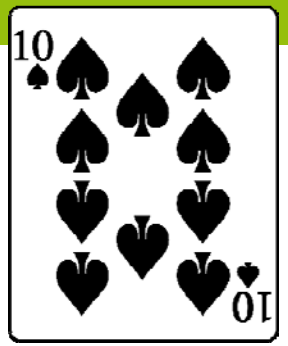
MEFANET after 10 years of networking: state of the union

Daniel Schwarz & MEFANET community

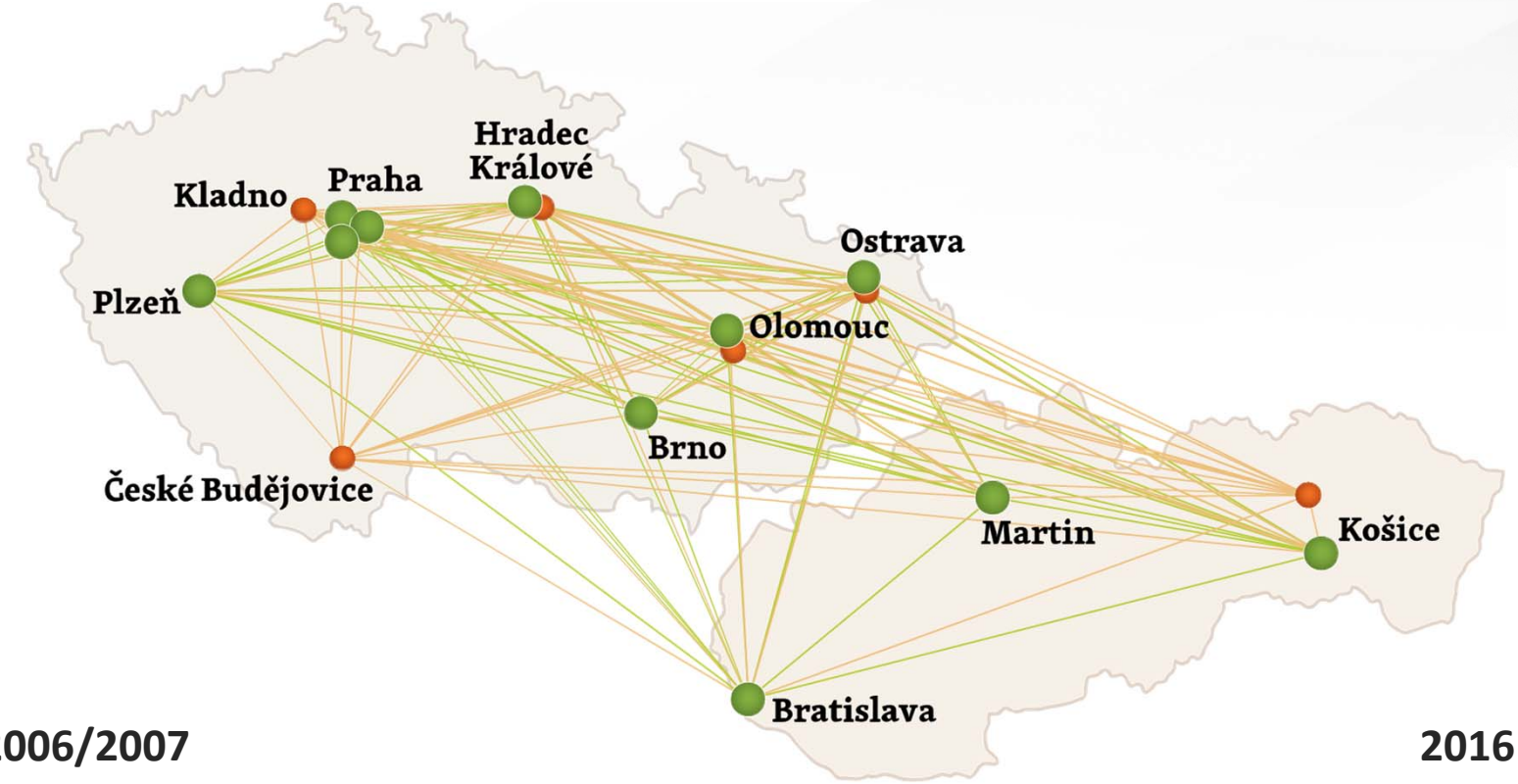
mefanet | MEDICAL FACULTIES NETWORK



Outline

1. MEFANET: history of the movement
2. Our achievements
3. What's next?

MEFANET: history of the movement



2006/2007

2016

UNIVERZITA KARLOVA V PRAZE
1. LÉKAŘSKÁ FAKULTA
121 08 PRAHA 2, KATEŘINSKÁ 32
DĚKAN FAKULTY

26. 05. 2006
Číslo: 2815

č. j.: 823/06, 718 68 658

V PRAZE
24. 5. 2006

Vážený pane děkane,

především dovolte, abych vyslovil velké uznání vašim pokrokům při zavádění multimediální výuky lékařských a zdravotnických studijních programů. Vedení naší fakulty sleduje výukové konference a vývoj výukového portálu vaší a přírodovědecké fakulty MU s velkým pochopením a zájmem, neboť zjišťuje, že kromě stejných cílů máme i více nebo méně podobné metody přístupu v řešení tohoto úkolu. 1. LF UK získala několik finančních dotací na eLearning a výukový SW i HW, modernizuje počítačovou síť, nakoupila zajímavé vývojové prostředí a vytváří výukový portál, řeší legislativní a vydavatelské otázky.

Obracím se na Vás s návrhem spolupráce v této oblasti. Mohli bychom začít na koncepční úrovni. Pokud byste s takovou spoluprací souhlasil, navrhuji, aby se naši odborníci (předseda naší eLearningové komise, vedoucí našeho oddělení výpočetní techniky a jeden až dva specialisté odpovědní za výukový server sešli s Vámi určenými odpovědnými pracovníky, informovali se o aktuálním stavu věcí a předložili nám návrh na případnou spolupráci. Pokud by se koncepční spolupráce ukázala prospěšnou pro obě strany, mohli bychom následně přistoupit k hlubší koordinaci multimediální výuky.

Věřím, že naše společné úsilí by bylo prospěšné pro učitele i studenty našich škol.

S přáním mnoha úspěchů a se srdečným pozdravem

Prof. MUDr. Tomáš Zima, DrSc.

Vážený pan
Prof. MUDr. Jan Žaloudík, CSc.
děkan
Lékařská fakulta Masarykovy Univerzity
Komenského náměstí 2

Seminář RITM 2006: Moderní metody výuky lékařských oborů pomocí informačních technologií a telemedicíny

RITM

Dne 15. listopadu 2006 se v přednáškové místnosti Psychiatrické kliniky Lékařské fakulty MU a Fakultní nemocnice Brno konal 2. ročník semináře RITM (Rady pro informační technologie v medicíně) - letos i s aktivní účastí kolegů z Lékařské fakulty Univerzity Palackého v Olomouci a z 1. Lékařské fakulty Univerzity Karlovy v Praze. V následující reportáži jsou shrnuty příspěvky jednotlivých přednášejících.

Dohoda o spolupráci lékařských fakult v síti MEFANET

Níže uvedeného dne, měsíce a

Masarykova univerzita, Lék
Komenského nám. 2, 662 43 B
IČ 00216224
Zastoupená prof. MUDr. Janer

Univerzita Karlova v Praze,
Kateřinská 32, 121 08 Praha 2
IČ 00216208
Zastoupená prof. MUDr. Tom

Univerzita Karlova v Praze,
V Úvalu 84, 150 06 Praha 5
IČ 00216208
Zastoupená doc. MUDr. Ondř

Univerzita Karlova v Praze,
Ruská 87, 100 34 Praha 10
IČ 00216208
Zastoupená doc. MUDr. Bohu

Univerzita Karlova v Praze,
Šimkova 870, 500 38 Hradec
IČ 00216208 .
Zastoupená prof. MUDr. Vlad

Univerzita Karlova v Praze,
Husova 3 , 306 05 Plzeň
IČ 00216208
Zastoupená doc. MUDr. Jaros

Univerzita Palackého v Olo
Tř. Svobody 8, 771 26 Olomo
IČ 61989592
Zastoupená prof. MUDr. Zde

Univerzita Komenského v B
Špitálska 24, 813 72 Bratislav
IČ 00397865-01
Zastoupená Prof. MUDr. P. L

Univerzita Komenského v B
Záborského 2, 036 45 Martin
IČ 00397865-02
Zastoupená doc. MUDr. Duš

dále zaregistrována doména www.MEFANET.eu. Existenc
portálů nijak neomezuje rozvoj portálů jednotlivých fa
prezentaci.

