MEFANET

červnové jednání Koordinační Rady

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Program jednání

1. Stav řešení jednotlivých bodů z minulého zápisu.
2. Projektové možnosti - konzultace s Ing. Evou Šebroňovou z Národního informačního centra pro evropský výzkum.
3. Portálová platforma MEFANET: nové vlastnosti a funkce.
4. Konference MEFANET 2014: náměty na workshopy a symposia. (Aktuálně se nám sešly tyto náměty: (i) Harmonizace kurikula, (ii) Vážné hry a simulace, (iii) Elektronická podpora výuky v akutní medicíně).
5. Časopis MEFANET Journal: distribuce stávajících čísel na fakulty, obsah dalších čísel.
6. Elektronické testování: aktivity pracovní skupiny.
7. Elektronické publikování - vydávání e-books.
8. Různé (mefanetIN, eduID.cz)

Hosté:

- doc. MUDr. Milena Králíčková, Ph.D. (studijní prorektor UK)
- MUDr. Milan Prášil, MBA (Odbor strategického rozvoje UK)
- Ing. Eva Šebroňová (NCP pro ICT v H.2020, TC AV)
- Bc. Martin Urx (Oddělení informačního systému, rektorát UK)

… z minulého zápisu

MEFANET a nelékařské zdravotnické vědy

Dotázat se představitelů NZV, v jakém stavu je kontakt s 2. LF UK (Dr. Feberová)
Další jednání mezi zástupci NZV a 2. LF UK nutná. Byla konstatována potřeba opětovného představení sítě MEFANET a jejich benefitů vedení na jednotlivých fakultách, ať už formou individuálních schůzek představitelů KR nebo na jednáních děkanů a proděkanů lékařských fakult.

… z minulého zápisu

MEFANET a vydávání e-books

Během konference MEFANET 2013 (blok věnovaný nakladatelským politikám) byla formulována potřeba navrhnout politiku a postoj vůči Open access (s ohledem na to, že stát žádné takové inciativy nevyvíjí, na rozdíl od ostatních zemí EU)

Úkol: Navrhnout pod hlavičkou MEFANET oficiální politiku spojenou s Open Access. Následně bude možné takto navržený dokument zaslat na příslušné vládní orgány (ministerstva). —— Schwarz a KR MEFANET
--- úkol v řešení

Úkol: Call for repository —— E. Kvašňák a KR MEFANET
--- úkol v řešení

Úkol: V návaznosti na oficiální politiku vznikne na portálových instancích nová sekce E-knihy.
--- separátní bod jednání

… z minulého zápisu

MEFANET Journal

Důraz na pravidelné vydávání, diskuze o citačních databázích apod.

Úkol: oslovit potenciálně novou komunitu autorů dostupných na MedEdWorld —– Schwarz
--- úkol splněn (01/2014)

Různé

Úkol: Nová záložka na oficiálním webu
www.mefanet.cz , která bude obsahovat ustanovení, dokumenty a doporučení schválené KR MEFANET —– Komenda, Schwarz
--- úkol splněn (05/2014)

Projekty vzdělávací sítě MEFANET

Realizované - síťové:
MEFANET – komunikační platforma - OPVK 2.4 (10/2009-09/2012) --- Brno
MEFANET – klinické rozhodování – OPVK 2.2 (10/2012-09/2015) --- Brno

Asociované - lokální:
MODIM – modernizace didaktických metod – OPVK (04/2012-03/2015) --- Plzeň
IT-MEDIK – OPVK (01/2011-12/2013) --- Hradec Králové

Aktuálně podané:
CROESUS (Clinical reasoning skills enhancements with the use of simulations and algorithms) - ERASMUS+ KA2 – Strategic partnership (Brno, Londýn, Košice)

Podané - nefinancované
CHIRON –FP7.ICT – Technology-enhanced learning (Soluň, Brno, Stockholm, …)

Projekty vzdělávací sítě MEFANET

Co dál?

- Společný projekt do H.2020 – nelze
- Společný projekt do OP VVV ???
- Společný projekt do OP Central Europe – spíše ne
- Rozvojové centralizované projekty MŠMT – získat podporu UK, MU, UPOL

- Individuální projekty s vlastními zahraničními partnery do H.2020 – ICT, HEALTH
- Individuální projekty s vlastními zahraničními partnery do Erasmus+
- Příprava společného projektu do OP VVV (aktuálně je programový dokument předkládán do meziresortního připomínkového řízení) – program bude řízen přes rektoráty => získat podporu UK, MU, UPOL

- Podnět: pravidla pro poskytování dotací a příspěvků VVŠ – str 20, odst. 4

Projekty vzdělávací sítě MEFANET

tzv. Univerzit třetího věku, USV (podrobněji rozpracováno v Příloze č. 2) a příspěvek na podporu zvýšených nákladů na studium studentů se specifickými potřebami, SSP (podrobněji rozpracováno v Příloze č. 3).

(4) **Tvůrčí činnosti, které vysoké školy realizují v rámci své hlavní činnosti** (jedna vysoká škola nebo skupina vysokých škol společně) u nichž platí, že výstup projektu má strategický rozměr a může sloužit nejen řešitelské vysoké škole, ale celé skupině vysokých škol, případně všem vysokým školám. V případě víceletého projektu je financování podmíněno každoroční žádostí vysoké školy na daný účel a dostatkem finančních prostředků státního rozpočtu pro vysoké školství.

a) Předložení žádosti: vysoká škola předkládá žádost o financování projektu v souladu s Přílohou č. 1.; žádost je adresována náměstkovi;

