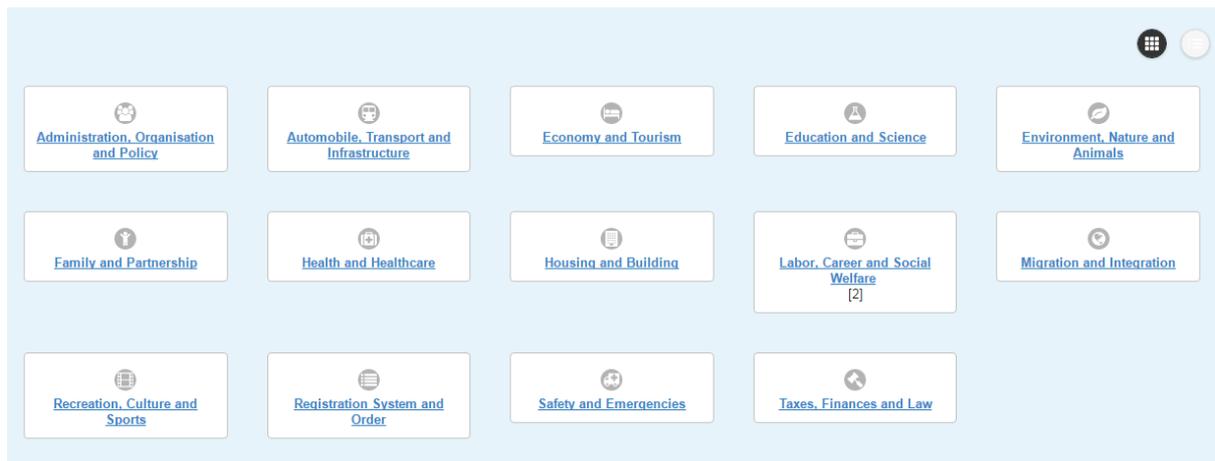


FIGURE 1: EAGLE TOPIC MAP

For Germany, a catalogue of municipal tasks, the communal service catalogue LEIKA, has been created by experts of public administration (see: <http://www.gk-leika.de>).

Initial research within the consortium and discussions with the developers of LEIKA did not yield any catalogues comparable to LEIKA in other countries. The only exception is Luxemburg, which seems to have a rudimentary classification of public community services, however not as detailed as LEIKA. A systematic investigation into European classification schemes for communal administrative processes would be a worthwhile endeavour to be taken up by future research projects.

The LEIKA Catalogue has been taken as a common base for developing the EAGLE Topic Map. It must, however, be acknowledged, that LEIKA is targeted towards formal processes in German public administrations. As such, it is only to some extent applicable to informal exchange of knowledge and experience. In order to use the topic hierarchy of the LEIKA Catalogue also for countries other than Germany, only level 1 and level 2 of the Catalogue have been incorporated in the EAGLE Topic Map, as they are more likely to be applicable in other contexts. The topics and subtopics of these two levels have been translated into English, French and Montenegrin. The number of levels that is displayed depends on the contents of the underlying database. Technically speaking, it is possible to extend the EAGLE Topic Map to up to 5 levels.

In the final version of the EAGLE Topic Map Tool, all German, English, French and Montenegrin topics are kept in a knowledge base. The EAGLE Topic Map Tool can switch between the different languages and the subtopics are now linked with respective OERs.

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The EAGLE Topic map can be adapted to other topic hierarchies. In addition to adding and splitting concepts, it is possible to link concepts which are located at different places in the map. This way, users of different countries are able to find a given concept at the expected location and retrieve the associated OERs.

The data of the final version of the EAGLE Topic Map Tool is managed using the Knowledge Management & Semantic Service of the EAGLE platform developed in Task 5.3.

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3 The Topic Map Tool at a Glance

3.1. Problem(s) addressed by the Topic Map Tool

In small communities, public servants must be able to quickly learn to handle tasks for new topics. However, they are not always fully acquainted with specialized issues. Therefore, they must learn new topics and often deepen their knowledge of their existing topics. To deal with specialized issues or to familiarize themselves with a new topic, the Topic Map can help them to find relevant Open Educational Resources (OERs).