Čl. VI. Pravidla sdílení autorských

Díla vzniklá v rámci činnosti projektu MEFANET vyjá
doplněná grafickým zpracováním, budou užívána na zá
dodatkem této smlouvy ve smyslu platných právních předp
Sb., o právu autorském, o právech souvisejících s právem
zák. č. 527/1990 Sb., o vynálezech a zlepšovacích návrzích,

Čl. VII. Společná a závěrečná ustan

1. Tato smlouva nabývá platnosti dnem, v němž ji akceptu
a účinnosti dnem 1.3. 2009 nebo dnem nabytí platnosti,
2. Tuto smlouvu lze měnit a doplňovat pouze formou pís
s nimiž souhlasí všechny smluvní strany.
3. Rozhodne-li se některá z fakult ukončit členství v síti M
chtít být smluvní stranou této dohody o spolupráci, je po
oznámit předsedovi Koordinační rady nejpozději do pos
roku. K poslednímu dni příslušného kalendářního roku
členem sítě MEFANET a smluvní stranou této dohody
ukončit členství v síti MEFANET a druhá věc je nebýt s
spolupráci.
4. Dohoda se vyhotovuje v 10 stejnopisech s platnost
z účastníků náleží po jednom.
5. Zástupci oprávnění jednat a podepisovat jménem či za
s obsahem této smlouvy, její obsah je jim znám a js
důkaz své svobodné, pravé a určité vůle uzavřít tuto dol

V Brně dne 23.2.2009
za Masarykovu univerzitu, Lékařskou fakultu

V Praze dne 12.6.2009

V PRAZE dne 29.6.2009
za Univerzitu Karlovu v Praze, 2. lékařskou fakultu

Univerzita Karlova v Praze
3. lékařská fakulta
OĚKANAT
100 00 Praha 10, Ruská 87
2

V PRAZE dne 15.6.2009
za Univerzitu Karlovu v Praze, 3. lékařskou fakultu

V HK dne 7.4.09
za Univerzitu Karlovu v Praze, Lékařskou fakultu v Hradci Králové

UNIVERZITA KARLOVA V PRAZE
Lékařská fakulta v Plzni
306 05 Plzeň, Husova 3
IČO: 00216208 DIČ: CZ00216208
tel.: 377 593 400, fax: 377 593 449

V PLZNI dne 26.3.2009
za Univerzitu Karlovu v Praze, Lékařskou fakultu v Plzni

V Olomouci dne 18.3.09
za Univerzitu Palackého v Olomouci, Lékařskou fakultu

V BRATISLAVE dne 18.05.09
za Univerzitu Komenského v Bratislave, Lekársku fakultu

V Martine dne 4.5.2009
za Univerzitu Komenského v Bratislave, Jeseniovu lekársku fakultu v Martine

V Košiciach dne 17.4.2009
za Univerzitu Pavla Jozefa Šafárika v Košiciach, Lekársku fakultu

Univerzita Pavla Jozefa Šafárika v Košiciach
Lekárska fakulta
Trieda SNP č.1, 040 11 Košice

MEFANET: reasons & motivation

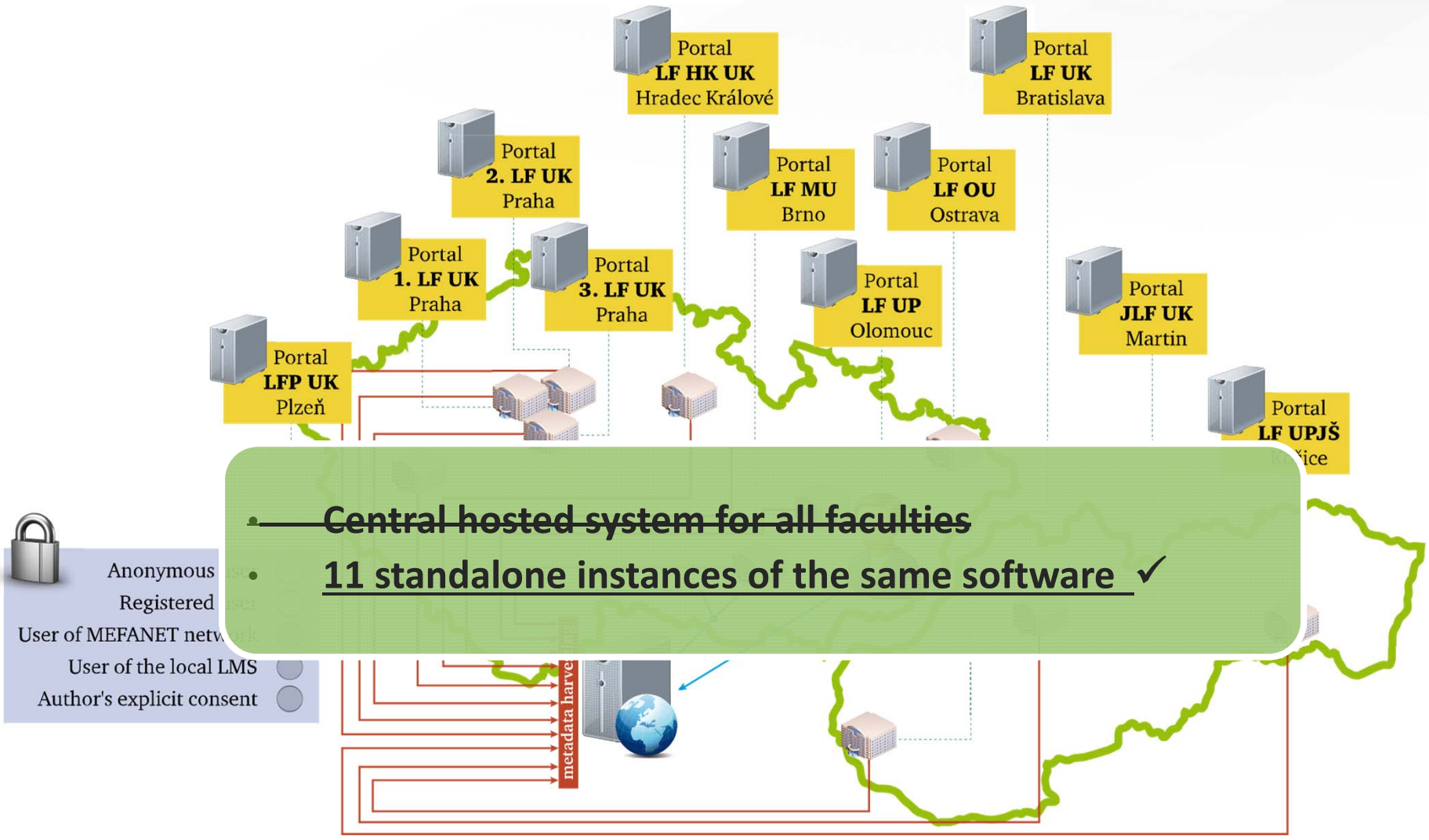
To support a process in education of medical and health care disciplines using modern ICT.

To ensure a horizontal accessibility of electronic teaching and learning tools for both teachers and students.

To facilitate the cooperation among teams from different schools.

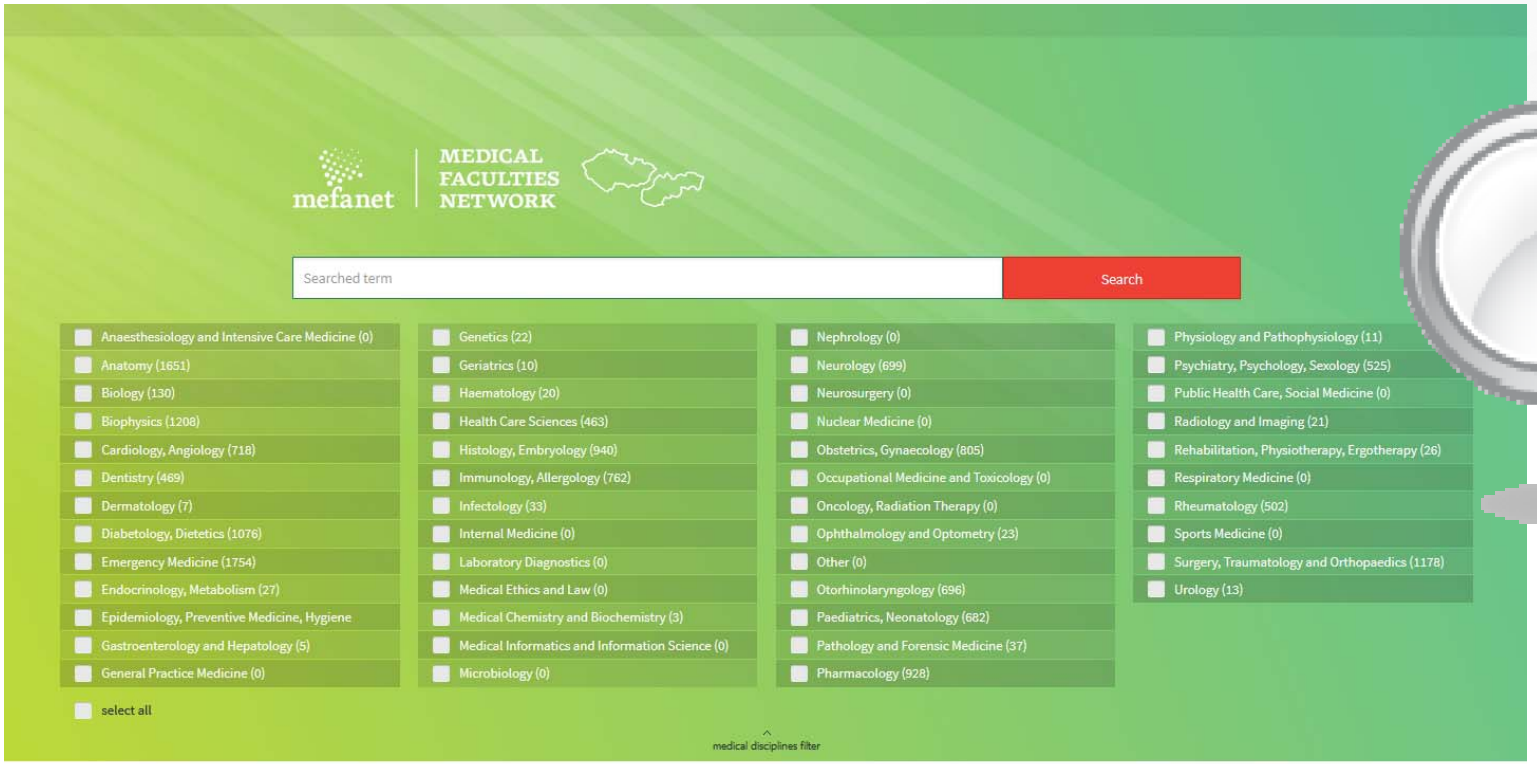
Czechs and Slovaks are traditionally academic partners with similar languages.

How do we share educational resources?

