



# STANDARDIZATION OF EDUCATIONAL WEB PLATFORM AMONG TEN MEDICAL SCHOOLS IN THE MEFANET PROJECT

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## **Abstract**

The MEFANET project (MEdical FACulties NETwork) has initiated international, effective and open cooperation among ten medical faculties in the Czech Republic and Slovakia. One of the elementary goals of this educational network is to advance medical teaching with the use of modern information and communication technologies. As an instrument for that, MEFANET has decided to develop an original and uniform solution for educational web portals which are used, together with a central gate, to offer and share digital educational content. Three fundamental principles of the educational web platform will be described: 1. medical disciplines linker, 2. federative framework for users' authentication/authorization, 3. four-dimensional quality assessment. As a success story, The Multimedia Atlas of Speech Disorders will be presented by its author as an example of a contribution that experienced a great expansion of its usage due to the portal platform.

**Key words:** computer communication network, distance education, educational technology, medical education, e-publishing

## **Introduction**

Rapid growth of the medical knowledge in our society makes medical school teachers to pass students ever increasing quantities of learning material. Sharing of educational contents with the use of information and communication technology (ICT) and open access to e-learning materials were encouraged in many reports, e.g. [1][2][3]. Only selected works [2][3] show the need for quality control of shared teaching materials and ensuring validity, accuracy and the use of evidence-based practice.

The idea of cooperation of medical faculties on sharing their educational digital contents appeared in 2006 for the first time. Early after that in 2007 all seven Czech medical faculties as well as all three Slovak medical faculties have formally joined the brand new network, see Figure 1. The MEFANET (Medical



Faculties NETWORK) project [4][5] aims to develop cooperation among the medical faculties as regards the progress in education of medical and health care disciplines using modern ICT by means of a common platform for sharing the educational digital contents. The primary objective of the MEFANET project is to ensure a horizontal accessibility of electronic teaching tools for both teachers and students. The MEFANET project is certainly not meant to affect or control teaching activities at individual faculties: all targets of the MEFANET project fully respect the independence of individual schools.

## Common portal platform

There are two particular goals concerning the educational web platform in the MEFANET project: 1. to unify educational web portals of the involved medical schools such that the published teaching materials are accessible horizontally, 2. to build a common central gateway enabling easy and comprehensible content browsing.

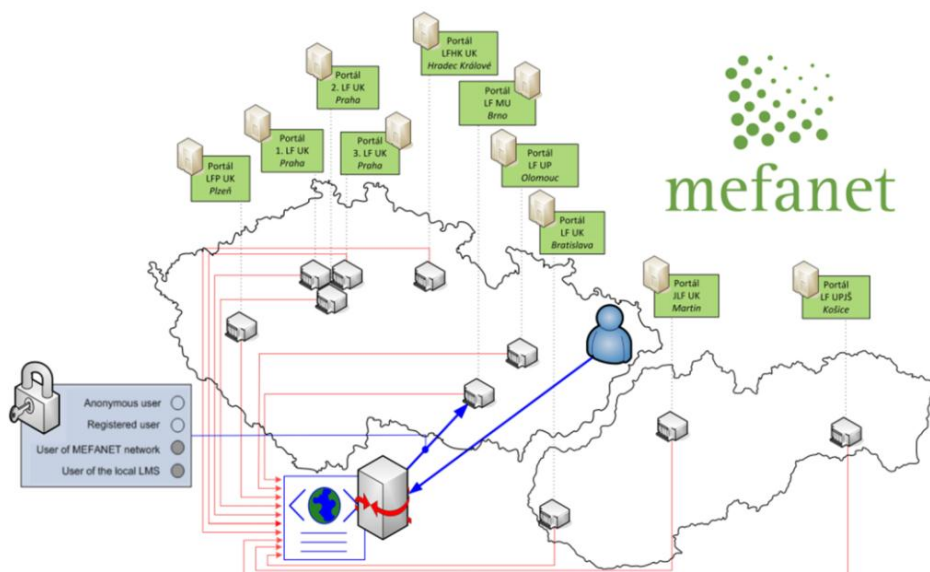


Figure 1: The MEFANET network involves all medical schools in the Czech Republic and Slovakia. They share each other digital teaching materials, using an e-publishing system, which consists of ten instances of educational web portal and a central gateway.