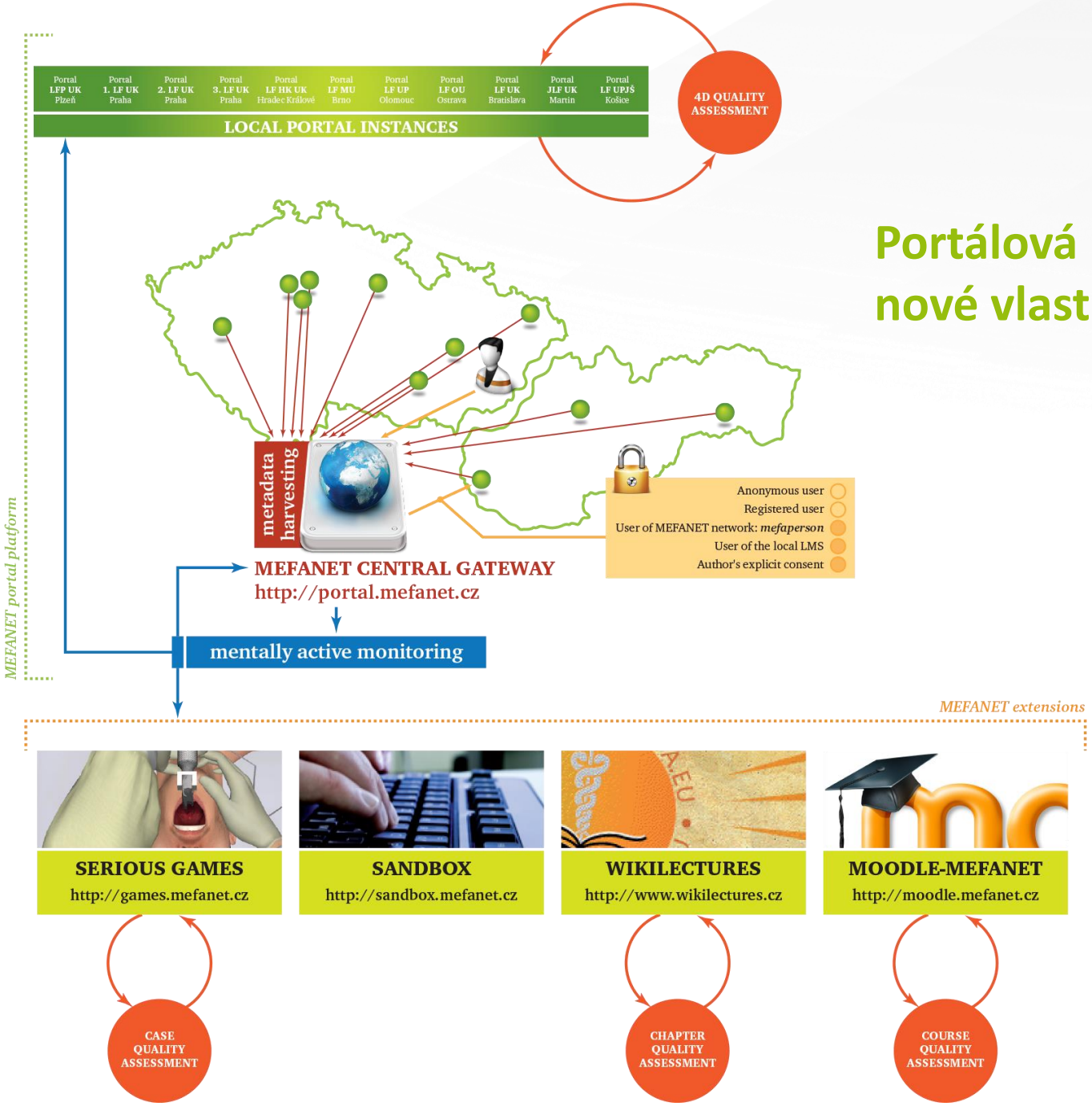
b) Výběrová kritéria: hodnotící kritéria jsou uvedena v Příloze č. 1;

c) Hodnocení: žádosti předložené v termínech do 31. 1., 31. 3., 31. 5. a 31. 10. kalendářního roku hodnotí odborné grémium. Termín pro vyhodnocení předložených žádostí je jeden měsíc po výše uvedených termínech. Rozhodnutí o poskytnutí příspěvku nebo dotace je v kompetenci náměstka;

d) Kontrola plnění: vysoká škola je povinna zpracovat a ministerstvu předat závěrečnou zprávu o plnění projektu do jednoho měsíce po ukončení projektu. V případě víceletého projektu vysoká škola zpracuje i průběžnou zprávu o plnění k 31. 1. za předchozí kalendářní rok.

(5) **Výzva vysokým školám k předkládání projektů ve specifické oblasti**, kterou považuje ministerstvo za prioritu v daném kalendářním roce a je třeba ji urgentně realizovat v souladu s dlouhodobým záměrem ministerstva (tedy mimo harmonogram ostatních výzev). Výzvu