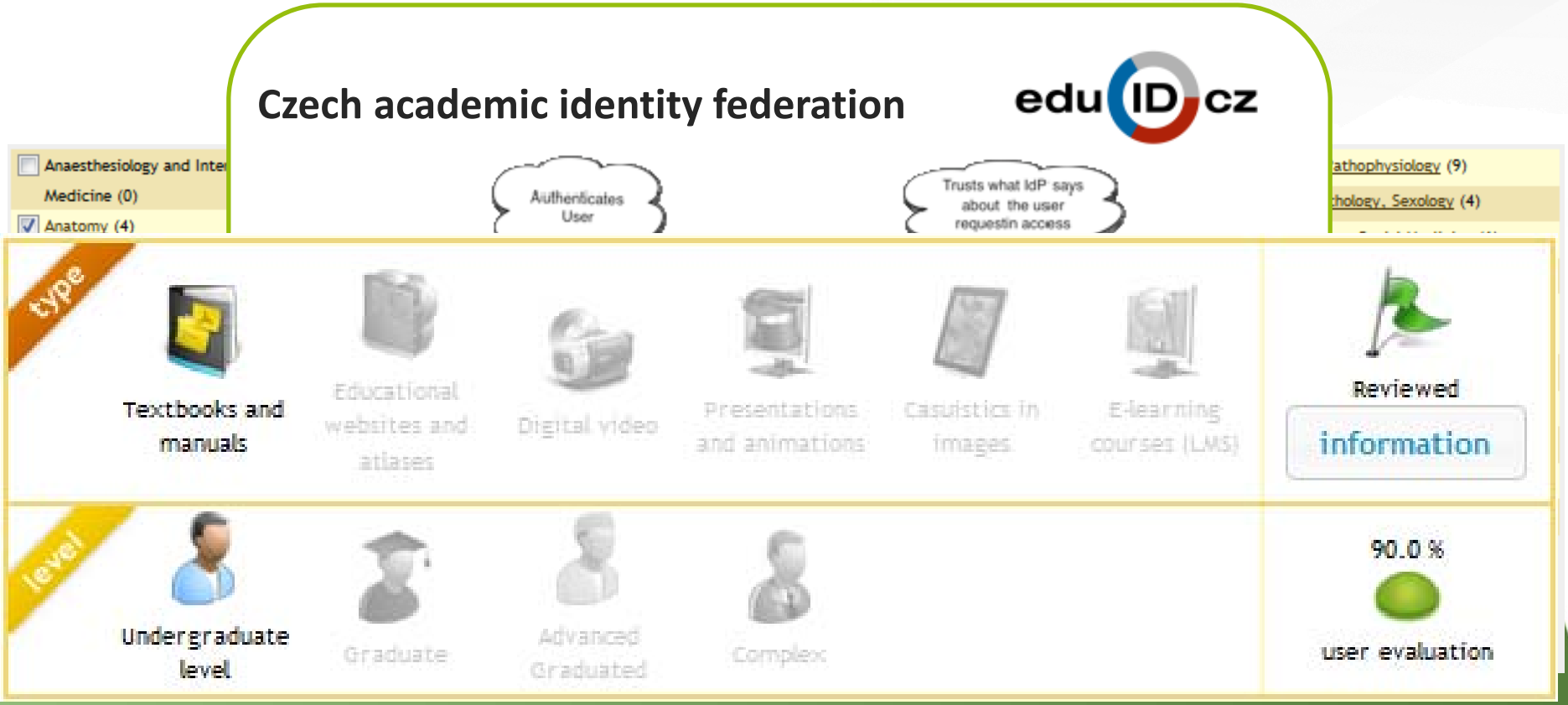


- ~~Central hosted system for all faculties~~
- 11 standalone instances of the same software ✓

E-publishing system – central gateway



Keeping the MIX appropriate



How do we evaluate the quality?

- Contribution
  - no review
  - review with possitive conclusions
    - udergraduate
    - graduate
    - advanced
    - complex
      - Textbooks and manuals
      - Websites and atlases
        - <33%
        - >66%
      - Digital video
      - Presentations, animations
      - Image Casuistry
      - Elearning courses (LMS)