3.2. Solution proposes by the Topic Map Tool

Because of their training and experience, public servants know how to classify issues according to their topics and subtopics, or processes and subprocesses. When interested in learning about how to handle new issues, public servants find topic maps useful for finding the relevant learning resources. Therefore, the topic map is designed to be a simple tool for helping public servants to find Open Educational Resources for specific issues or areas of responsibility. The topic map enables public servants to quickly navigate to the relevant OERs.

3.3. Innovative aspects of the Topic Map Tool

Both the Topic Map and the EAGLE semantic search engine provide ways to find Open Educational Resources. It makes sense to use the Topic Map if you do not know what OERs exist for a given topic and want to get an overview of existing OER regarding the topic.

3.4. Prerequisites to use the Topic Map Tool

The Topic Map helps public servants to navigate to and find relevant Open Educational Resources, but only for OERs which have been tagged and classified with the relevant topics. For the Topic Map to be useful, creators of OERs must understand the classification system and classify their OERs appropriately.

3.5. Integration of the Topic Map tool into the EAGLE Platform

The Topic Map Tool is a three-tiered web application (see below in section 9). It is integrated into the EAGLE platform via a portlet providing the graphical user interface to the functions and services of the Topic Map web services backend.

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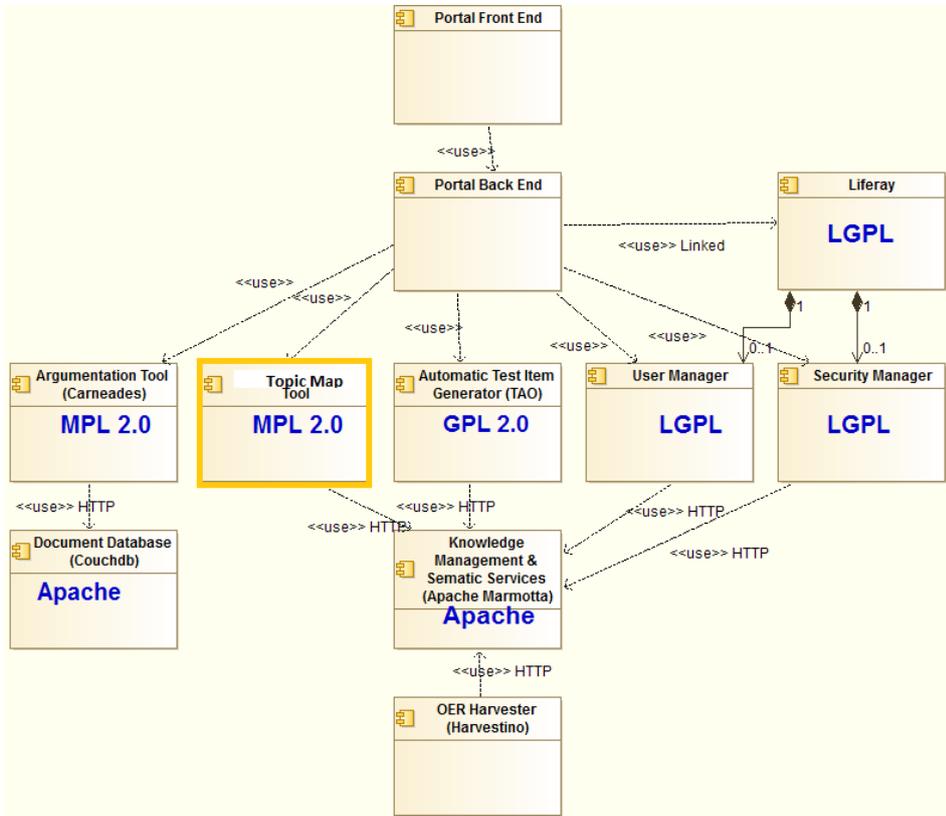


FIGURE 2: INTEGRATION OF THE EAGLE TOPIC MAP

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4 The Topic Map Tool from a User Perspective

In EAGLE five personas have been developed as well an overall scenario. This section describes first more abstract user stories and second instantiates than one of these user stories by using one specific persona. This scenario describes the use of the automatic item generator for a specific work example.