Portálová platforma: nové vlastnosti a funkce



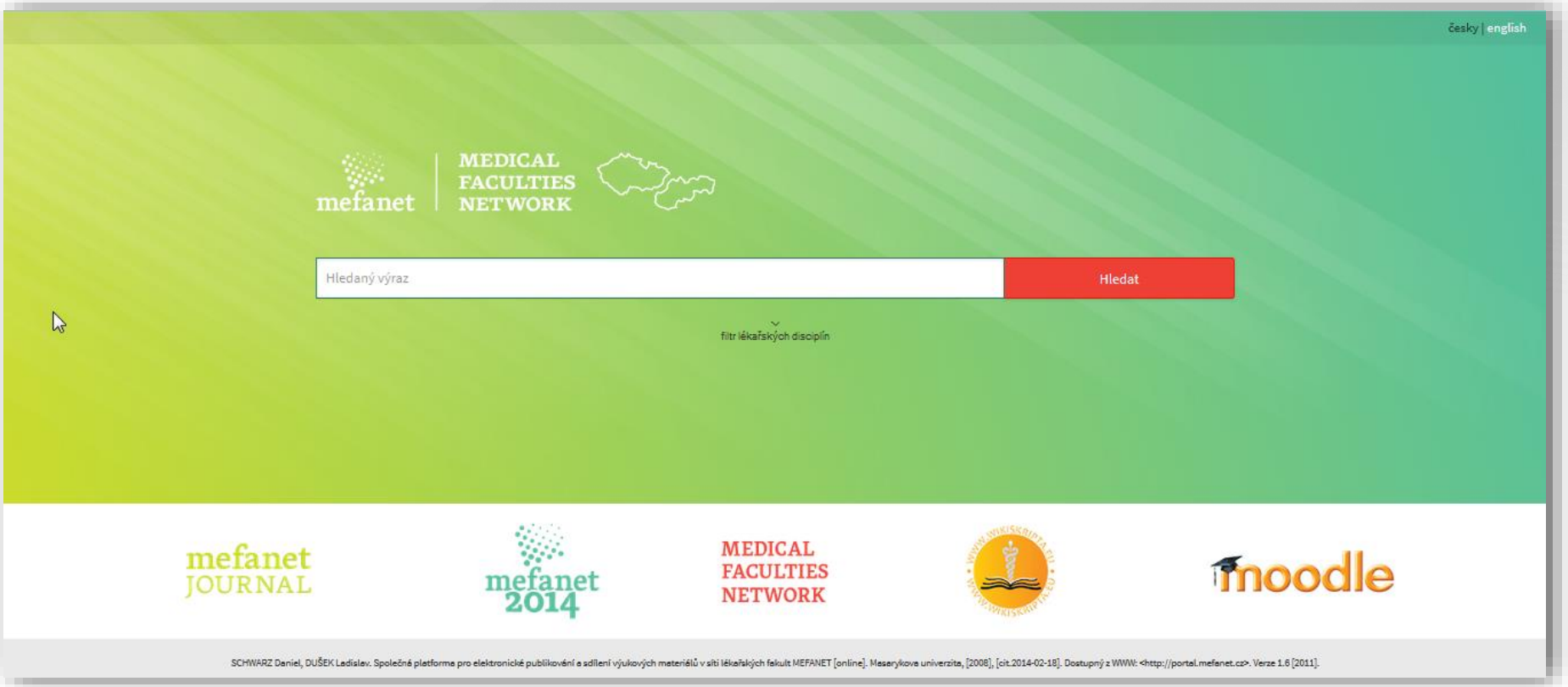
Portálová platforma: nové vlastnosti a funkce

Elektronické publikování garantovaného vzdělávacího obsahu
Integrace metadat na centrální bráně (metadata harvesting)

Web-scale discovery system (new-generation catalog)

- Indexace přiložených dokumentů (deep indexing)
- Fazetové vyhledávání (refine your search)

Portálová platforma: „google pro mediky“



Portálová platforma: fazety

česky | english

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Hledaný výraz

Hledat

Upřesnit vyhledávání

- Dostupnost pro MEFAPERSON (813)
- Dostupnost všem (794)
- Zahrnout i nedostupné výsledky (825)
- Pouze díla s recenzí

Lékařské disciplíny

- Anatomie (603)
- Histologie, embryologie (97)
- Neurologie (75)
- Chirurgie, traumatologie, ortopedie (65)

Zobrazit další

Úroveň

- Základní úroveň (740)
- Specializační úroveň (6)

Jazyk

- Česky (800)
- Anglicky (13)

Klíčová slova

- Klinický obraz (16)
- Diagnostika (14)
- Anatomické struktury (12)
- Léčba (12)

Zobrazit další

ŘADIT PODLE relevance času publikování času poslední úpravy

Nalezeno 864 výsledků

Mikroskopická anatomie

Mikroskopická **anatomie** … mikroskopická **anatomie** … Učební text a atlas mikroskopické **anatomie** v nové verzi aplikace MedAtlas 2.0. Elektronická podoba … /MedAtlas_2/medatlas.html UPOZORNĚNÍ: Obrazová dokumentace Mikroskopické **anatomie** se převádí a v této verzi … Atlas mikroskopicke **anatomie** (součást projektu MedAtlas) | 27. 9. 2011 kdokoli – Ústav histologie …

portál LF MU | disciplína: Histologie, embryologie | klíčová slova: mikroskopická anatomie, orgány, mikroskop, mikroskopie | publikováno: 17. 5. 2006
autor: Miroslava Sedláčková, Ladislav Ilkovics

Anatomie trávící soustavy

Anatomie trávící soustavy … **anatomie** … Odkaz Datum Přístupnost [?] Klinicky citlivé [?] Licence **ANATOMIE** TRÁVÍCÍ SOUSTAVY | 14. 12. 2009 … registrovaný uživatel – Ústav **anatomie** … **Anatomie** …

portál 3.LF UK | disciplína: Anatomie | klíčová slova: anatomie | publikováno: 14. 12. 2009
autor: Václav Báča

Anatomie dýchací soustavy

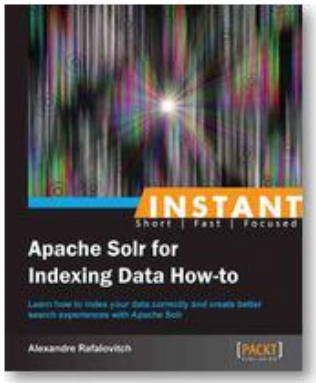
Anatomie dýchací soustavy … **anatomie** … Odkaz Datum Přístupnost [?] Klinicky citlivé [?] Licence **ANATOMIE** TRÁVÍCÍ SOUSTAVY | 14. 12. 2009 … registrovaný uživatel – Ústav **anatomie** … **Anatomie** …

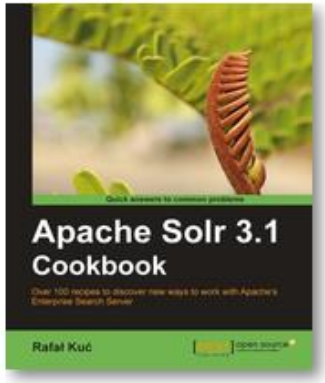
portál 3.LF UK | disciplína: Anatomie | klíčová slova: anatomie | publikováno: 14. 12. 2009
autor: Václav Báča

