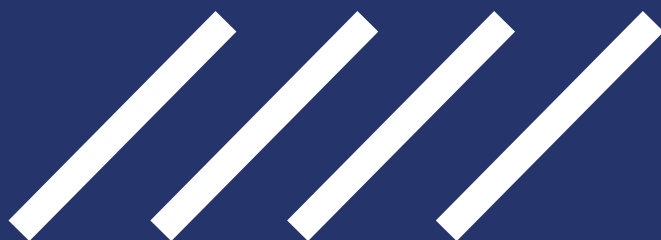# **MEFANET**
+ .JOURNAL

CONTENTS

DEVELOPMENT OF CLINICAL CASE REPORTS DATABASE TO IMPROVE PREPARATION OF MEDICAL STUDENTS FOR BEDSIDE TEACHING AND CLINICAL PRACTICE

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ABSTRACT

Clinical case reports play an invaluable role in education of medical students, especially in their preparation for bedside teaching. In general, it is because of the real background based on true stories and integration of professionals' experiences involved in strategies used to solve particular clinical case. In addition, the real clinical case reports are often the core and essential part of another teaching methods including problem-based learning, virtual patients etc. The inconsistency in such education materials offered to our students forced us to initiate activities leading to the development of clinical case reports database and to the motivation of our academic clinicians to participate on it and to utilize it in the education process.

INTRODUCTION

Medical education involves various teaching methods and strategies showing students clinical stories and examples based on real patients' health related problems. Even if the evidence-based medicine is considered to be one of the most relevant methods revealing background of systematic research and scientific clinical outputs, individual case reports have still a great potential to increase students' medical knowledge.

Clinical case reports, as the sources of evidence located at the bottom parts of the evidence-based medicine hierarchy [1], represent the rich source of practical knowledge and experiences applicable in any medicine oriented pedagogical process. In general, the clinical case reports are offered as documentation of clinical observations that describe common and rare cases; characteristics of known and unknown diseases; novelty and/or new ideas in medicine; variations in diseases and their combinations; positive and negative effects of interventions; side effects of drugs usage as well as the ways the professionals use to solve particular clinical case, respecting their best recent knowledge.

Because of the absence of general reporting guidelines designed for case reports, the clinicians and teachers report their clinical cases to the students in various heterogeneous forms. These forms can be either electronic or paper based. However, there are efforts to generate guidelines for clinical case reports in specific clinical domains. One of the positive developments in this area is an initiative of international group of experts that developed Case Reports guidelines (CARE guidelines) [2,3]. With the aim to reduce bias, to increase transparency and to provide first outputs of clinically working methods, these guidelines are useful mostly for publication of high-quality clinical cases in scientific journals.

Several medical journals already stopped to publish case reports as for the low citation index and thus negative effect on journal's impact factor [4]. Contemporary studies pointed out the case reports based on guidelines, whether modified or derived from CARE guidelines, have their usefulness and are not rarely cited. Thus, the well-written clinical case reports are again popularly published either in new medical journals or in special supplements, volumes or websites of many prestigious publishers.

Aiming at higher educational level, the reporting of modern clinical cases tends to take the form of narratives to reveal problem solution [5]. However, CARE guidelines can be used to develop framework of clinical case reports for education purpose as well [6]. On the other hand, one have to be aware of broad variety of general and specific objectives in individual clinical disciplines that cannot result in a single case report framework applicable to all clinical cases and domains. Therefore, various protocols and architectures of clinical case reports were published across different clinical disciplines [7, 8] or in biomedical applications [9,10]. Focused on specifics related to particular area such guidelines reflected more or less CARE guidelines [11].

In contrast to the above-mentioned publishing phenomena, and because of the educational background of our work, we had opposite role, where the main task was to design not specific, but rather generalized case report framework to suit as many disciplines as possible while keeping authors a reasonable space for integration of their specifics that vary from case to case. Thus, our primary effort and objective was to specify a common interdisciplinary acceptable framework and to offer it to the authors together with possibilities to modify its

elements according to the characteristics of their particular clinical case and to share it through web-based tools as well.

MATERIALS AND METHODS

To develop a clinical case reports database, which will serve medical students as additional source of clinically relevant study materials and which should help them in better preparation for their later real clinical practice, we solved both the methodological and the technological problems. The methodological problem aimed to find a framework of case reports that best fits to the most of the clinical disciplines. To solve the technological problem, we searched for the best way to create, share and maintain the database of clinical case reports that should be available to students anytime and anywhere.