4.1. User Stories

User stories have been designed for the main components of the EAGLE platform to facilitate the technical review of the different software deliverables in WP5 and WP6.

All user stories have been defined in a standardised way to ease their understanding. Each user story starts with a type of user, a well-defined task, and the effect or impact it will bring.

Furthermore, feedback can be given by naming the corresponding user story. The following template was used.

As <a type of user>, I want to <task to be performed with EAGLE>, so that <>.

The following user story has been implemented in the second prototype of the EAGLE Topic Map Tool:

EAGLE Topic Map User story:

As an employee in a public administration, I want to navigate through and browse the EAGLE Topic Map, so that I can zoom in on the OERs about a particular topic.

The topic map complements the search features of the Knowledge Management & Semantic Services component. Whereas the topic map provides a simple way for users to navigate and browse topics to find relevant OERs, the Knowledge Management & Semantic Service provides a powerful query language for searching for OERs with particular properties.

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4.2. User scenario example: Persona – Seamus

This example scenario uses the persona of Seamus.



Seamus works in the service centre dealing with citizen queries. He wants to improve his knowledge about topics frequently of interest to citizens. He does not know which OERs exist for a given topic. The EAGLE Topic Map Tool allows him to obtain an overview of existing OERs for a given topic. OERs assigned to a topic are shown in figure 3.