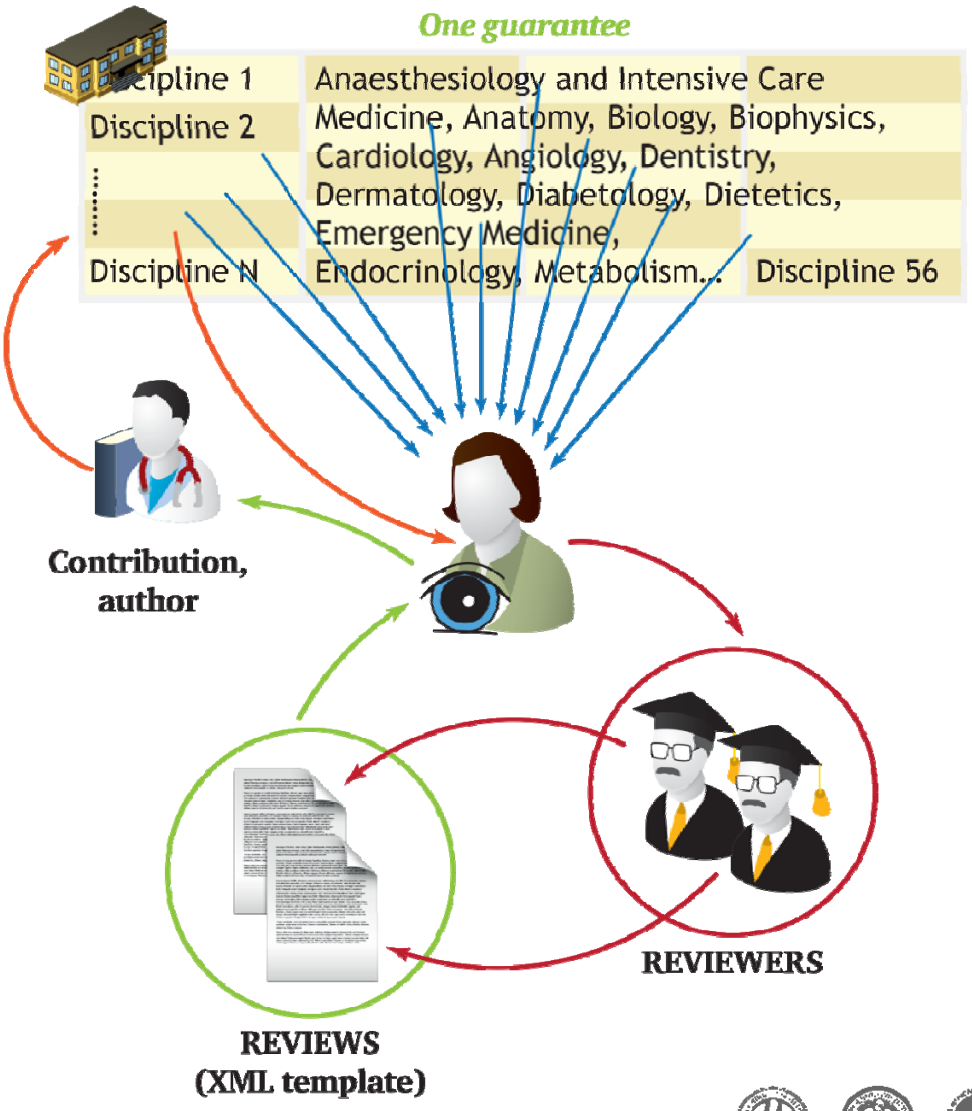
REVIEW

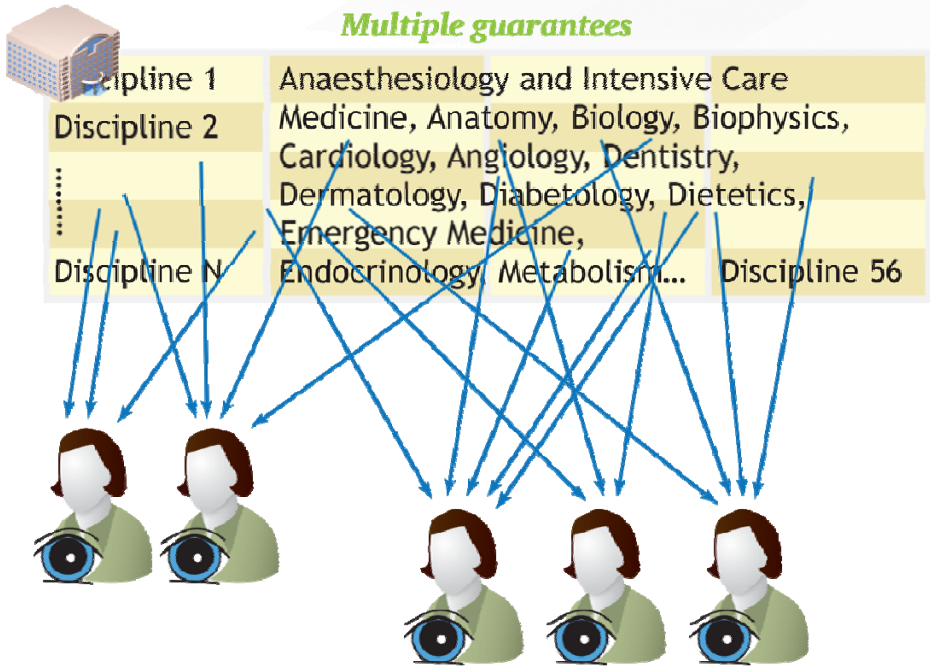
LEVEL

TYPE

SELFSTUDY SCORE

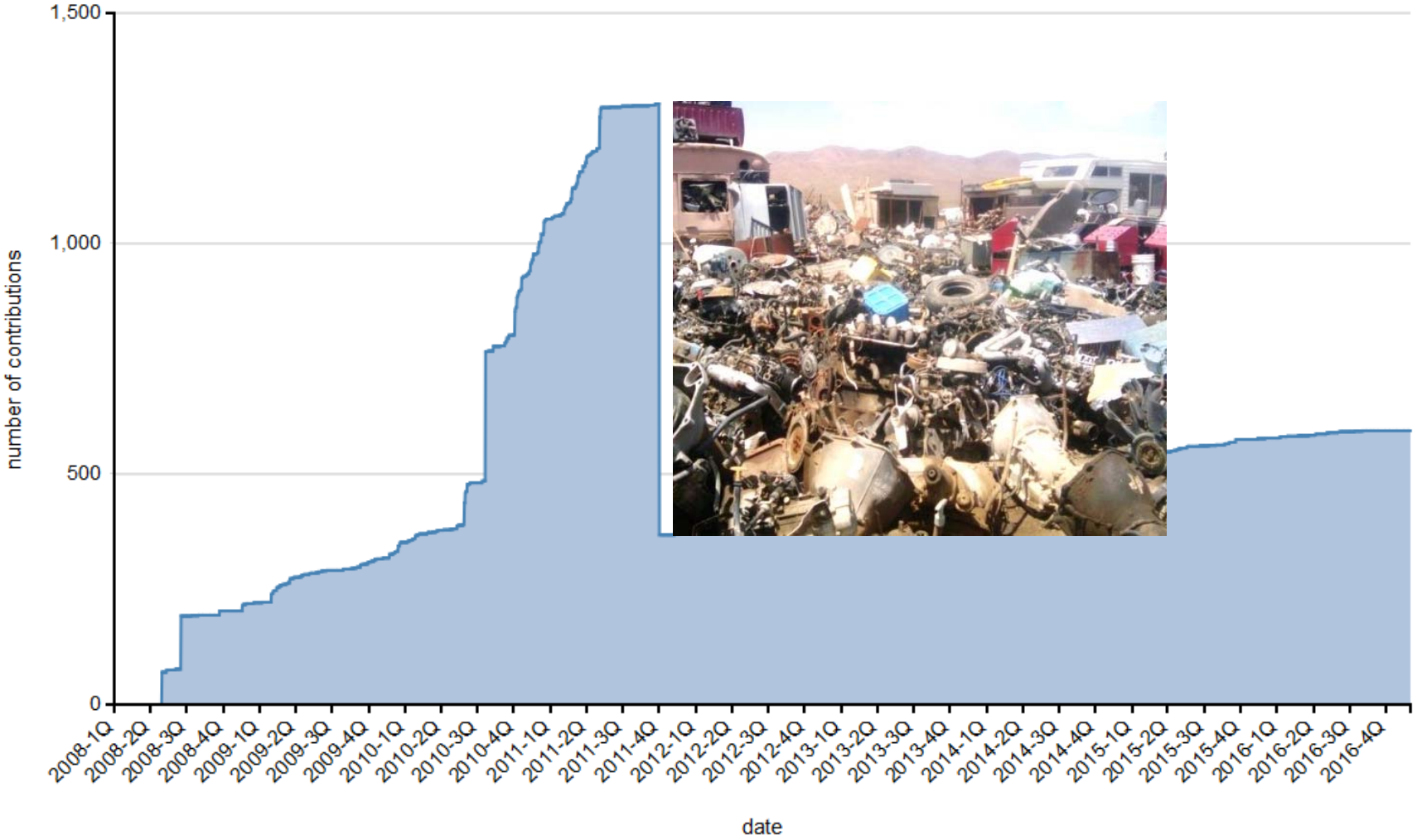
Quality assessment: guarantors, reviewers, authors



