mEducator Village: Medical Educational Resources in the Era of Semantic Web (web 3.0) & Social Media (web 2.0)

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Abstract. Sharing and retrieving medical educational resources effectively has always been problematic. Efforts are recently shaped along notion of Social Media (web 2.0) and Semantic Web (web 3.0). mEducator, an EU co-funded project, has achieved the first real combination of social media technologies (Web2.0) and the semantic web (Linked Data/Web3.0) into education and learning (Linked Learning / Linked Medical Education). Collaborative ways of sharing educational resources, mashups that provide a pervasive sharing experience, Virtual Worlds that visualize the semantic description of the resources in Second Life, maps that allow the "educemiology" of the resources, are having the mEducator scheme as a base – a forthcoming standard - thereby exposing metadata and annotations to the Linked Open Data Cloud, and enabling effective federated queries re educational descriptions and best practice guidelines; all these are set out as instances in the mEducator Village of the future.

Introduction

During the last couple of decades the growth of ICT has lead to an enormous creation of digital medical education resources that exist in institutional learning content management systems or other local and/or independent repositories. Individual or small groups efforts have emphasised the use of web 2.0 technologies for sharing and shaping high quality medical education resources, while other research groups have been investigating the likely role of semantic web and Linked Open Data on the enrichment of medical educational resources with additional knowledge and information. In addition, Social Media have occupied a pivotal place within closed academic communities and medical associations when it comes to creating and exchanging medical educational resources..

The sharing and retrieving of medical educational resources based on the new web2.0/3.0 technologies mainly occur within an institution/organization or small communities. Furthermore there are a few centralized repositories that allow the sharing and retrieving of medical educational resources, but with limited use of the advance of web2.0/3.0 technologies.

mEducator, an EU co-funded project (funded by the European Commission under the eContentPlus2008 programme, Contract Nr: ECP 2008 EDU 418006)

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(www.mEducator.net) [1], tries to fill in this gap by moving the sharing, retrieving, re-use and repurposing to the era of semantic web and social media.

mEducator elaborates on pedagogical, technical, standardization, cultural, social and legal issues towards a standard-based infrastructure that enables the sharing of state-of-the-art digital medical educational content among medical educators and students in European higher academic institutions. mEducator compares two contemporary ways of achieving this content sharing, namely, mEducator 2.0 - a solution based on Web2.0 technologies, and meducator3.0 - a solution based on Semantic Web Services and Linked Data [2].

The mEducator Story

All the medical educational resources in order to be discoverable should be described by a schema that includes pedagogical, technical, cultural, social and legal aspects of the resource. Many existing educational standards have been researched [3] before a mEducator scheme could be established. Based on those, the mEducator scheme turned out to be a well formed scheme described in XML, but then "rdfized" and transformed into an mEducator Ontology, so as to capitalize Linked Data developments. The mEducator scheme is under process in the MedBiquitous Organisation to become a standard.

The description of the medical educational resources is further used by the two contemporary ways of achieving this content exchange: mEducator2.0 and mEducator3.0.

mEducator 2.0 is based on traditional isolated learning content management systems (LCMS), loosely associated via commonplace web 2.0 technologies. "Mashup" technology is used in order to provide to each LCMS the gateway to store the descriptions of their educational resources to a centralized repository. mEducator 2.0 facilitates collaborative sharing of resources through closed and open "educational groups" from specific stakeholders (e.g. University, medical association, etc.), folksonomies and taxonomies to describe specific fields of the metadata, and allowance of multilinguality of metadata in order to provide a cross-European platform attractive to the end users. A central platform interconnected with the "mashups" at the isolated LCMS acts also as a traditional repository where independent users could search, retrieve, re-use and repurpose their medical educational resources.

mEducator 3.0 is based on a more federated architecture of LCMSs which is founded on a reference (Semantic) Linked Service architecture for search, interchange and delivery of medical educational resources. Each institution or organization is responsible to expose the description of their educational resources as rdf triples conforming to the mEducator scheme, thereby becoming an independent eLearning repository across the Web/Cloud. In each of those independent eLearning repositories, a semantic service is being enabled in order to allow in real time federated queries against the rest of the repositories for search and retrieval of educational resources. The use of Linked Data and the connection of mEducator resources with the Linked Open Data (LOD) cloud, enhance the connection with new knowledge and information providing to the end user a unique experience of searching for and retrieving a richness of educational resources. For example, when a user searches for a specific educational resource, related resources such as clinical trials or PubMed articles accompany the retrieval. In order for mEducator 3.0 to be tested and the end users to gain a best practice solution example, three different systems have been initiated; these are: (i)

Medical Inter-Linked Educational Space (MILES+) as an extension of the Moodle 2.0 LCMS, (ii) Medical Educational LINked Arena (MELINA+) as an extension of the Drupal 7 CMS, and (iii) Linked Labyrinth (LL+) as an extension of OpenLabyrinth Virtual Patient platform.

To this extent, mEducator 3.0 instantiations may also exist in a Multi-User Virtual Environment (MUVE), namely Second Life (SL). Thus, a user may have a unique experience for browsing and even searching and retrieving educational resources in MUVE through the Sloodle module of the popular Moodle System, which allows for seamless integration of the electronic classroom into the second life virtual environment. mEducator 3.0 provides also a unique way of 3D representation of metadata of educational resource in SL by transforming linked data from the Semantic web into 3D structures, ready for browsing and further exploitation.

In addition, mEducator 3.0 combines web 2.0 and web 3.0 technologies, such as geographical maps representing the existence or the citation of educational resources and related information by retrieving data from the LOD, thereby providing an "educemiology" of educational resources[2]; furthermore, the system provides an end-user rating system for the resources, a review system for the resources and numerous facilities for collaborative creation of resources based on human/user relations of a social network.

Both the schema and the solutions have been evaluated by different end-users, through technical evaluations, scenario based evaluations, expert interviews with respect to institutional adoptability, thereby leading to Best Practice Guidelines as well as, simple IPR schemes for publishing content and re-purposed content.

And the mEducator Story goes on: the Future of Sharing, Retrieving and Repurposing Medical Educational Resources

As funding by the EU has recently ended, the mEducator consortium is now turned into a mEducator partnership in order to promote the sustainability of mEducator outcomes. The market facts for mEducator have been analysed and a business plan has been set up in an effort to spark income generation from: donations, institutional subscriptions, advertising, fees for upgraded users, contemporary medical education content development and maintenance, system parameterisation and consulting. Strategic alliances with other initiatives are in the process to be established and plans for approaching giant players at a later more mature stage (e.g. Google, Bing, etc.) are drawn.

The first real combination of social media technologies (Web2.0) and the semantic web (Linked Data/Web3.0) into education and learning (Linked Learning / Linked Medical Education) was established by mEducator. That gives a great advantage to mEducator in comparison with other past projects and repositories. Glimpses of all the above achievements will be presented in this Village of the Future presentation.

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[2]http://www.mei2012.org/content/educemiology-%E2%80%9Cepidemiology%E2%80%9D-medical-learning-resources

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