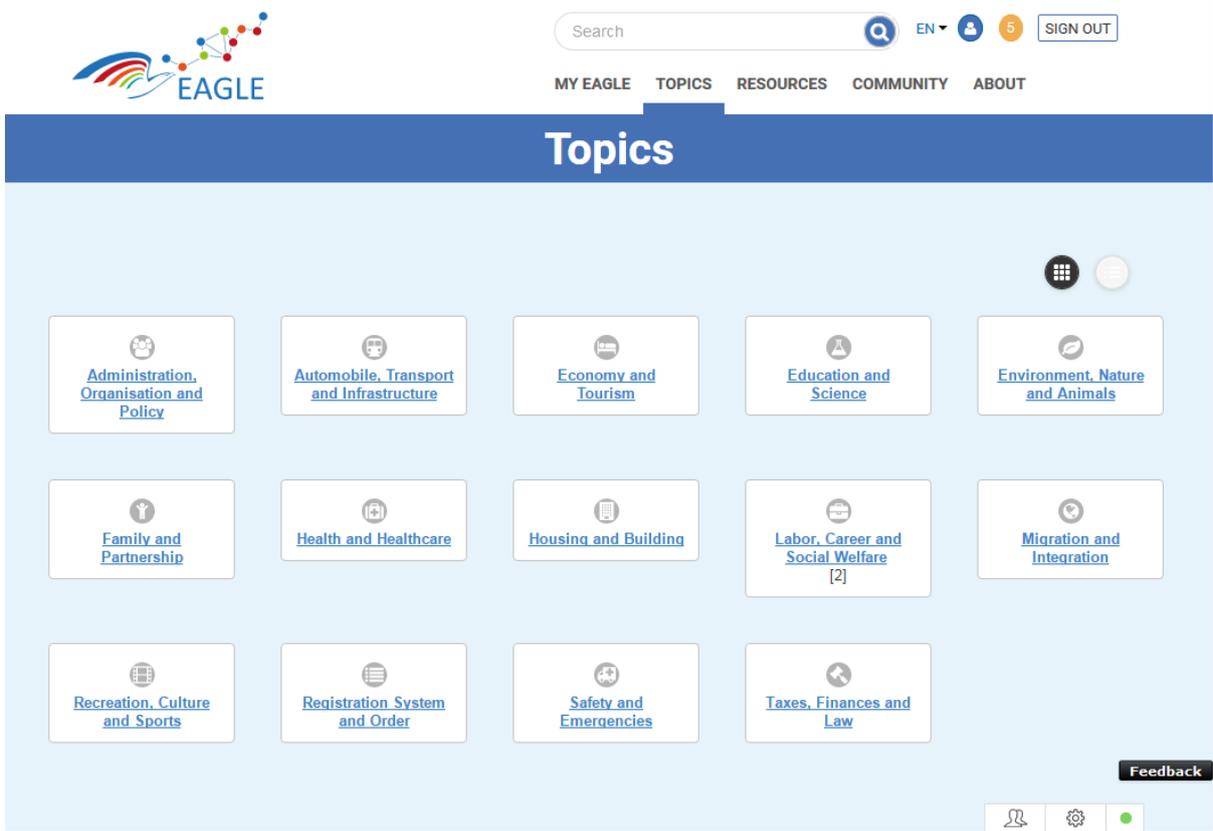
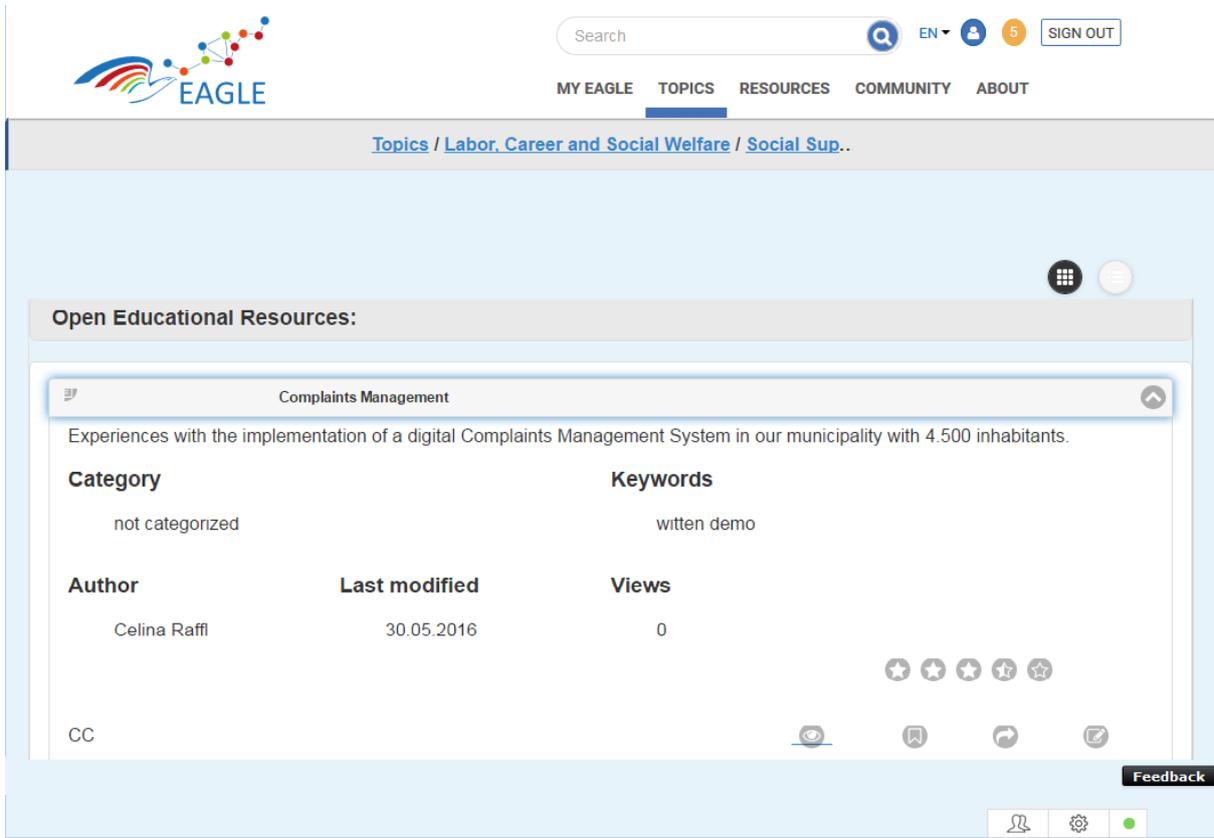