To find the best consensus across various clinical disciplines we studied the forms of case reports presented to our students at individual clinical departments. Not surprisingly, the clinical teachers used a broad scale of options, starting by reading the examination notes in paper-based health records, through PowerPoint presentations and ending with study of the records and laboratory test results stored in clinicians' information systems. However, no one offered comprehensive structured report prepared in compliance with CARE guidelines or similar ones. In addition, no of the reports was available outside of the university network. The discussions followed afterwards and the committee consisting of vice-deans and guarantors reviewed and annotated importance and usefulness of individual sections in these forms of case reports. The conclusion was to use a generalized structure of education aimed case reports as it was already presented in [12] and as it is described in Table 1.

Considering the possibilities of modern technologies and the fact that our teachers presented clinical cases to our students in various heterogeneous forms, including paper based and oral presentations, we decided to concentrate their work in this area to the one unified and online available place. Thanks to the MEFANET network that already brought several interdisciplinary useful educational tools [13,14], we found the solution of this problem in tools used within this network. In addition, we

wanted to maintain the nature of traditional case reports and not to transform them into the simulation or standalone learning management systems, for example, as it was in [15]. Because of the great potential of MEFANET portal platform, we decided to use our local instance of this portal to host repository of our clinical case reports developed for various clinical disciplines. The advantages for teachers include the possibility to use generalized structure of case reports, minimal requirements on their technical skills and many others. On the other hand, the students can find everything in one system and they can study individual clinical cases, together with other types of study materials, wherever and whenever they need. Furthermore, using this way and depending on author's decision, the individual case reports can be shared via MEFANET Central Gate to all students studying at all medical faculties in Czech Republic and Slovakia.

RESULTS

To ensure widest possible impact of our work, to start our project efficiently, to find the best consensus for all disciplines, to address the widest community of clinical teachers and finally to reach continuously growing number of clinical case reports, the management of the faculty organized a meeting with academic clinicians and teachers in September 2017. More than 60 clinicians took part in this meeting and they were informed about ideas and aims of that educational activity. Case Report framework was presented to the participants and consequently it was revised together with opened discussion to prove it is acceptable for academics teaching medical students of our faculty. This also led to elimination of potential confusions and incompleteness of some parts or descriptions. Then, the participants were informed about the Portal of multimedia support in the education of clinical and health care disciplines at Faculty of Medicine at Pavol Jozef Safarik University in Kosice as well as about the ways used to publish clinical case reports on this Portal. The sections of approved case report structure together with sections related to the unique portal presentation are shown in Table 1.

Table 1. Main sections of education-based clinical case reports recommended to be used at faculty's portal

Section number	Section	Description
1	Title	Topic of interest related to the patient, disease, symptoms, interventions etc.
2	Author(s) details	Author(s) name(s) and affiliation to department(s) of medical faculty
3	Medical discipline (s)	Assigned medical discipline(s) related to the problem to be solved
4	Annotation image	Image associated to the problem of presented case report
5	Annotation	Brief introduction to the problem and/or short summary of the case report background
6	Patient's history (anamnesis)	Medical, social and family history, abuses, current health problems and symptoms etc.
7	Laboratory tests	Clinical findings, results of relevant physical examinations, special laboratory tests etc.
8	Imaging methods	Imaging diagnostic methods where applicable, images from modalities used, description of findings and obtained results
9	Diagnosis	Main diagnosis specified according to ICD-10 and resulting from clinical findings and tests, used also to search for similar case reports published at faculty's portal
10	Differential diagnosis	Diagnostic reasoning with all considered diagnoses in patient assessment process
11	Therapy	Therapeutic interventions performed, important dates, treatment administration, prognostic details etc.
12	Discussion and comments	Results of the case, assessment of the results achieved, recent patient's status, strengths of the case, risks and limitations if any, recommendations of relevant literature
13	Keywords	Key elements of the case, used also to search for similar case reports published at faculty's portal
14	Courses	List of associated courses taught at the faculty coursed, used also to search for another education materials and articles related to the course(s) published at faculty's portal

The idea of our initiative was accepted quite positively and most of the participants agreed to participate on first round of case reports development that was opened from 1 October 2017 to 31 December 2017. The first case reports were sent to the redaction within few days after the meeting took place and once the post-meeting discussions were finished. As we expected, the majority of the case reports was prepared in internal medicine, surgery and dental medicine too. The academic clinicians generated several tenths of cases within this three-month period. Sixty-three of them were finished, rearranged to fit the portal's framework and layout and shared to the students by 31 December 2017.