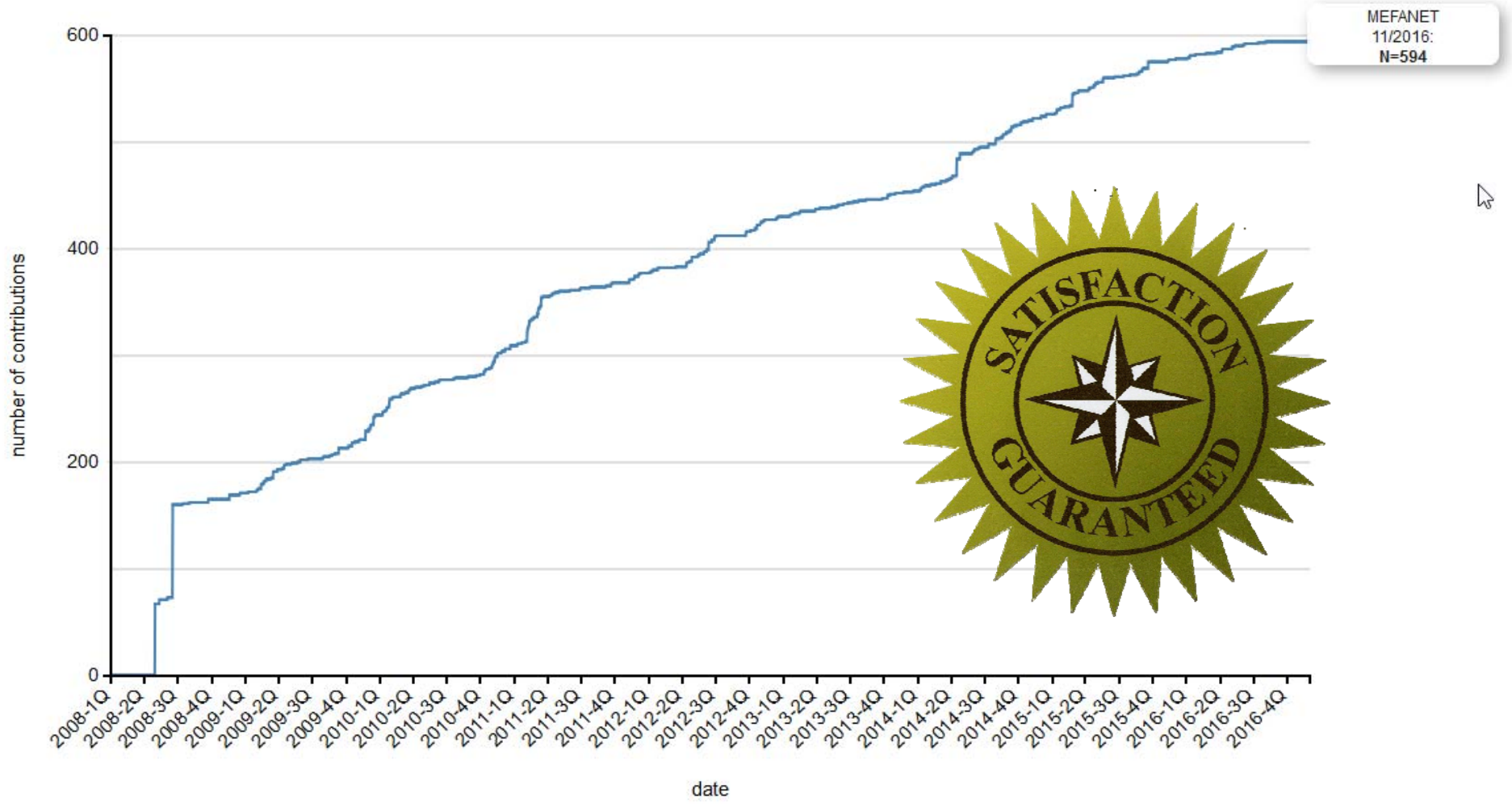


Quality assessment: guarantors, reviewers, authors

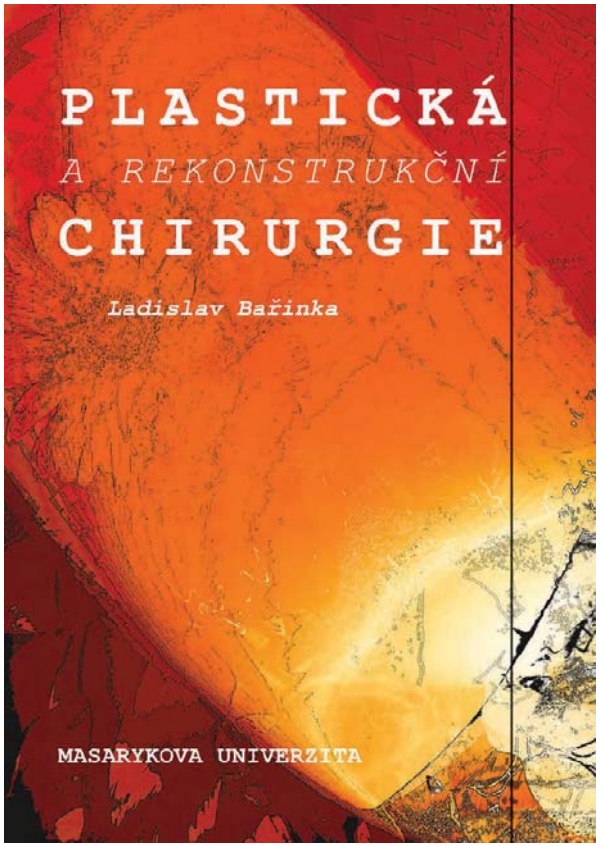
CENTRAL GATEWAY + SANDBOX

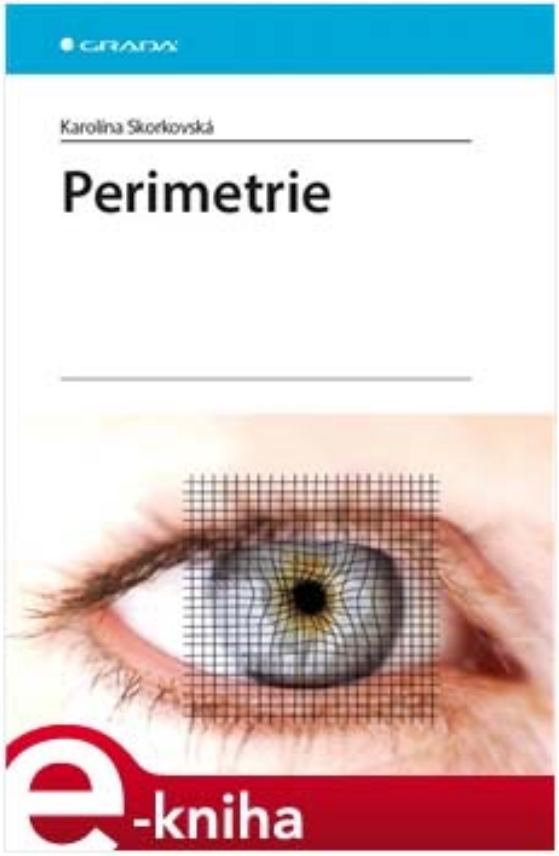


CENTRAL GATEWAY only



E-publishing system – focus on quality

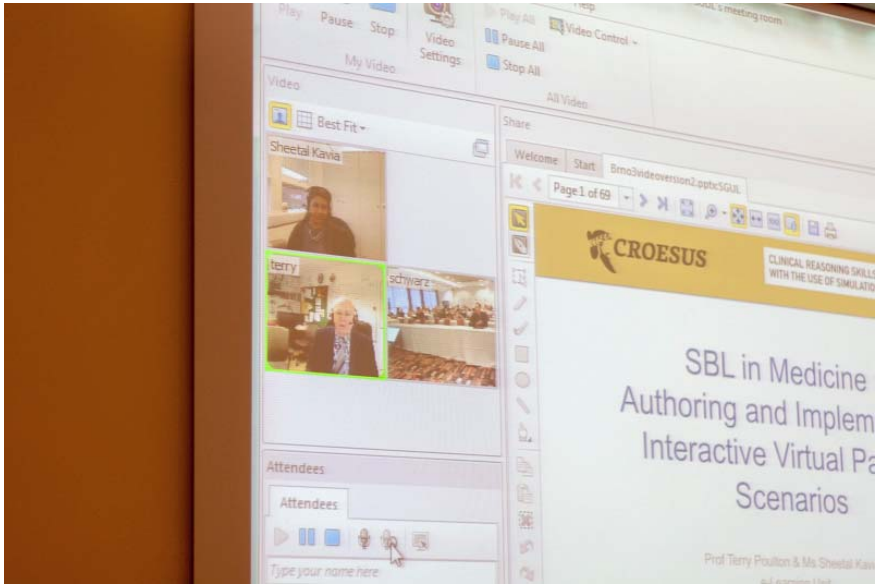




When teaching kills learning…..

"The kids don't listen, so I have to repeat myself. I'm always repeating myself. You know, always saying the same thing more than once. I say it once, and then they make me say it again..."

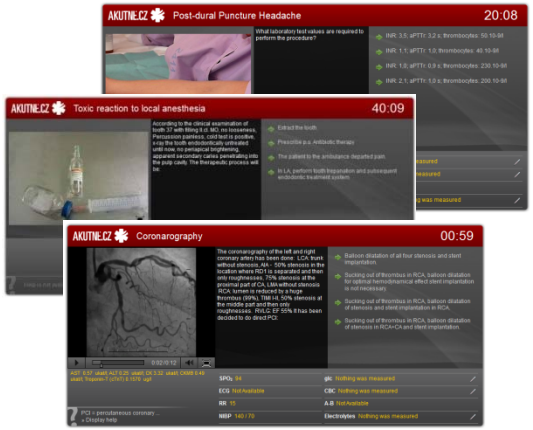
Simulations in medical education



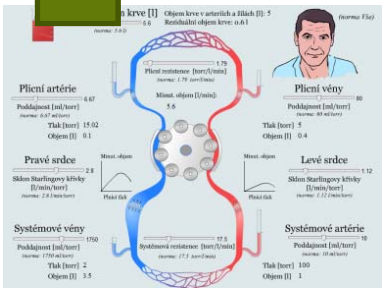
games.mefanet.cz

virtual cases

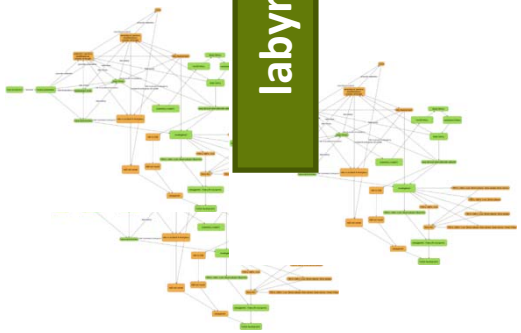
algorithms



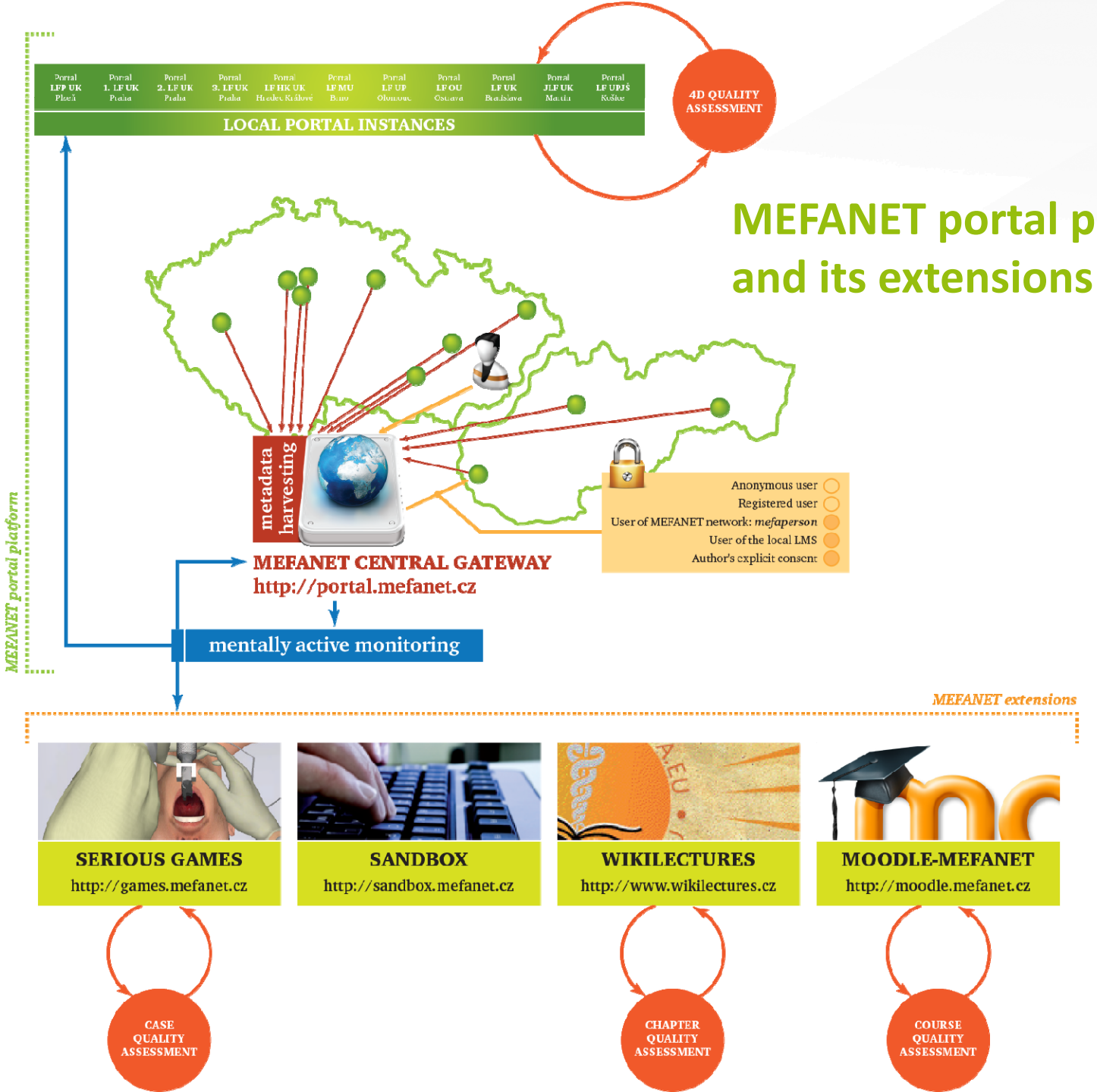
simulators



labyrinths



MEFANET portal platform and its extensions



Index Summary

Index Size	201.77 MB
Num Docs	15175
Dostupnost	
Access for MEFAPERSON	13307
Access for all	11802
Nedostupné výsledky	15175
Díla s recenzí	172
Level:	
Undergraduate level	8444
Graduate	350
Advanced Graduated	232
Complex	97
Language:	
czech	11887
slovak	1709
english	1579
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content ?

Attracting the interest of students…

AKUTNĚ.CZ

Attracting the interest of students…

Attracting the interest of students…
…& TEACHERS!

Intensive training program

A) Virtual cases authoring in OpenLabyrinth

B) PBL session tutoring

CROESUS

Attracting the interest of students…
…& TEACHERS!

Intensive training program

A) Virtual cases authoring in OpenLabyrinth

B) PBL session tutoring

Attracting the interest of students…
…& TEACHERS!

Intensive training program - feedback

A) Virtual cases authoring in OpenLabyrinth
B) PBL session tutoring

If you learned any new skills which will be useful in your general teaching, what were they?

- „To transfer the responsibility for learning outcomes on the student.“
- „To work with more difficult students.“

What, if anything, did you “take away” from the educational activity?

- „It is possible and still not too hard.“
- „Knowledge about another educational system.“
- „A new approach to students with more space for their learning and expression.“
- „How to get students’ attention and how to give it back to them.”