FIGURE 3: TOPIC LEVEL OF THE EAGLE TOPIC MAP INDICATING THE NUMBER OF ASSOCIATED OERs

When Seamus navigates to an OER and clicks on it, a brief overview of the OER is presented (author, creation date, summary), along with a link to its contents.

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The screenshot shows the EAGLE platform interface. At the top left is the EAGLE logo. To its right is a search bar and navigation links for EN, a user profile icon with the number 5, and a SIGN OUT button. Below these are navigation tabs: MY EAGLE, TOPICS (highlighted), RESOURCES, COMMUNITY, and ABOUT. A breadcrumb trail reads: Topics / Labor, Career and Social Welfare / Social Sup..

The main content area is titled "Open Educational Resources:". It displays a preview of an OER titled "Complaints Management". The preview includes the following information:

- Description:** Experiences with the implementation of a digital Complaints Management System in our municipality with 4.500 inhabitants.
- Category:** not categorized
- Keywords:** witten demo
- Author:** Celina Raffl
- Last modified:** 30.05.2016
- Views:** 0

At the bottom of the preview, there are icons for CC (Creative Commons), a list of five stars for rating, and icons for eye, bookmark, share, and edit. A "Feedback" button is located at the bottom right of the preview area.

FIGURE 2: OVERVIEW OF AN OER

To actually work with an OER, Seamus clicks on the link to its contents. The OER is then opened within the EAGLE platform.

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5 System Architecture

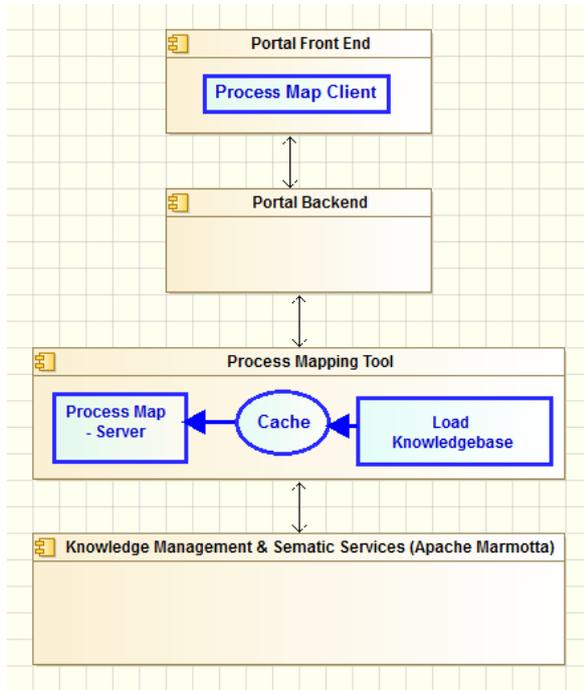


FIGURE 3: SYSTEM ARCHITECTURE OF THE TOPIC MAP TOOL

The EAGLE Topic Map Tool is a web application with a three-tiered architecture, embedded in the EAGLE portal and consisting of:

- Knowledge Management & Semantic Service (Apache Marmotta): A database, for storing topic map items, serialized in JSON and implemented using an RDF knowledge database developed by SRFG. Since the topic maps are expressed as a SKOS thesaurus, they become interchangeable and reusable¹.

The Knowledge Management & Semantic Service component provides a database of statements, where each *statement* represents a *subject-predicate-object triple* and is assigned a URI. The service provides the SPARQL Protocol and RDF Query Language to searching the database. For example, the following SPARQL query finds all topics in the database:

.

