Skill-Based Scouting of Open Management Content

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Abstract. Already existing open educational resources in management have a high potential for enterprises to address the increasing training needs of their employees. However, access barriers still prevent the full exploitation of this potential. Users have to search a number of repositories with heterogeneous interfaces in order to retrieve the desired content. In addition, the use of search criteria related to skills, such as learning objectives and skill-levels is in most cases not supported. The demonstrator presented in this paper addresses these shortcomings by federating multiple repositories, integrating and enriching their metadata, and employing skill-based search for management related content.

Keywords: open educational resources, content reuse, competences, federated search, management education.

1 Introduction

Management is a large education and training business field in Europe. Training topics range from general management and leadership to very specific issues like managing risks in banking industry. Many enterprises lack the resources and time to cover the resulting specific training needs of their employees by expensive face-to-face

courses. Therefore E-Learning using open content has a high potential to support the increasing training needs. Repositories for Open Educational Resources (OER) [1] already provide access to large amounts of open educational material for management topics. However, end-users like learners or teachers are faced with several access barriers when utilizing the content for continuous learning in management. Currently users have to search a number of repositories with heterogeneous interfaces and categories in order to retrieve the desired content. Additionally, the usage of search criteria related to competences and skills, such as learning objectives and competence-levels to be achieved is in most cases not supported.

The demonstrator currently developed within the EU co-funded project Open-Scout[1] addresses these two main access barriers. OpenScout aims at providing skill-based federated search and retrieval web services that enable users to easily find, access, use and exchange open content for management education and training.

Thereto, OpenScout builds on technologies developed by the Ariadne foundation[2] and the *e*Content*Plus* targeted project MACE (Metadata for Architectural Contents in Europe) [2]. The Ariadne foundation develops tools and methodologies for e.g. producing, managing and reusing of computer-based pedagogical elements, whereas the MACE project uses and extends these technologies to connect various repositories of architectural knowledge and enriches their contents with metadata to enable searching and browsing architectural contents. Furthermore, competence services developed in earlier projects like MACE and TENCompetence[3] will be used to implement agreed-upon competence models from the domain that will be discussed and modified by the stakeholder groups within the consortium to ensure their applicability for the target groups of the project.

OpenScout not only adapts existing technologies to specific requirements of the management domain but significantly extends them e.g. by providing an openly accessible tool library for improvement and re-publishing of contents. Furthermore, OpenScout plans to integrate its search services into existing social networks, such as MySpace[4] and LinkedIn[5], as well as into existing LCMSs, like CLIX[6] and learn eXact[7], to enable access from environments familiar to a wide range of users.

The paper is organized as follows. In chapter 2, we describe the demonstrator focusing on the infrastructure and the OpenScout portal. In chapter 3, we give an outlook of further work.

2 Demonstrator

2.1 Infrastructure

This section summarizes the architecture of OpenScout as depicted in Fig. 1. Open-Scout already integrates several learning object repositories (LOR), such as

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[1] http://www.openscout.net
[2] http://www.ariadne-eu.org/
[3] http://www.tencompetence.org
[4] http://www.myspace.com/
[5] http://www.linkedin.com/
[6] http://www.im-c.de/en/products/learning-management-system/product-overview/what-is-clix/
[7] http://www.learnexact.com/

OpenLearn[8], OpenER[9] and SlideStar[10]. Each repository offers an OAI-PMH [3] interface to enable harvesting of the repository's LOM instances which are represented using the OpenScout application profile. The application profile relies on the LOMv1.0 standard [4] and is extended to enable skill- and competence-based search following the European Qualification Framework (EQF). The EQF describes skills as cognitive and practical while competences are described as the ability to use knowledge, skills and personal, social or methodological abilities. Since the domain of management education cannot be described only based on functional skills, OpenScout also uses the broader concept of competences. As a starting point an initial taxonomy for Business and Management Education is used, which will be expanded and tailored to different user groups.
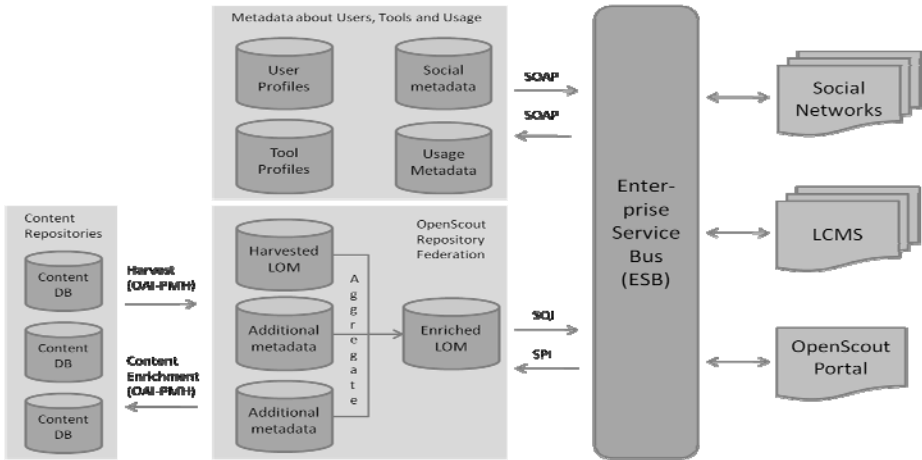
Fig. 1. The OpenScout architecture

The harvested LOM instances are stored in the central OpenScout Repository Federation. Prior harvesting is preferred over direct search for performance and reliability reasons [5]. An OAI-PMH interface is offered to content providers in order to retrieve enriched metadata of their learning objects. The harvested LOM instances are extended with additional metadata like connections between different LOM instances that are generated within OpenScout when objects are used together in a course or when a new object is generated by re-authoring of an existing object.