Mikroskopická anatomie

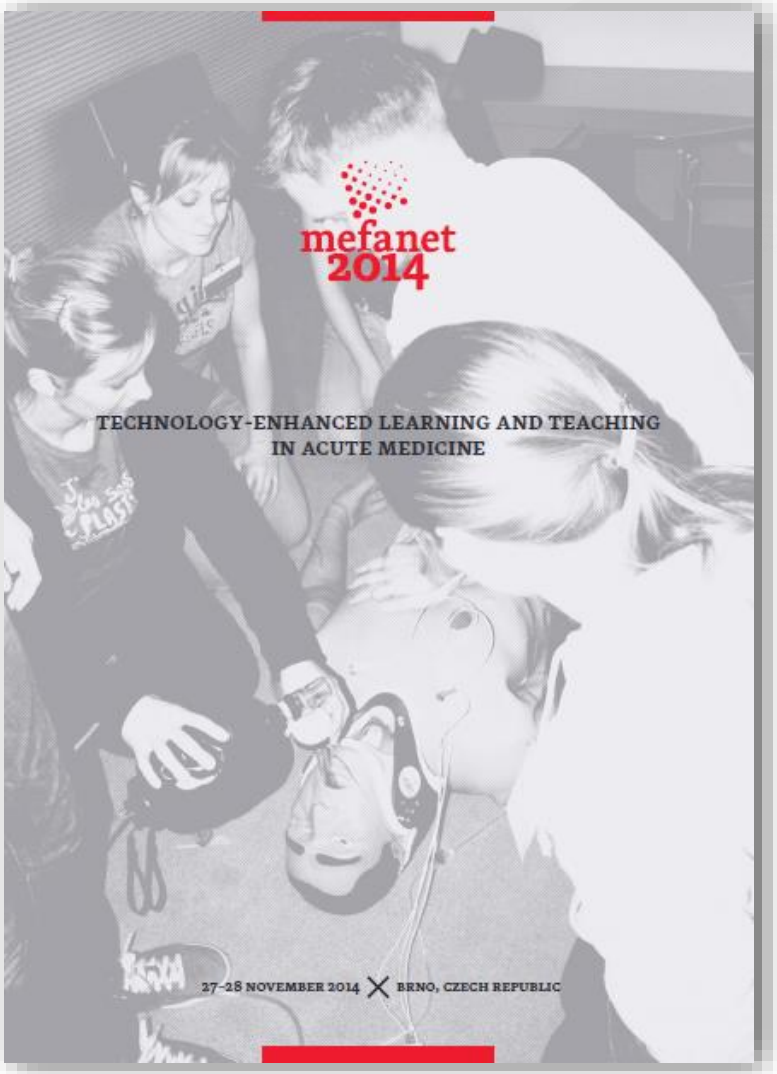
Portálová platforma: deep indexing

- Chytré full-textové vyhledávání, včetně multijazykové podpory (skloňování, lemmatizace apod.)
- Indexujeme:
  - metadata všech portálových instancí
  - PDF, DOC, PPT publikované prostřednictvím portálové platformy
  - WikiSkripta
  - Games.mefanet.cz





Konference MEFANET 2014



Termín 8. ročníku konference
26.-27.11.2014

Symposia a workshopy

1. Elektronická podpora výuky v akutní medicíně (Petr Štourač, Brno)
2. Harmonizace kurikula (Martin Komenda, Brno)
3. Vážné hry a simulace (Daniel Schwarz, Brno).

Zahraniční hosté

1. Nabil Zary (Karolinska Institutet)
2. Zástupce ePBLnet

Konference MEFANET 2014

Elektronická podpora výuky v akutní medicíně – předběžný program hlavního bloku

1. Simulace v akutní medicíně - nadstavba či nezbytnost? --- *Petr Štourač (Brno)*
2. Sociální sítě a alternativní informační zdroje v akutní medicíně --- *Michal Pisár (Zlín)*
3. Pokročilé pacientské simulátory ve výuce anesteziologie a řešení krizových situací --- *Michael Stern (Praha)*
4. Kazuisticky orientovaná výuka prostřednictvím virtuálního pacienta ve výuce magisterských i bakalářských směrů na lékařské fakultě --- *Hana Harazim (Brno)*
5. Pevnost Těchonín aneb simulovaný pacient v mimořádných podmínkách --- *Tomáš Březina (Olomouc)*
6. E-learningové nástroje pro výuku přednemocničních stavů --- *Jana Kubalová (Brno)*
7. Elektronická podpora výuky anesteziologie a kardiopulmonální resuscitace. *Jiří Málek (Praha)*
8. Virtuální realita v pokročilých simulacích scénářů intenzivní péče --- *Pavol Privitzer (Praha)*
9. Struktura scénářů pro simulační výuku intenzivní medicíny --- *Václav Zvoníček (Brno)*
10. Využití profesionálních herců jako standardizovaných pacientů v simulační výuce komunikačních dovedností zdravotníků

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mefanet JOURNAL

PREFACE

We would like to present, with great pleasure, the second issue of the inaugural volume of a new scholarly journal, "MEFANET Journal (Mefanet J)". This journal follows the edition of the annual proceedings RTIM report 01-02 and MEFANET report 01–05, published between 2005 and 2012. It is devoted to the gamut of medical education science issues, from theoretical aspects to application-dependent studies and the validation of emerging technologies. This new journal was envisioned and founded to represent the growing needs of computational science as an emerging and increasingly vital field, now widely recognized as an integral part of medical education scientific and technical investigations. Its mission is to become the premier vehicle for disseminating information about MEdical FAculties NETwork, which covers all Czech and Slovak medical faculties as well as schools or faculties of health care sciences.