Figure 1 shows the cumulative progress in numbers of clinical case reports shared at the Portal of multimedia support in the education of clinical and health care disciplines at Faculty of Medicine at Pavol Jozef Safarik University in Kosice during fourth quarter of 2017.

Figure 2 shows an example of clinical case reports published at the Portal of multimedia support in the education of clinical and health care disciplines at Faculty of Medicine at Pavol Jozef Safarik University in Kosice.

The activity to create clinical case reports database at our faculty continues and the authors create new and improve their existing cease reports in 2018 too. There were totally 76 case reports finished and published at the Portal by the end of the March 2018. All the case reports are published according to the portal's rules. To ensure the highest quality, guarantors of particular clinical disciplines review the content of all case reports.

Then, each reviewed case report is labelled by the review logo to allow students recognizing reviewed and unreviewed clinical case reports. The reviewed case reports are automatically sent to the Central Gate of MEFANET portals, thus the students of all medical faculties in Czech Republic and Slovakia can find them in one place and use them in their studies no matter which faculty they are from.

Another added value of our work, as we suppose, is that we expect increased motivation to create case reports for education also in academic clinicians from another medical faculties involved in MEFANET. The motivation can be increased not only because of our pilot round of development, but maybe also because of the first positive students'
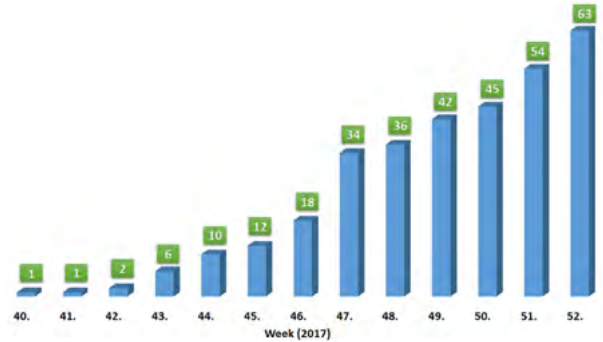

Figure 1. Cumulative number of case reports shared at faculty's portal during first round of the project

Figure 2. Example of a clinical case report published at faculty's portal

Figure 3. Total amount of clinical case reports published at portals of individual medical faculties involved in MEFANET by 31 December 2017

feedbacks we noticed after publishing our pilot case reports. The technological requirements already exist as all the faculties already runs their own portals together with functional exports of reviewed materials to the MEFANET Central Gate. Doing so, the contemporary negative, but very challenging situation in sharing of educational case reports (see Figure 3) can be changed and the students will be able to use the database of hundreds if not thousands of clinical case reports in one place.
Conclusions

Our primary goal was to initiate development of clinical case reports database covering various clinical branches that will be offered to medical students with the aim to support clinical education process. Even if the scientific impact of clinical reports is considered as very low, we suggest the critical thinking of medical students can be improved thanks to the combination of high-quality clinical case reports, other traditional and electronic education methods used at the faculty and clinical bedside teaching. Except of others, the benefits for medical students included access to the valuable clinical experiences. Prior to the clinical practice, the students are able to study how the theory interacts with practical skills in particular patient's problems. Studying common as well as rare clinical cases helps students to improve critical thinking and thus to minimize later clinical failures and/or mistakes in their real clinical decisions.
Acknowledgements

CONCLUSIONS

Our primary goal was to initiate development of clinical case reports database covering various clinical branches that will be offered to medical students with the aim to support clinical education process. Even if the scientific impact of clinical reports is considered as very low, we suggest the critical thinking of medical students can be improved thanks to the combination of high-quality clinical case reports, other traditional and electronic education methods used at the faculty and clinical bedside teaching. Except of others, the benefits for medical students included access to the valuable clinical experiences. Prior to the clinical practice, the students are able to study how the theory interacts with practical skills in particular patient's problems. Studying common as well as rare clinical cases helps students to improve critical thinking and thus to minimize later clinical failures and/or mistakes in their real clinical decisions.

ACKNOWLEDGEMENTS

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TEN YEARS WITH AKUTNĚ.CZ®

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ABSTRACT

The 18 October, 2017 marked the 10-year anniversary of the day when, upon entering the domain name akutne.cz, educational content was displayed in the worldwide Internet network for the first time. It is rather unique that, throughout the ten years, this has been a strictly academic activity aimed to unify and modernize the education of acute medicine.