Additionally, OpenScout maintains user profiles (containing information about the users, e.g. interests and competences), tool profiles (containing data about tools that can be recommended, social metadata (data added by users, e.g. tags and ratings), and usage metadata (data about the user's actions and the usage of objects).

Since the OpenScout web portal accesses different data sources and will mix this data to create new services, it needs a backend layer that allows scalability, and an

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8 http://openlearn.open.ac.uk
9 http://www.opener.ou.nl
10 http://slidestar.de

easy way to extend services with a plug-in based architecture without affecting the client layer. In order to address these issues, the enterprise service bus (ESB) technology, namely the open source ESB Apache ServiceMix[11] is used. All communication concerning the web services takes place via the ESB. Furthermore, whenever an event occurs (e.g. when a user conducts a search or opens a document), the ESB calls a web service that stores the event as CAM (Contextualized Attention Metadata) [6] instance in the usage metadata database to enable further services, e.g. for recommending learning objects based on trust or users to collaborate with.

2.2   The OpenScout Portal

The OpenScout web portal aims to provide value-added services that build on the OpenScout infrastructure. It is structured as a container of customizable widgets providing the GUI for respective services. The main functionality offered at this stage is the federated search as depicted in Fig 2.
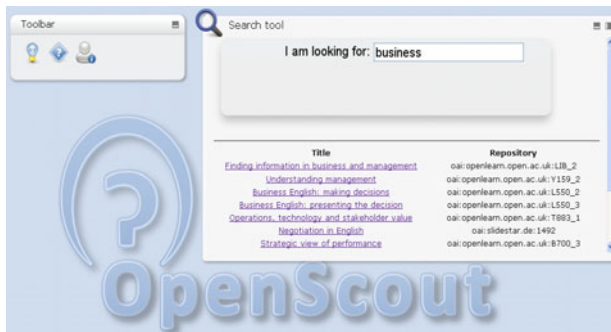

Fig. 2. Federated search

The search functionality is currently extended to support faceted search enabling filtering of the search results, according to the properties of the retrieved learning objects, e.g. content type, competences, language, and repository. The search results are presented together with basic information derived from the LOM description of each learning object. After selecting a learning object, the user is presented with a new container that holds document specific information according to general metadata (date, author, type etc.), social metadata (ratings, reviews, tags), as well as user competences and skills, see Fig. 3. Registered users can add their own ratings, tags and reviews. Competences can only be changed by authorized persons, such as content providers or facilitators. Additionally, the user is presented with recommended tools for working with the selected resource. These recommendations consist of tools for visualization, authoring, and collaboration and are based on the user profile, the profile of the selected learning object and the profiles of the tools.
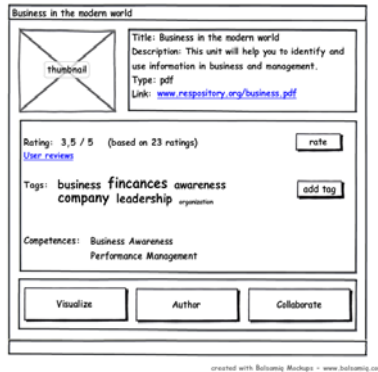
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[11] http://servicemix.apache.org/home.html

Fig. 3. Presentation of the metadata and tools associated with a learning object

3   Conclusion and Further Work

The paper presents an early prototype of the OpenScout educational services. The purpose of providing a demonstrator at an early stage is to allow various user groups in the management domain, e.g. content providers, educators, content developers or individual learners, to give early feedback so that the final application will support their specific needs. Hence the demonstrator will enable OpenScout stakeholders to evaluate the usability and the added-value of the system. Moreover, the demonstrator will create incentives for content providers to open up their repositories for Open-Scout related services and hence to allow more content to be accessed. As a consequence of this evaluating the feasibility of integrating new content repositories into the content federation will be another question to be answered. The usage of the OpenScout services in early stages will furthermore help to collect from the start relevant usage metadata that again helps to develop and improve the intended recommendations. The demonstrator related evaluation objectives will be addressed by running pilots mainly done with non-technical partners. OpenScout will develop target-specific questionnaires for semi-structured interviews in order to collect predominantly qualitative user feedback and to critically assess the degree to which the demonstrator fulfills a consensual set of objectives.

The next step for the demonstrator consists of integrating further management related repositories, e.g. provided by INSEAD[12], one of the world's leading graduate business schools, and by the Avicenna Network[13]. A further next step is to integrate a simple search functionality through gadgets into Social Networks which will bring added-value to the networks and supports viral distribution of the OpenScout service.

Furthermore, we will extend the functionalities of the OpenScout portal. Besides a general user tagging (What is a resource about?) we will implement a so called purpose tagging (What do users do with the resource?) to add additional competence related information [8]. Whilst only authorized persons use the top-down taxonomies

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[12] http://www.insead.edu

[13] http://pleiad.unesco.org/aquas/index.php

to describe learning resources, the purpose tagging enables end users to describe skills or competences that they see related to the learning objects. Due to the nature of the tags we will implement a post-hoc tagging procedure that asks users about a resource after usage. Additionally, we already collected an initial problem list of SME managers based on a desk analysis of consulting talks in the PLATO network. The relations between problems and competences should help them to identify learning resources that fit to their competence development goals, as stakeholders from SME are more used to find resources related to problems they have in their daily practice than to competences [9].

Acknowledgement

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