This second issue includes two detailed editorial reports, one review and four original articles. The editorial material by Štouračˇ P. et al. address the fifth annual AKUTNE.CZ congress, which was held in Brno during November 2013 and which attracted more than six hundred participants interested in advances in acute medicine. The other editorial material by Ban N. reports on the 45-year history and activities of the Japan Society for Medical Education. The review by Kiško A. et al. covers a very important problem in the current medicine: measurements of physical activity, which play a key role in internal medicine, pediatric medicine, orthopaedics, traumatology, physiotherapy etc. Authors of the original articles in this issue explore the potential of information and communication technologies in various domains of medical education. Sochorova et al. shares many years of experience of one particular medical faculty with the blended learning method and with the learning management system Moodle. Štouračˇ P. et al. provides interesting insights into the interactive tools of the AKUTNE.CZ and SEPSIS-Q.CZ portals for problem-based learning (PBL) sessions. PBL sessions structured with the use of simulated cases represent an effective method for improving critical thinking and clinical reasoning skills of students who will once become physicians, dentists or nurses. The critical thinking and clinical competences are highlighted also in the article by Miertova et al. focused on professional training of nurses.

This second issue would not have been possible without the great support of the Editorial Board members and reviewers – I would like to express my sincere thanks to all of them. I would also like to express my gratitude to the honorary advisors of the journal: assoc. prof. Ladislav Dušek, prof. Vladimír Mihál, prof. Aleš Ryška

...nfound

AN OVERVIEW OF CURRENTLY AVAILABLE METHODS AND FUTURE TRENDS FOR PHYSICAL ACTIVITY

Alexander Kiško, Anna Hudáková*, Tatiana Šantová, Andrea Šuličová, Ľubica Derňárová, Dagmar Magurová
Faculty of Health Care, University of Presov in Presov, Slovakia
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physical activity
assessment
questionnaires
accelerometry

ABSTRACT — **Background:** Methodological limitations make comparison of various instruments difficult, although the number of publications on physical activity assessment has extensively increased. Therefore, systematization of techniques and definitions is essential for the improvement of knowledge in the area.
Objective: This paper systematically describes and compares up-to-date methods that assess habitual physical activity and discusses main issues regarding the use and interpretation of data collected with these techniques.
Methods: A general outline of the measures and techniques described above is presented in review form, along with their respective definition, usual applications, positive aspects and shortcomings.
Results and Conclusions: The various factors to be considered in the selection of physical activity assessment methods include goals, sample size, budget, cultural and social/environmental factors, physical burden for the subject, and statistical factors, such as accuracy and precision. It is concluded that no single current technique is able to quantify all aspects of physical activity in free-living conditions, requiring the use of complementary devices will take advantage of

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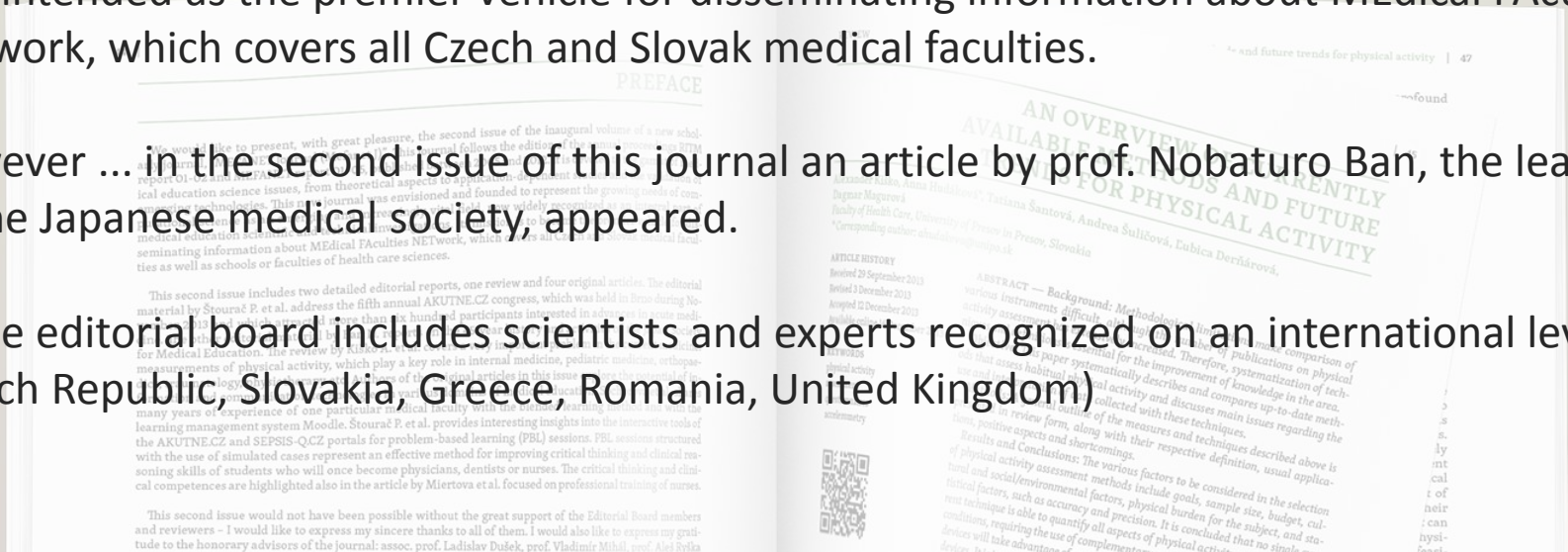
… continues in the tradition of post-conference, education-oriented summary proceedings MEFANET Report 01–05, being published in 2007-2012.

... is intended as the premier vehicle for disseminating information about MEdical FAculties NETwork, which covers all Czech and Slovak medical faculties.

However ... in the second issue of this journal an article by prof. Nobaturo Ban, the leader of the Japanese medical society, appeared.