Recently, education in medical fields has undergone dynamic changes and a shift to modern teaching methods. The educational and publishing portal of AKUTNĚ.CZ (the AKUTNĚ.CZ Portal) reflects these changes and brings to light the modern forms of education for both under- and postgraduate candidates in Anaesthesiology and Intensive Medicine (AIM). It is a great appreciation and, at the same time, commitment to the future that a large part of more than 150 students of the Faculty of Medicine of Masaryk University who participated in its development have chosen AIM for their further professional grow.

This article aims to introduce the ten-year history of the AKUTNĚ. CZ Portal.

PORTAL SUPPORT

The creation and development of the AKUTNĚ.CZ portal were strongly influenced by four grants from the Higher Education Development Fund (FRVŠ). The creation of the portal itself was initiated by the first grant in 2007 (FRVŠ 421/2007 F3d Training Portal of Acute Medicine). It was a great appreciation that, at the very beginning of its activity, the portal was assigned the International Standard Serial Number ISSN 1803-179X. Further direction of the portal towards its flagship – the implementation of Virtual Patient in the form of interactive algorithms in teaching – was made possible in 2009 (FRVŠ 1969/2009 F3d Multimedia Decision-Making Algorithms in the Teaching of Acute Medicine). Today, these Virtual Patients, the number of which has so far reached 80, represent an integral part of both undergraduate and postgraduate education in AIM. In the same year, another project enhancing the field education was addressed (FRVŠ 1893/2009 Aa Videoconferencing System for Operations and Anaesthesiology). By 2011, the latest grant from perishing FRVŠ (FRVŠ 2216/2011 Fd3 Unified Framework for Multimedia Interactive Algorithms in Professional Guaranteed Acute Medicine) was obtained which brought the portal into another dimension marked by clearly defined and professionally guaranteed professional content. The accent on the use of interactive algorithms in bilingual problem-oriented education focused on the decision-making process was further facilitated by the FRMU (the Development Fund of Masaryk University) project No. 1541/2015. In recent years, this project has been supporting the activities of the Nadační fond AKUTNĚ.CZ (the endowment fund) established at Masaryk University. Moreover, the AKUTNĚ.CZ portal has been granted a significant professional support by an international academic network of shared educational content, MEFANET (www.mefanet.cz). At the same time, the content of the portal is archived by the National Library of the Czech Republic within the WebArchiv project.

Abbreviations	
AIM	Anesteziologie a intenzivní medicína (Anaesthesiology and Intensive Medicine)
MCQ	Multiple Choice Question
KUM	Kurz urgentní medicíny (Emergency Medicine Course)
FM MU	Faculty of Medicine at Masaryk University
BLS	Basic Life Support
ALS	Advanced Life Support
ČSARIM	Česká společnost anesteziologie, resuscitace a intenzivní medicíny (Czech Society of Anaesthesiology, Resuscitation and Intensive Medicine)
ČSIM	Česká společnost intenzivní medicíny (Czech Society of Intensive Medicine)
FRVŠ	Fond rozvoje vysokých škol (Higher Education Development Fund)
ČSFPS	Česko-Slovenské fórum pro sepsi (Czech-Slovak Forum for Sepsis)
AMEE	An International Association For Medical Education
ESA	European Society of Anaesthesiology
MEFANET	Medical Faculties Network
IF	Impact Factor
WoS	Web of Science

BRIEF STRUCTURE OF THE PORTAL

The structure of the portal has been stable over the years, allowing readers to navigate its content easily. It consists of the following sections: News, Education, Publications, and Reports. The history and development of portal structure are detailed in Table1.

Table 1. The firsts of the AKUTNĚ.CZ portal

Section	Date	Event	Detail
Launch	18 Sep 2007	portal of AKUTNĚ.CZ	Launching the educational portal of AKUTNĚ.CZ
News	17 Jan 2008	News	Establishing collaboration with the educational server of the 3rd FM CU
Congresses	2 Oct 2008	Report	Xth annual Czech-Slovak Dialogues on Pain
Congresses	18 Oct 2008	Report from an international congress	ASA, Orlando
Publications	13 Oct 2008	Lecture proceedings	9th Anaesthesia Days at the Na Homolce Hospital
Transmissions	23 Oct 2010	Video transmission	12th Colours of Sepsis
Education	24 Dec 2009	Multimedia algorithms	First published algorithms
Education	24 Nov 2009	Conference	1st AKUTNĚ.CZ Conference
Education	16 Apr 2011	Course	Emergency Medicine Course
Publications	28 Apr 2011	Monitoring of articles	Establishing the monitoring of articles

News is the oldest and at the same time one of the most visited sections of the portal. Gradually, it had to be thematically divided for its scale and so nowadays, we have dominant news about expert events, feuilletons, but also news monitoring professional literature in the given field or reviews of current professional books. Reports section is filled with the entries by the reporters of AKUTNĚ.CZ, physicians and students, from national and international expert events. More than 100 reports have been created since the portal was founded and the team of reporters have visited over 13 countries. Frequently, the team members participated actively in the congresses as the authors of posters and/or lecturers making the portal unquestionably unique.