WHERE

```
{
  http://knowledge.eagle-learning.eu/resource/pmap/vocabulary/TopicMapGermany
  <http://www.w3.org/2004/02/skos/core#hasTopConcept> ?uri.
  ....}
```

¹ https://en.wikipedia.org/wiki/Simple_Knowledge_Organization_System.

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This will return all Uniform Resource Identifiers (URIs) that are the objects of the “TopConcept”-predicate of the subject “TopicMapGermany”.

- Topic Mapping Tool: An application logic layer, running on the server-side and implemented in Go, as is the EAGLE argumentation tool². It consists of three parts:
 - Load Knowledgebase: A database interface to access the Knowledge Base and to periodically load the topic map data into the cache.
 - Cache: A temporary storage of the topic map data.
 - Topic Map-Server: A server-side application to handle user requests.
- Topic Map Client embedded in Portal Front End: A web client and user interface, implemented in HTML and JavaScript using jQuery Mobile³ and CSS⁴:
The Portal Backend forwards all requests and replies between Topic Map Client and Topic Map Server.

² [https://en.wikipedia.org/wiki/Go_\(programming_language\)](https://en.wikipedia.org/wiki/Go_(programming_language)).

³ https://en.wikipedia.org/wiki/JQuery_Mobile.

⁴ https://en.wikipedia.org/wiki/Cascading_Style_Sheets.

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6 Accessibility

The accessibility guidelines for the EAGLE platform specified in D4.3 (Learning technologies – contextual analysis), which recommends following the W3C Web Content Accessibility Guidelines (WCAG), have been adhered to in the design and implementation of the EAGLE Topic Map Tool. Most of the user interfaces of the EAGLE Topic Map Tool have been implemented using the jQuery Mobile [<https://jquerymobile.com/>] JavaScript library for responsive, display independent user interfaces, which adheres to the W3C Accessible Rich Internet Applications (WAI-ARIA) guidelines, which are part of the same W3G Web Accessibility Initiative (WAI) as the earlier WCAG guidelines:

jQuery Mobile is built upon standard, semantic HTML, allowing pages to be accessible to the broadest range of devices possible. For A-Grade browsers, many of the components in jQuery Mobile leverage techniques such as focus management, keyboard navigation, and HTML attributes specified in the W3C's WAI-ARIA specification. By utilizing these techniques, we do our best to ensure an accessible experience to users with disabilities such as blindness, who may use screen readers (like VoiceOver, on Apple's iPhone device) or other assistive technology to access the web.

The user interface of the EAGLE Topic Map Tool for browsing through the topics, subtopics, and processes, is tightly integrated with the rest of the EAGLE Platform.

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7 Source Code of the Current Release

The source code can be found at: <https://git.list.lu/eagle/ProcessMap>.

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8 Installation Guide

This section gives instructions for building and running the EAGLE Topic Map Tool.

8.1. Test Server

The final version of the EAGLE Topic Map Tool is integrated into the EAGLE Platform and can be tested and evaluated online, without having to install any software, using the test server of the EAGLE Platform at

<https://eagle-irl.dhbw-heidenheim.de>.

To display the EAGLE Topic Map Tool the user has to click on the button „TOPICS“.