... the editorial board includes scientists and experts recognized on an international level (Czech Republic, Slovakia, Greece, Romania, United Kingdom)

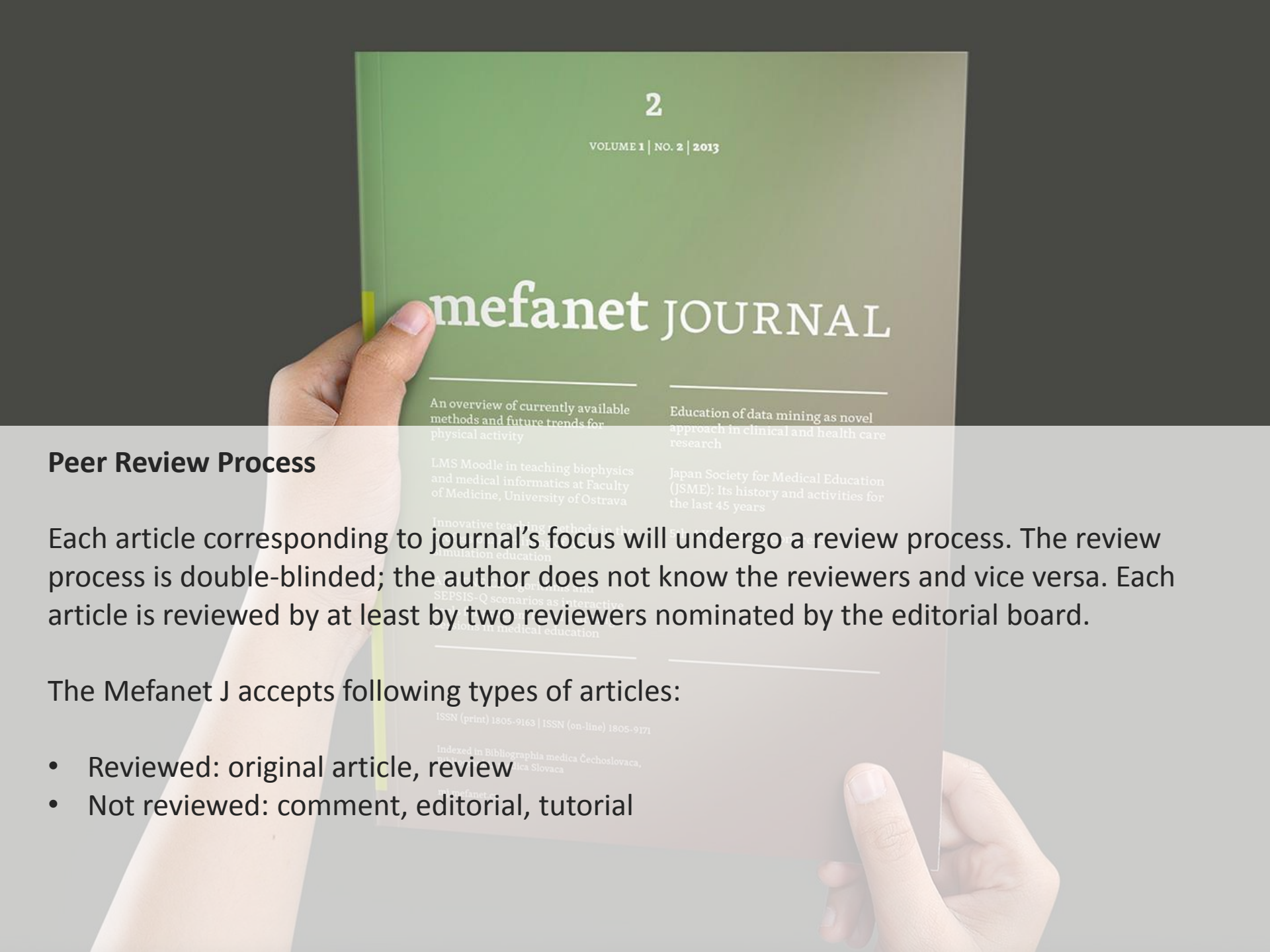



2
VOLUME 1 | NO. 2 | 2013
mefanet JOURNAL
An overview of currently available methods and future trends for physical activity
LMS Moodle in teaching biophysics and medical informatics at Faculty of Medicine, University of Ostrava
Innovative teaching methods in the professional training of nurses – simulation education
AKUTNE.CZ algorithms and SEPSIS-Q scenarios as interactive tools for problem based learning sessions in medical education
Education of data mining as novel approach in clinical and health care research
Japan Society for Medical Education (JSME): Its history and activities for the last 45 years
5th AKUTNE.CZ Congress
ISSN (print) 1805-9163 | ISSN (on-line) 1805-9171
Indexed in Bibliographia medica Čechoslovaca, Bibliographia medica Slovaca
mj.mefanet.cz