The idea of the shared e-publishing system [6][7] is based on a set of standalone web portals rather than on a centralized application hosted for all



medical schools, what might be an inflexible and more vulnerable alternative solution. Each portal instance represents an independent publication media with its ISSN code and an editorial board. Local metadata describing the digital educational contents are replicated regularly to the central gateway, see Figure 1.

There are three fundamental elements which have to be kept rigid on the parts of the local administrators: 1. Medical disciplines linker, 2. Authentication - authorization framework and 3. Multidimensional quality assessment. The other features, properties, functionalities can be adapted or localized to meet the needs of the particular schools.

### **Medical disciplines linker**

The medical disciplines linker represents taxonomy of the contributions. At the beginning single-level or multilevel list of medical specializations were considered as well as the possibility to adapt an existing scheme from the National library of the Czech Republic, which is based on the standard Conspectus method [8]. However, the medical disciplines mapping according to the Conspectus method showed to be inapplicable for MEFANET purposes. Thus, an own medical disciplines linker was composed, based on various taxonomies adapted from significant medical publishing houses. It is a single level list of 48 medical specializations. It is the only obligatory structure of a portal instance and any change to it is a subject to approval of the coordinating committee of the MEFANET project.

### **Authentication / authorization framework**

The access to portal instances is not restricted anyhow. All pages and contributions are accessible for anyone. Thus, everyone interested can get an overview of digital educational contents available in the given medical school or even in the whole MEFANET network. The educational contents itself is included in attached files or hypertext links. Each attachment and/or link contains information on a group of users who have access to these materials.

The authors of the teaching materials (i.e. published attachments) can choose from the following user groups, in order to permit or deny access to their materials: 1. nonregistered anonymous users, 2. registered anonymous users, who accepts the terms of use within his/her registration, 3. user of MEFANET network, i.e. student or teacher from any Czech or Slovak medical school, 4. user of local university, whose affiliation to that university has been verified at the portal via the local information system of that university, 5. user to whom attachments are made available only on the author's explicit consent.



Services of the Czech academic identity federation EDUID.CZ [9] are used, in order to check affiliations of the users of the portal instances. This federation uses Shibboleth technology which is one of many authentication frameworks allowing sharing web resources among institutions using the SAML (Security Assertion Markup Language) protocol standard. The portal instances behave like service providers in this federation, whereas the information systems of the involved schools behave like identity providers.

## 4-D quality assessment

There are four dimensions which are of crucial importance when evaluating the quality of electronic teaching materials, see Figure 2.

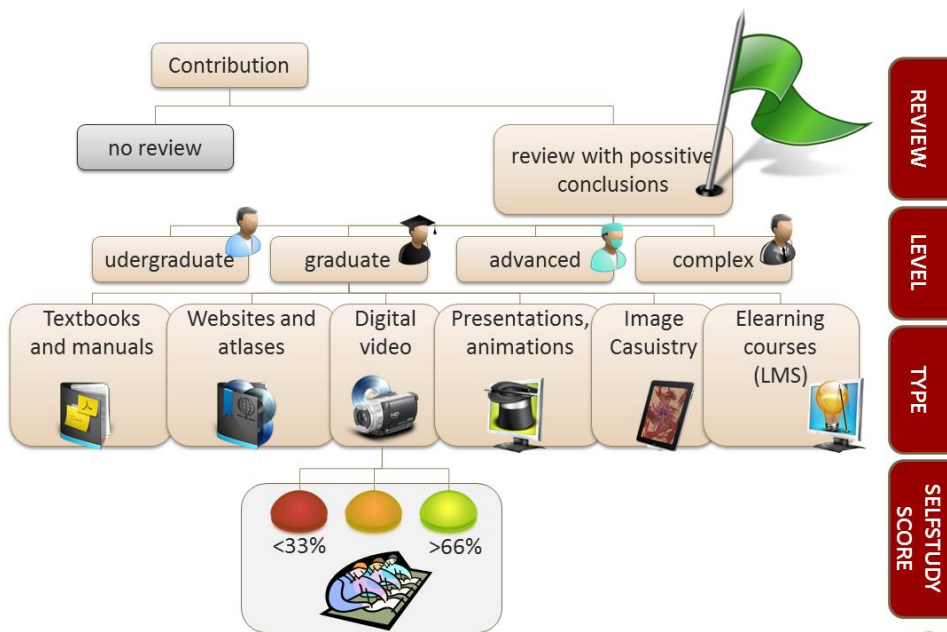


Figure 2. Four-dimensional quality assessment of the contributions involves the following four dimensions: 1. expert review, 2. educational level of target users, 3. classification by type, and 4. selfstudy score.