Promoting the network

http://mj.mefanet.cz

No. of papers per type	Vol. 1 nr. 1 JUN 2013	Vol. 1 nr. 2 DEC 2014	Vol. 2 nr. 1 JUN 2014	Vol. 2 nr. 2 DEC 2014	Vol. 3 nr. 1 JUN 2015	Vol. 3 nr. 2 DEC 2015	Vol. 4 nr. 1 JUN 2016
ORIGINAL ARTICLE	4	4	3	5	2	3	5
REVIEW	1	1	1	0	2	0	1
EDITORIAL	2	3	2	2	1	3	2
	7	**8**	**6**	**7**	**5**	**6**	**8**

Scope of the journal

Manuscripts are invited which deal with the following topics:

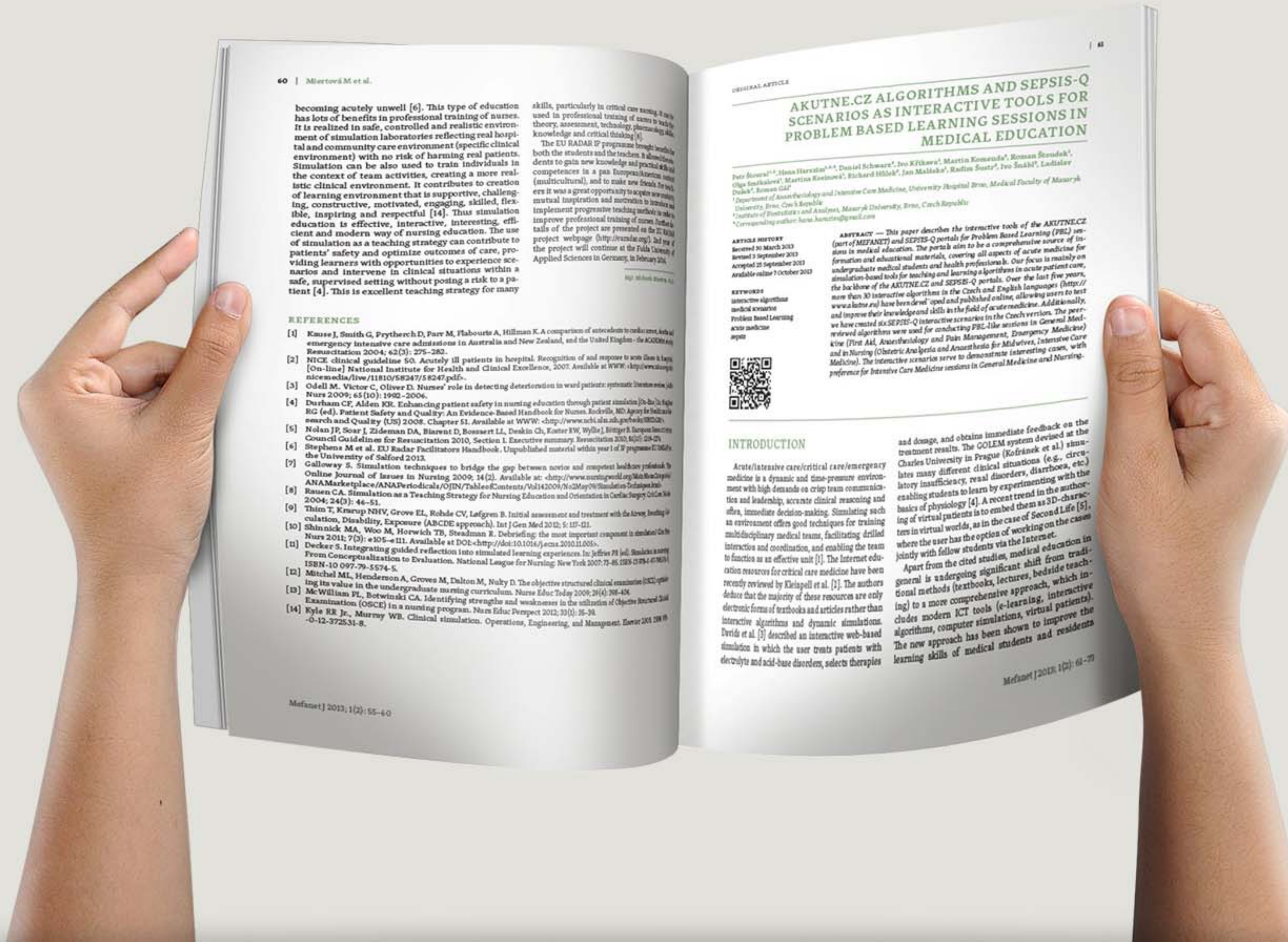
- E-health and telemedicine
- E-learning
- Information science
- Innovative teaching methods
- Medical educational informatics and learning analytics
- Modelling and simulation
- Multimedia
- Social media pedagogy
- Evidence-based medicine in education

Peer Review Process

Each article corresponding to journal's focus will undergo a review process. The review process is double-blinded; the author does not know the reviewers and vice versa. Each article is reviewed by at least by two reviewers nominated by the editorial board.

The Mefanet J accepts following types of articles:

- Reviewed: original article, review
- Not reviewed: comment, editorial, tutorial


60 | Miertová M et al.
becoming acutely unwell [6]. This type of education has lots of benefits in professional training of nurses. It is realized in safe, controlled and realistic environment of simulation laboratories reflecting real hospital and community care environment (specific clinical environment) with no risk of harming real patients. Simulation can be also used to train individuals in the context of team activities, creating a more realistic clinical environment. It contributes to creation of learning environment that is supportive, challenging, constructive, motivated, engaging, skilled, flexible, inspiring and respectful [14]. Thus simulation education is effective, interactive, interesting, efficient and modern way of nursing education. The use of simulation as a teaching strategy can contribute to patients' safety and optimize outcomes of care, providing learners with opportunities to experience scenarios and intervene in clinical situations within a safe, supervised setting without posing a risk to a patient [4]. This is excellent teaching strategy for many
REFERENCES
[1] Kause J, Smith G, Prytherch D, Parr M, Flabouris A, Hillman K. A comparison of antecedents to cardiac arrest, deaths and emergency intensive care admissions in Australia and New Zealand, and the United Kingdom
Resuscitation 2004; 62(3): 275–282.
Mefanet J 2013; 1(2): 55–60
61
ORIGINAL ARTICLE
AKUTNE.CZ ALGORITHMS AND SEPSIS-Q SCENARIOS AS INTERACTIVE TOOLS FOR PROBLEM BASED LEARNING SESSIONS IN MEDICAL EDUCATION
ARTICLE HISTORY
KEYWORDS
INTRODUCTION
and dosage, and obtains immediate feedback on the treatment results. The GOLEM system devised at the
Mefanet J 2013; 1(2): 61–

MEFANET Journal, ISSN 1805-9163 (print)
MEFANET Journal, ISSN 1805-9171 (online)

60 | Miertová M et al.

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The EU RADAR IP programme brought benefits for both the students and the teachers. It allowed students to gain new knowledge and practical skills and competences in a pan European/American context (multicultural), and to make new friends. For teachers it was a great opportunity to acquire new creativity, mutual inspiration and motivation to introduce and implement progressive teaching methods in order to improve professional training of nurses. Further details of the project are presented on the EU RADAR project webpage (http://euradar.org/). 2nd year of the project will continue at the Fulda University of Applied Sciences in Germany, in February 2014.

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[1] Kause J, Smith G, Prytherch D, Parr M, Flabouris A, Hillman K. A comparison of antecedents to medical error, death and emergency intensive care admissions in Australia and New Zealand, and the United Kingdom – the ACADEMIA study. Resuscitation 2004; 62(3): 275–282.
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[6] Stephens M et al. EU Radar Facilitators Handbook. Unpublished material within year 1 of IP programme © MaFa the University of Salford 2013.
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ORIGINAL ARTICLE

AKUTNE.CZ ALGORITHMS AND SEPSIS-Q SCENARIOS AS INTERACTIVE TOOLS FOR PROBLEM BASED LEARNING SESSIONS IN MEDICAL EDUCATION

Petr Štourač[1,2], Hana Harazim[1,2,3], Daniel Schwarz[4], Ivo Křikava[4], Martin Komenda[4], Roman Štozický[1], Olga Smrčinková[1], Martina Kosinová[1], Richard Hlídek[1], Jan Mališka[1], Radim Šustr[5], Ivo Šmahl[5], Ladislav Dušek[4], Roman Gál[1]
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ABSTRACT — *This paper describes the interactive tools of the AKUTNE.CZ (part of MEFANET) and SEPSIS-Q portals for Problem Based Learning (PBL) sessions in medical education. The portals aim to be a comprehensive source of information and educational materials, covering all aspects of acute medicine for undergraduate medical students and health professionals. Our focus is mainly on simulation-based tools for teaching and learning algorithms in acute patient care, the backbone of the AKUTNE.CZ and SEPSIS-Q portals. Over the last five years, more than 30 interactive algorithms in the Czech and English languages (https://www.akutne.cz) have been developed and published online, allowing users to test and improve their knowledge and skills in the field of acute medicine. Additionally, we have created six SEPSIS-Q interactive scenarios in General Medicine (First Aid, Anaesthesiology and Pain Management, Emergency Medicine) and in Nursing (Obstetric Analgesia and Anaesthesia for Midwives, Intensive Care Medicine). The interactive scenarios serve to demonstrate interesting cases, with reviewed algorithms were used for conducting PBL-like sessions in General Medicine and Nursing. The peer-reference for Intensive Care Medicine sessions in General Medicine and Nursing.*

INTRODUCTION

Acute/intensive care/critical care/emergency medicine is a dynamic and time-pressure environment with high demands on crisp team communication and leadership, accurate clinical reasoning and often, immediate decision-making. Simulating such an environment offers good techniques for training multidisciplinary medical teams, facilitating drilled interactive and coordination, and enabling the team to function as an effective unit [1]. The Internet education resources for critical care medicine have been recently reviewed by Kleinpell et al. [2]. The authors deduce that the majority of these resources are only electronic forms of textbooks and articles rather than interactive algorithms and dynamic simulations. Davids et al. [3] described an interactive web-based simulation in which the user treats patients with electrolyte and acid-base disorders, selects therapies and dosage, and obtains immediate feedback on the treatment results. The GOLEM system devised at the Charles University in Prague (Kofránek et al.) simulates many different clinical situations (e.g., circulatory insufficiency, renal disorders, diarrhoea, etc.) enabling students to learn by experimenting with the basics of physiology [4]. A recent trend in the authoring of virtual patients is to embed them as 3D-characters in virtual worlds, as in the case of Second Life [5], where the user has the option of working on the cases jointly with fellow students via the Internet.