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

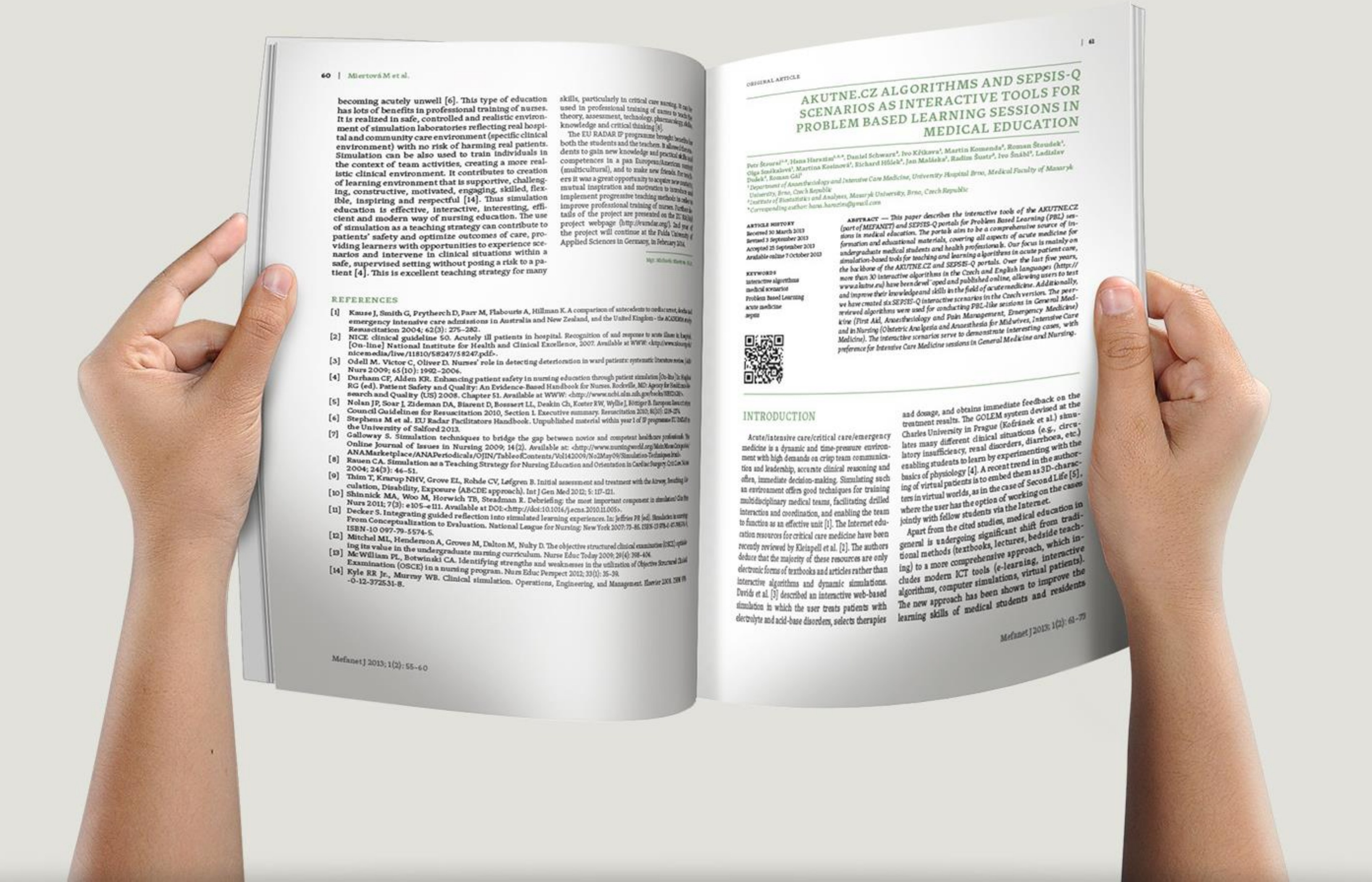


Peer Review Process

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



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 skills, particularly in critical care nursing. It can be used in professional training of nurses to teach the theory, assessment, technology, pharmacology, skills, knowledge and critical thinking [8].

The EU RADAR IP programme brought benefits for both the students and the teachers. It allowed the students to gain new knowledge and practical skills and competences in a pan European/American [illegible] (multicultural), and to make new friends. For teachers it was a great opportunity to acquire new [illegible] 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.

[illegible]

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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,*], Daniel Schwarz[2], Ivo Křikava[1], Martin Komenda[2], Roman Štoudek[1], Olga Smékalová[1], Martina Kosinová[1], Richard Hölek[2], Jan Maláska[1], Radim Šustr[2], Ivo Šnábl[1], Ladislav Dušek[2], Roman Gál[1]

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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 interaction 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

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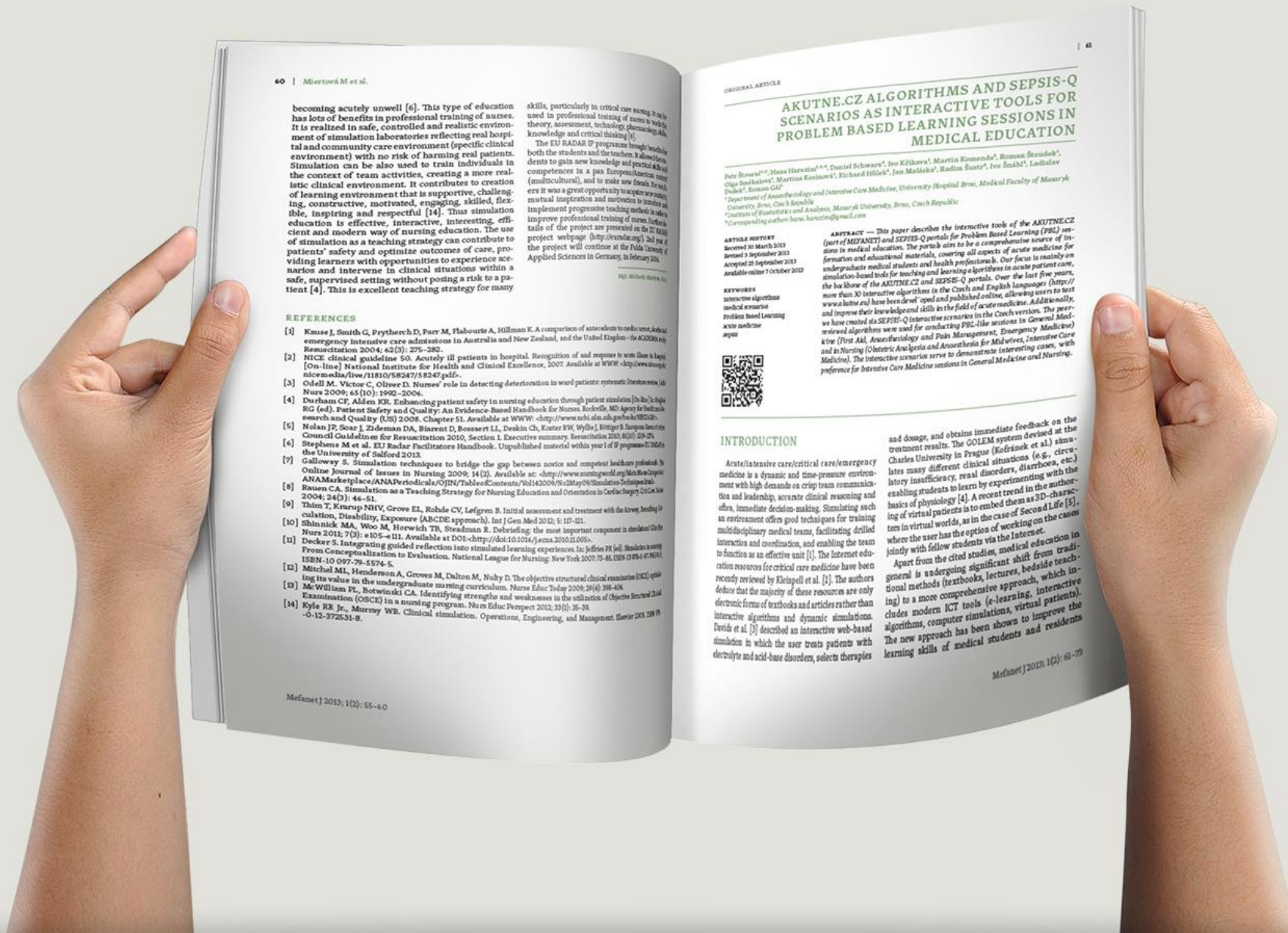