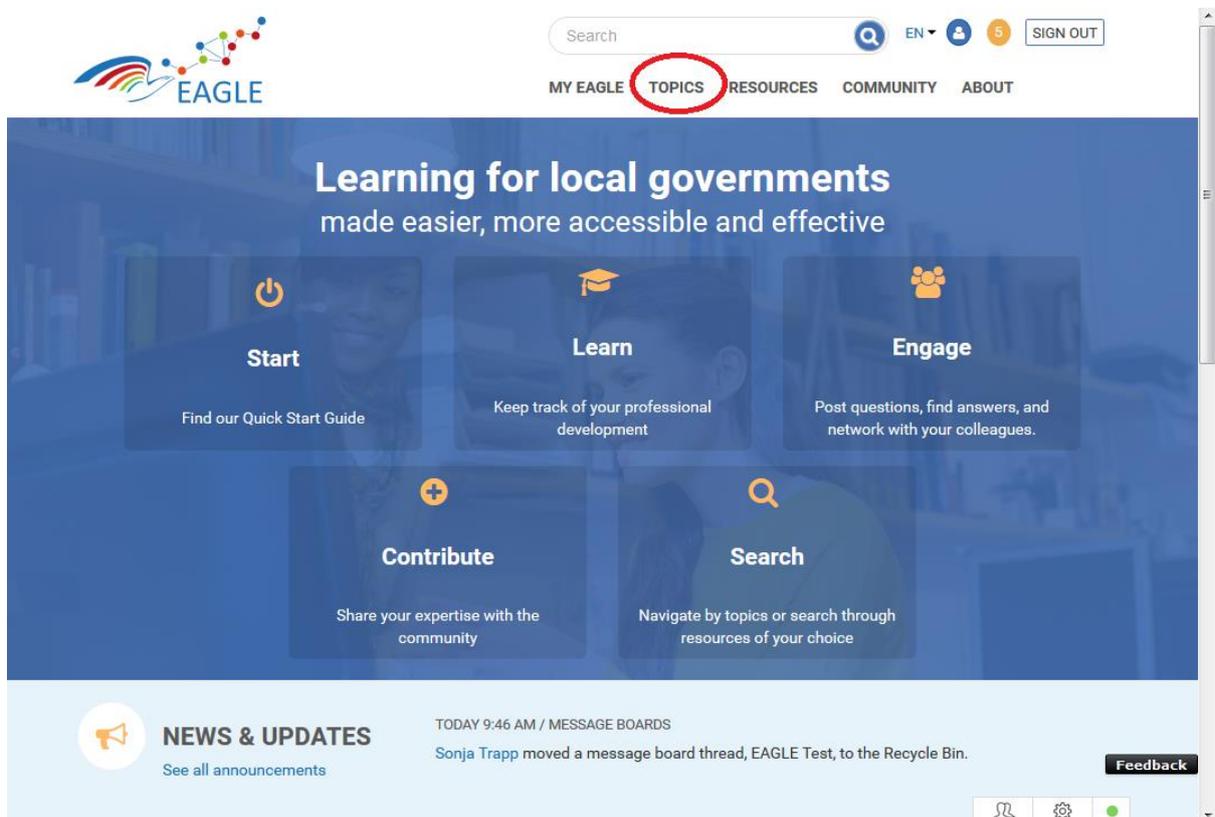


FIGURE 4: DISPLAY OF EAGLE TOPIC MAP TOOL

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8.2. Prerequisites

The following software is required for building, installing, and running the EAGLE Topic Map Tool:

- Version 1.6x or later of the Go programming language compiler suite.
- The client for the Git distributed version control system client (see <https://git-scm.com/downloads>).

8.3. Configuration

Set the `GOPATH` environment variable to a directory for Go packages, e.g.

```
$ mkdir ~/go
$ typeset -x GOPATH=~/go
```

8.4. Building and Running the Tool

Use the `go` tool to get, build and install the EAGLE Topic Map Tool executable:

```
$ go get https://git.list.lu/eagle/TopicMap.git
```

The `topic-map-tool` executable should now be installed in

```
$GOPATH/bin/eagle-topic-map-tool
```

You can execute the program using this full path. Alternatively, add `$GOPATH/bin` to your `PATH` environment. You should then be able to execute the command directly, as in

```
$ eagle-topic-map-tool [-p port][-t time]
```

This program starts a server. You can access this server using

```
$ localhost:8082/processmap
```

in a browser. The `-p` flag ("port") specifies the port to use for the web service (default: 8082). The `-t` flag (time) specifies the waiting time (in minutes) between reload the knowledge base (default 120).

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