The first of them is an expert review: only the contributions with positive conclusion from reviewers can be published on the central gateway. The contributions with no review can be published on local portal instances only and users are warned strongly when using unreviewed materials. The review includes binary questions as well as open questions. The structure of the review-form can be localized by modifying an XML template file. The second dimension is represented by the educational level of the target group of the



teaching material, which is a useful piece of information for users as well as for reviewers. Next dimension is represented by a multiple-choice classification according to the types of attachments – the enumerated scale includes static files for web-based learning as well as interactive e-learning courses encapsulated in learn management systems (LMS). The last dimension – a self-study score – shows what users think about usability of a particular contribution for their self-studies.

Roles of authors, guarantees and reviewers will be explained and the workflow of a contribution will be shown here in the final paper.

## Central gateway

The central gateway is besides ten portal instances another web-based application which collects all metadata from the web portals in the MEFANET network. A complete image about the available digital contents is constructed in this way. Students and academic staff can search and browse the contributions sorted by medical disciplines, authors, schools or multidimensional quality assessment criteria. For details, see <http://portal.mefanet.cz/>.

The data format of a shared contribution is based on XML-based RELAX NG schema language [10]. XML documents representing the contributions without their attachments are imported regularly with 24-hour period. The XML validation procedures are based on matching patterns specified in own RELAX NG schema.

## Conclusions

The educational web platform for offering and sharing digital teaching materials among all medical schools in the Czech Republic and Slovakia was presented and its fundamental elements were described. The platform is used at ten medical schools in two countries by users in two groups: academic staff – about 3.900 potential users – and students – about 16.500 potential users.

The local portal instances do not replace well-established LMS systems at the medical schools. Compared to the LMS, the educational portal platform provides additional e publishing tools with well-defined rules for quality assessment. Further, it allows users federated authentication, and so they do not have to create ten separate user accounts for each portal instance.

High-quality digital educational contents production has become a matter of prestige at medical schools in this region and the volume of teaching



materials available is growing rapidly – thanks to the MEFANET project and its platform. Further development will aim to encourage publication of materials aimed at clinical reasoning based on the concept of virtual patients.

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## References

- [1] P. L. Beux and M. Fieschi, “Virtual biomedical universities and e-learning”, *International Journal of Medical Informatics*, vol. 76, pp. 331 - 335, 2007.
- [2] N. Mattheos et al., “Potential of information technology in dental education”, *European Journal of Dental Education*, vol. 12, pp. 85–92, 2008.
- [3] J. Potomkova, V. Mihal, J. Zapletalova, and D. Subova, “Integration of evidence-based practice in bedside teaching paediatrics supported by e-learning”, *Biomedical Papers*, vol. 154, pp. 83-88, 2010.
- [4] “MEFANET”, About the project, 2007. [Online]. Available: <http://www.mefanet.cz/index-en.php>. [Accessed: 20-mar-2011].
- [5] L. Dušek, S. Štípek, V. Mihál, D. Schwarz, and Č. Štuka, “MEFANET - A Collaborative Project of the Czech and Slovak Medical Faculties for Development of a Joint Educational Network”, in *MEFANET report 01*, Brno, 2008.
- [6] D. Schwarz, L. Dušek, S. Štípek, and V. Mihál, “A Common Portal Platform for Developing and Sharing Digital Content in the MEFANET Project: Concepts, Functionality and the State of Implementation”, in *MEFANET report 02 - Information technology and e-learning in medical education*, Brno, 2009, vol. 2, pp. 33-39.
- [7] D. Schwarz, I. Šnábl, L. Dušek, and J. Feberová, “New Components and Functionality of the Common Portal Platform in the MEFANET Project”, in *MEFANET report 03 - Medical teaching with the use of advanced technology*, Brno, 2010, vol. 3, pp. 111-116.
- [8] B. Stoklasová, “Conspectus Method Used for Collections Mapping and Structuring of Portals”. 2006.



- [9] "Czech academic identity federation eduID.cz [eduID.cz]". [Online]. Available: <http://www.eduid.cz/wiki/en/eduid/index>. [Accessed: 21-mar-2011].
- [10] J. Clark and M. Murata, "RELAX NG Specification", Committee Specification 3 December 2001, dec-2001. [Online]. Available: <http://relaxng.org/spec-20011203.html>.