becoming acutely unwell [6]. This type of education has lots of benefits in professional training of nurses. It is realized in safe, controlled and realistic environment of simulation laboratories reflecting real hospital and community care environment (specific clinical environment) with no risk of 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 skills, particularly in critical care nursing. It can be used in professional training of exams to teach theory, assessment, technology, pharmacology skills, knowledge and critical thinking [8].

The EU RADAR IP programme brought benefits to 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 contacts, 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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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 in general uses 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 strong, 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 portality (https://is.med.muni.cz/clanek-318-zavedeni-technologie-data-mininga-e-vyuky-lekarskych-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 scoring of risk clients, non-legal usage of credit cards, e-mail classification and spam messages detection, text and speech recognition or molecular data analysis. Therefore, the DM is the area of science where the development is multidisciplinary in 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, … to detect interesting subsets to form hypotheses for… hidden information. Wide set of univariate and mul… tivariate analyses can be adopted for this exploratory analysis (Figure 2).

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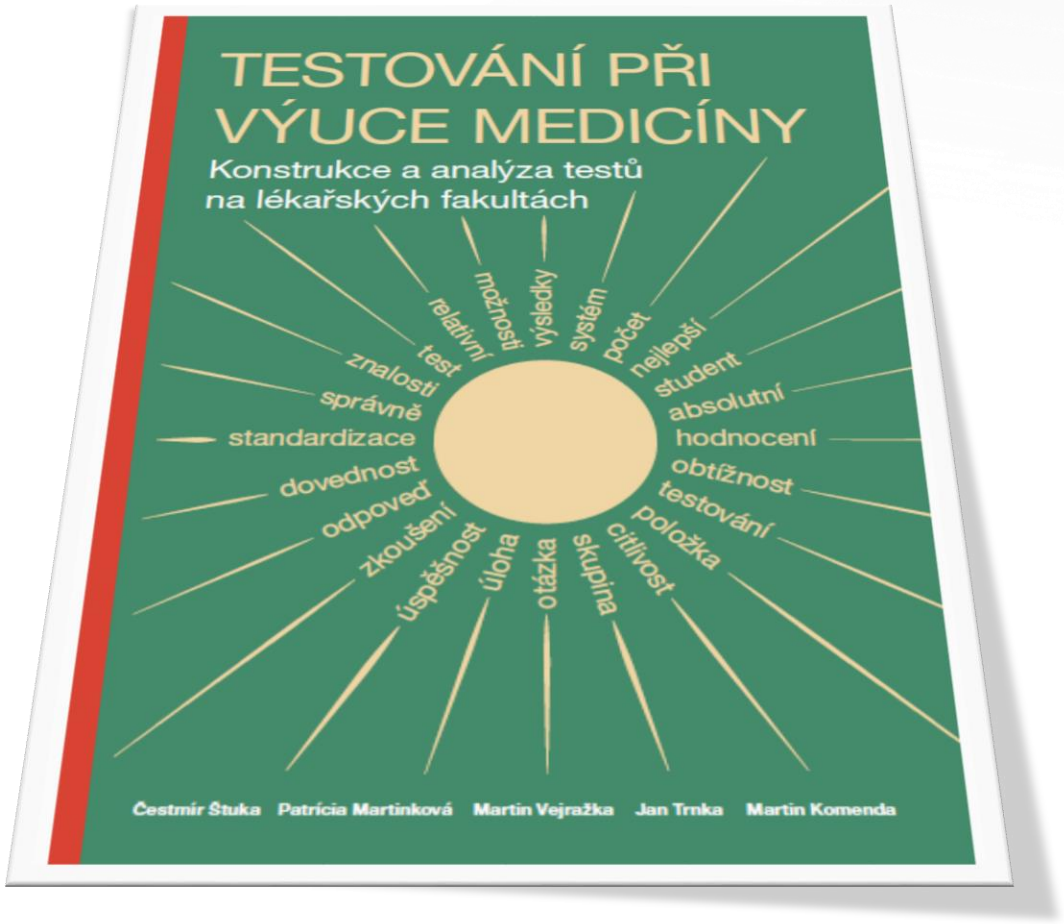

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