EDUCATION

Virtual patient on AKUTNĚ.CZ

The true showpiece of the portal are the modern bilingual teaching aids in the form of virtual patients, the co-called AKUTNĚ.CZ Interactive Algorithms, which currently number well over 80. Undoubtedly, this is one of the largest sets of Virtual Patients worldwide. Unlike most of other teaching aids, AKUTNĚ.CZ algorithms undergo a multiple-stage peer review with an expert, usually outside the FM MU, as the last referee. Therefore, it is no coincidence that the algorithms have been awarded at university (the best electronic teaching aid), national (ČSARIM award), and international level (highly cited publication in the Journal of Medical Internet Research which, with IF 5.1, is World 1 in this area). The best published algorithms for each year can be found in Table 2. All algorithms undergo regular reviews to stay up-to-date and to follow the latest recommendations. The uniqueness of the algorithms is underlined by original illustrations and

videos added to each node. Subsequently, the acquired knowledge can be verified by test questions complementing each algorithm. It is worth mentioning that, with 18%, the algorithms rank the second in the number of visits, just behind the portal front page; see Figure 1.

Table 2. Winners of the best algorithm competition published on the AKUTNĚ.CZ portal in the given year

Period	Rank	Name of the algorithm	Authors
before 2012	1st	Acute Coronary Syndrome	Lukáš Dadák, Hana Harazim, Martina Pleskačová
	2nd	Treatment of Acute Postoperative Pain	Ivo Křikava, Martina Kosinová, Gabriela Kolářová
	3rd	Diabetes Mellitus	Petr Štourač, Michaela Drašková, Mayra Bermudés, Monika Ťažká
		Electric Shock	Olga Smékalová, Martina Šablaturová
2013	1st	Peripartal Life-Threatening Haemorrhage	Petr Štourač, Kristýna Malá, Jan Hudec, Vojtěch Hurčík
	2nd	Acute Abdomen	Hana Harazim, Zdeněk Drlík
	3rd	Childbirth in the Field	Michaela Drašková, Hana Harazim, Eva Filipová, Veronika Horváthová, Táňa Novotná
2014	1st	Caesarean Section	Petr Štourač, Tomáš Korbička, Gabriela Matuščinová, Klára Přichystalová, Petra Polochová
	2nd	Newborn Resuscitation	Petr Štourač, Ľubomíra Longauerová, Hana Pulkrábková, Terezie Lásková
	3rd	Laryngospasm	Hana Harazim, Jan Blahut, Monika Ďuricová
2015	1st	Ski Slope Injury	Martina Kosinová, Lucie Janalíková, Ľudovít Kadlec
	2nd	Epilepsy	Hana Harazim, Radka Kadlčíková, Mária Moravská
	3rd	Rupture of Abdominal Aortic Aneurysm	Martina Kosinová, Lukáš Korbel, Kateřina Gajdošíková, Daniela Hahnová
2016	1st	Carbon Monoxide Poisoning	Martina Klincová, Ľubomíra Ventrčová Longauerová, Jakub Zmrzlík, Barbora Žajdlíková
	2nd	Crush Syndrome	Olga Smékalová, Dominika Machajdíková, Deana Slovjaková
	3rd	Anaesthesia of Obese Patient	Marek Kovář, Marta Juřeníková, Emma Jurkovičová

Recordings from video conferencing and other teaching aids of AKUTNĚ.CZ

AKUTNĚ.CZ team monitors the latest best practices of professional societies. They succeeded in publishing the Manuál kritických stavů (the "Manual of Critical Situations") written by Dr Stern, a senior consultant, as well as several domestic and foreign aids, mainly for clinical practice. Highly used and visited are the records of lectures from expert events. Eager readers may already watch their parts online in the course of the lectures. The records often become a part of the post-conference proceedings of the event. Being traditional partners, there are also the events organized by the AKUTNĚ.CZ portal (AKUTNĚ.CZ Conference, Urgent Medicine Course), Ostrava's Colours of Sepsis and the International Congress of Traumatology and Forensic Medicine in Mikulov.