Apart from the cited studies, medical education in general is undergoing significant shift from traditional methods (textbooks, lectures, bedside teaching) to a more comprehensive approach, which includes modern ICT tools (e-learning, interactive algorithms, computer simulations, virtual patients). The new approach has been shown to improve the learning skills of medical students and residents

http://mj.mefanet.cz

EDUCATION OF DATA MINING AS A NOVEL APPROACH IN CLINICAL AND HEALTH CARE PRACTICE

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ABSTRACT — *Data mining (DM) is a widely adopted methodology for the analysis of large datasets which is on the other hand often overestimated or incorrectly considered as a universal solution. This statement is also valid for clinical research in which large and heterogeneous datasets are often processed. DM is grounded on standard methods available in common statistical software and combines them into a complex workflow methodology covering all the steps of data analysis from data acquisition through pre-processing and data analysis to interpretation of the results. The whole workflow is aimed at one final goal - to find any meaning, non-trivially hidden and potentially useful information. This innovative concept of data mining was adopted in our educational course of the Faculty of Medicine at the Masaryk University accessible from its e-learning portal (http://is.med.muni.cz/clanek-318-zavedeni-technologie-data-mining-a-analyzy-velkych-genovych-expresnich-map-do-vyuky.html.*

INTRODUCTION

The term "data mining" (DM) is currently widespread in all areas related to data analysis. Clinical research belongs to them as well and the application of complex computational methods has become very popular in this area because of increasing amount of available data. The DM concept is nevertheless often overestimated or incorrectly considered as a universal solution for all problems. Although data mining seems to be well defined, the opposite is true. Even its definition is problematic and there are many definitions books and web portals dealing with the data mining. There are two probably the most popular definitions: "The nontrivial extraction of implicit, previously unknown, and potentially useful information from data" [1] and "The science of extracting useful information from large data sets or databases" [2].

In the article we would like to introduce our educational materials presenting concepts and approaches of data mining for clinicians and other researches in clinical and health care fields.

DM is mostly considered in the relation to large datasets; its usage in the commercial applications is common as well. In fact, the DM is universal methodology applicable to any data analysis and it is not "owned" by any area of science. The DM has been adopted in wide area of applications, such as marketing of risk clients, non-legal usage of credit cards, e-mail classification and spam messages detection, text and speech recognition or molecular bio-analysis. Therefore, the DM is the area of science where the development is multidisciplinary to its nature. Methods applicable in commercial applications can be applied in any other research areas and vice versa.

Data mining is often connected to an idea of gaining machine mining previously unknown information from the data and the methodology is often presented as a "black box" with simplified description. The reality is of course more rational. Good knowledge of mathematical background of the DM methods and their limitations is crucial for the correct application of the DM; the most important is expert knowledge and long-term experience. Methods applied in the DM are principally multivariate and have to follow all rules of multivariate data analysis. The benefits of multivariate methods are as follows [3]:

- Visualization of data with multiple variables
- Searching of meaningful views on multivariate data, identification of importance and hierarchy of variables
- Identification of correlations among variables, simplification of their structure
- Analysis of similarities between analysed subjects, their stratification, classification and predictionn

The question is whether the data mining is in any way different from the commonly adopted statistical methods? The answer is both yes and no. DM uses methods available in common statistical packages and "mining" can be sometimes used as a marketing term only. On the other hand, even common statistical methods are used in novel, complex and logically joined context. The real DM is a standardized complex methodology covering all the steps of data analysis from data acquisition through pre-processing and data analysis to interpretation of the results; the example is CRISP-DM, JDM (Java Data Mining) or complex methods of model description such as PMML (Predictive Model Markup Language). The data mining thus brings new quality in data analysis which is more related to innovative combination of methods than to any single method. DM in the hands of experienced data analyst is an important tool of scientific data analysis to be applied on complex heterogeneous multivariate data.

The workflow of data mining can be separated into simple individual steps from data storage and preprocessing to their description and predictive modelling. The individual steps can be performed in various software, such as Statistica, SPSS, SPSS Modeler, S+, Matlab, WEKA or R.

METHODS

Workflow of data mining

As already mentioned, data mining can be considered as an innovative connection of various methods of multivariate data analysis. Methodology of the complex DM approach always incorporates process workflow of analytical steps. Example of such approach is the CRISP DM methodology describing life cycle of DM project and their interconnections [4]; this methodology as one of the most general approaches available was also adopted in our article and educational materials.

According to CRISP-DM methodology the DM project life cycle consists of six phases; their order and direction of crossing between them is not strictly given and the movement in the scheme is based on the results of the previous phase (the arrows in the scheme shows the most common paths). The outer circle symbolizes cyclical nature of data analysis which is repeated until the solution is found. The knowledge gained in one cycle can generate new questions and new cycles utilizing experiences from the previous cycles.

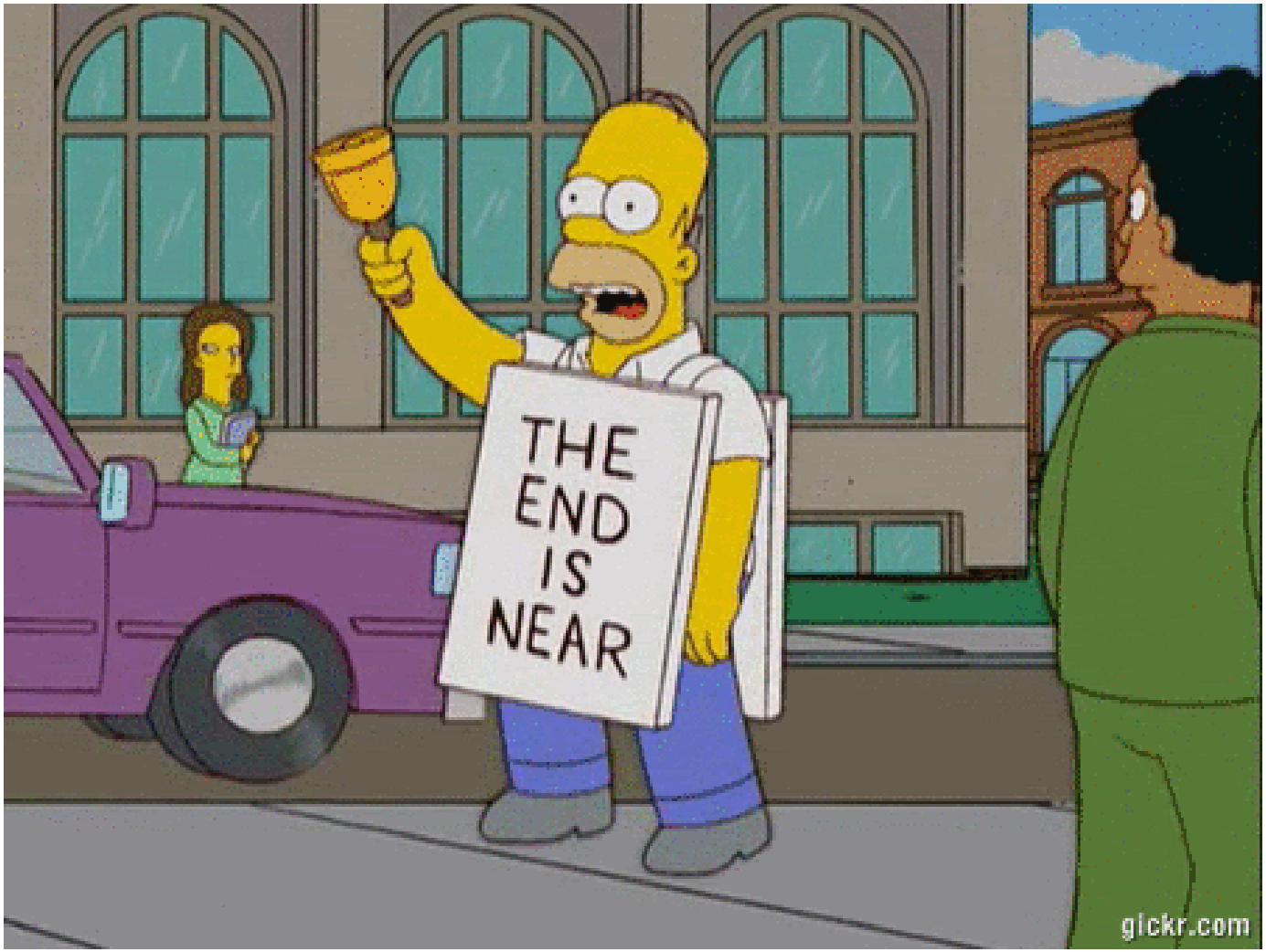
Figure 1: DM workflow according to CRISP-DM methodology (taken from CRISP-DM)

Understanding

This initial phase focuses on understanding the analysis objectives and requirements, and then converting this knowledge into a data mining problem definition and a preliminary plan designed to achieve the objectives. For example, in clinical data analysis this is the preliminary phase of literature review of given clinical problem (terminology, cut-offs, known correlations of variables etc.). Although it looks rather simple, this information is strategically important during the multivariate analysis. Limited knowledge on importance and meaning of variables can resulted into biased or uninterpretable results and during multivariate analysis these problems should not be necessarily revealed. Pa... preliminary phase should be also the powe... and assessment of the necessary sample siz...

Data Understanding

The data understanding phase starts with an i... data collection and proceeds with activities in or... to get familiar with the data, to identify data quali... problems, to discover first insights into the data, o... to detect interesting subsets to form hypotheses fo... hidden information. Wide set of univariate and mul... tivariate analyses can be adopted for this exploratory analysis (Figure 2).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Conclusions I: achievements

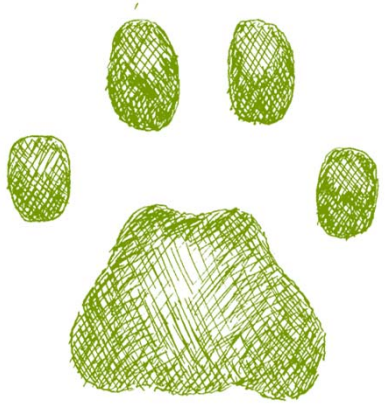
1. Development, implementation and maintenance of the uniform educational portal at the participating institutions

2. Wide range of shared digital education material with controlled quality

3. A comprehensive set of virtual patients and other types of virtual scenarios to support developmet of critical thinking and clinical reasoning skills in medical students.

4. Initiation of student movements: WikiLectures & Akutne.cz

5. Training delivered to a substantial part of academics:
    1. creators of labyrinths, algorithms, virtual cases;
    2. developers and analysts of assessment instruments;
    3. PBL tutors.



6. Established cooperation with other institutions, projects and businesses
    1. at the European level: CROESUS, MEDCIN, WAVES, TAME, ModeHED, etc.
    2. worldwide: MedBiquitous

Conclusions II: ~~institutionalization~~

1. MEFANET is a voluntary network of academics without any institutional identity.

2. We appreciate the support from the deans of medical faculties and from the university managements.

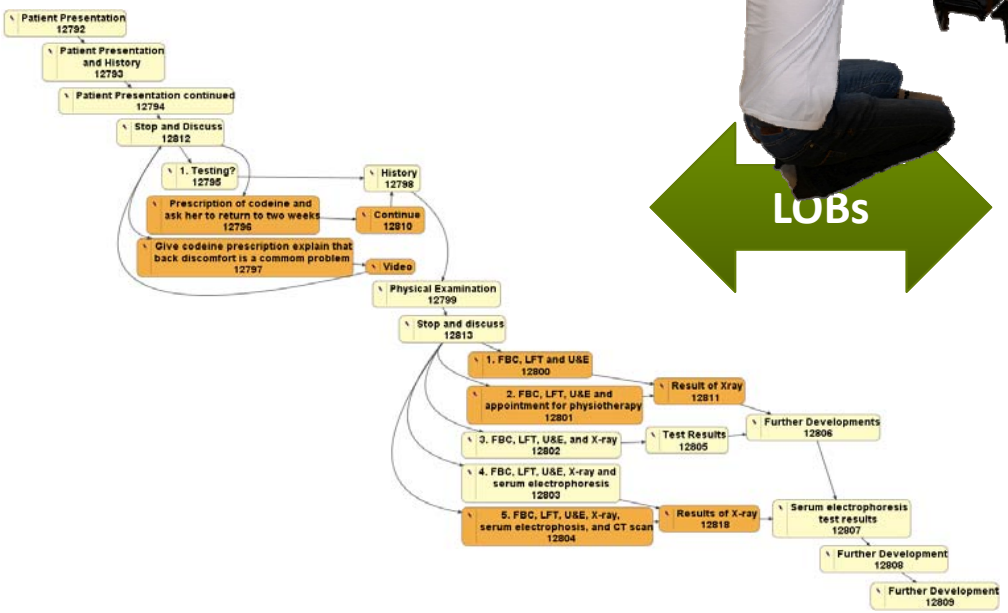
Conclusions III: what's next?

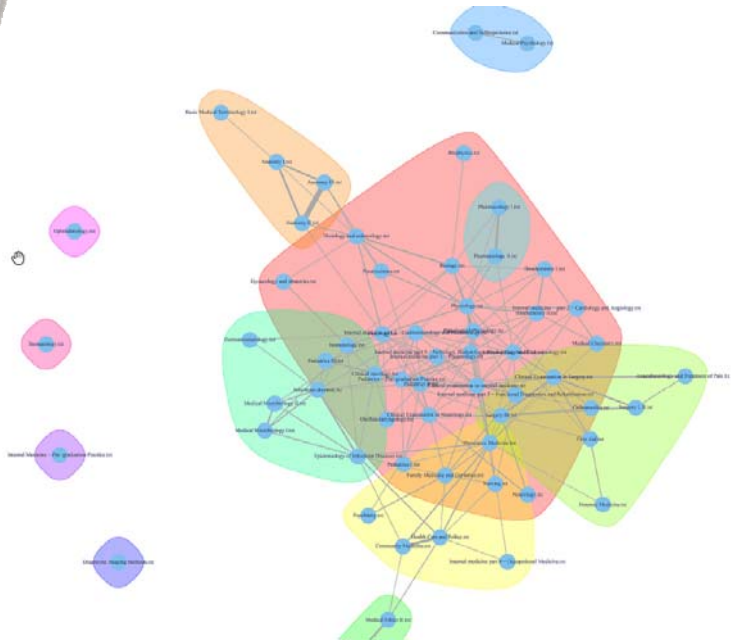
21st CENTURY PEDAGOGY

- learning by doing
- problem solving using real world scenarios
- collaborative environment
- self-directed learning
- virtual patients
- MOOCs
- assessing students clear and transparent objectives & appropriate feedback
- ...

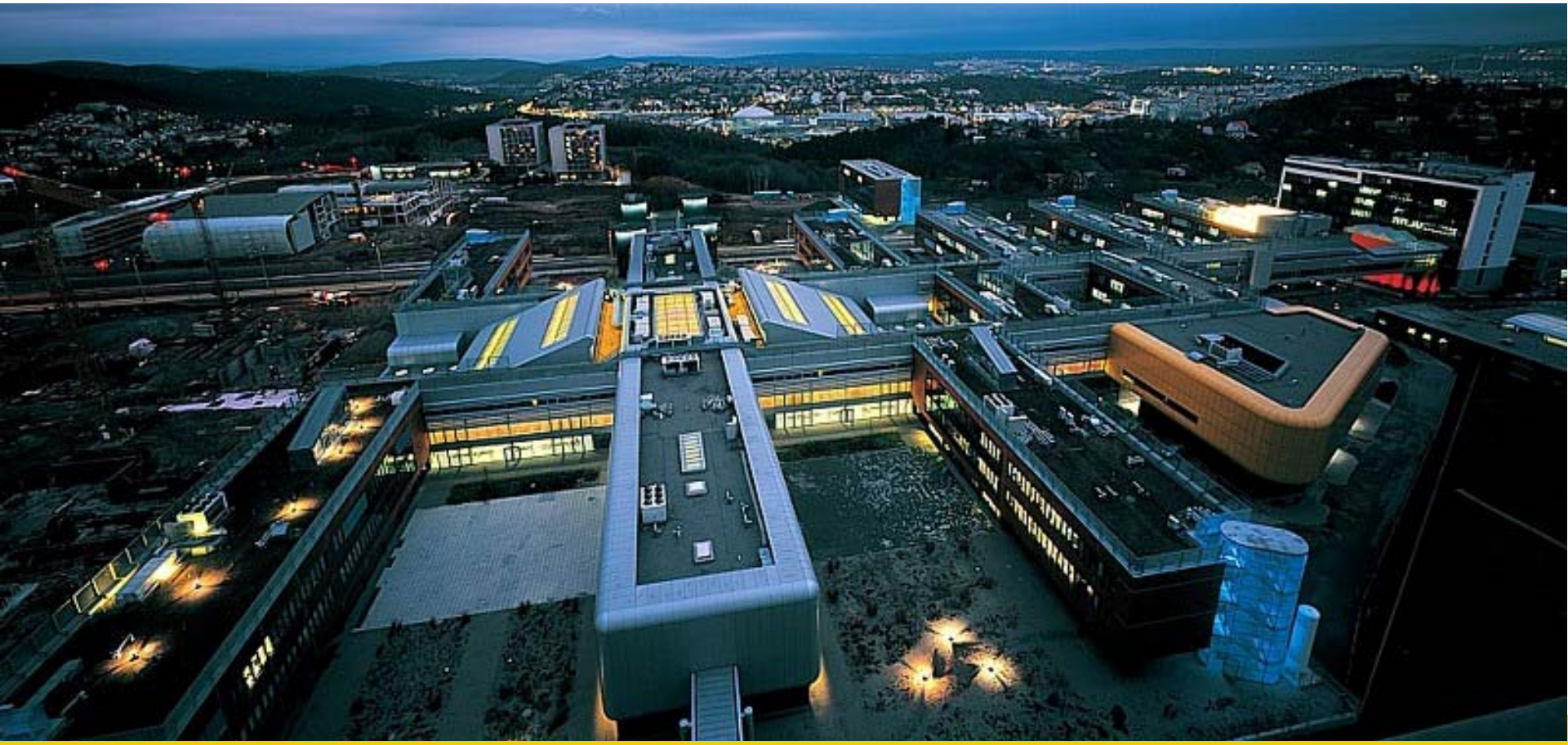
ENABLING TECHNOLOGIES

- SBL: authoring & playing toolkits
- collaborative media
- medical simulation modalities
- (data) academic analytics
- curriculum mapping systems
- ...





Thank you for your attention.



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