AKUTNĚ.CZ Conference, Urgent Medicine Course and Contact Teaching

The activities of the portal are not only the virtual ones. Each year, the implementation team prepares the AKUTNĚ.CZ Conference which, according to the number of participants, ranks among the largest one-day events in AIM. Traditionally, the AKUTNĚ.CZ Conference takes place in November when the Bohunice campus fills with almost 1,000 participants from among the experts and students alike. Every year, they may choose from a number of lectures held in several parallel sections (non-medical, Young Anaesthesiologists, themed blocks held in a parallel section). We also provide the greatest opportunity for practical training in individual workshops found elsewhere in the Czech Republic. The workshops have traditionally included, for example, an internationally certified Essential Pain Management course, a legendary workshop ...jde o čas… ("... time matters..."), PBL/TBL lessons with AKUTNĚ.CZ Virtual Patient, the basics of ultrasonic technique and viscoelastic coagulation methods, and others. The AKUTNĚ.CZ Conference has also pioneered the implementation of workshops using an advanced patient simulator. The progress of the Conference can be seen in Table 3. What is more, all the time since its inception, the conference is exempt from the registration fee.

Table 3. The development of the AKUTNĚ.CZ Conference

Year	Date	Number of participants	Number of sections	Workshops
I	21 Nov 2009	188	1	2
II	20 Nov 2010	250	1	2
III	19 Nov 2011	420	2	3
IV	17 Nov 2012	470	2	4
V	16 Nov 2013	659	2	4
VI	22 Nov 2014	725	3	8
VII	19 Nov 2015	954	3	8
VIII	18 Nov 2016	928	3	11
IX	25 Nov 2017	1086	4	13

Additionally, the AKUTNĚ.CZ team organizes a weekly Emergency Medicine course for FM MU students, which is intended for the students of the 4th-6th years of General Medicine and, in the last year, also of Dentistry. Supervised by experienced specialists, students practice the basic and advanced resuscitation, airways management and access to the vascular system, on-site traffic accident and much more. Students' interest in this event is enormous, which is attested to by the fact that every year, the capacity of the course fills up within 2 minutes after the beginning of the registration. Furthermore, AKUTNĚ.CZ organizes some other, also very popular, courses – Workshop Airway Academy within the framework of Colours of Sepsis and/or First Aid Station at Masaryk Junior University.

IMPACT ON THE EXPERTS

Domestic

The AKUTNĚ.CZ portal has become visible not only on the academic and clinical grounds, where it enjoys a significant support from, among others, both FM MU and the University Hospital Brno, but it is also supported by professional companies, namely the Czech Society of Anaesthesiology, Resuscitation and Intensive Medicine, the Czech Society of Intensive Medicine, the Czech-Slovak Forum for Sepsis and, last but not least, the Czech Medical Chamber. Throughout its many years of existence, the portal and its activities have been awarded several times at university, national, and international level. This happened at the ČSARIM National Congress already in 2009. In 2012, the Virtual Patients were awarded the best published works and aids of the FM MU. A great appreciation is the use of AKUTNĚ.CZ algorithms in undergraduate education at the Third Faculty of Medicine of the Charles University (FM CU) whose educational materials appear reciprocally on AKUTNĚ.CZ website.

International

During the first year of its activity, the AKUTNĚ.CZ portal was already presented at the University of Basel. International activities of the portal are most often reflected in the form of presentations at foreign conferences. These are lectures and posters about portal's activities as well as presentations of the scientific work of the AKUTNĚ.CZ team. The first presentations of the AKUTNĚ.CZ portal abroad were given, quite symbolically, at the largest AMEE conference on medical education, by associate professors, doc. Štourač and doc. Schwarz, in 2012 in Lyon, France. Following were more detailed insights into the portal and its activities at IAMSE 2013 (St Andrews, UK), AMEE 2014 (Milan, Italy), and Anesthesiology 2015 (San Diego, US). Similarly successful was the presentation of Dr Klincová at the Euroanaesthesia 2016 Congress in London (UK).

Another important way of realizing international cooperation is the involvement of the AKUTNĚ.CZ portal in the MEFANET international network, a project supporting the cooperation of Czech and Slovak medical faculties in the development of modern and e-learning methods of teaching.
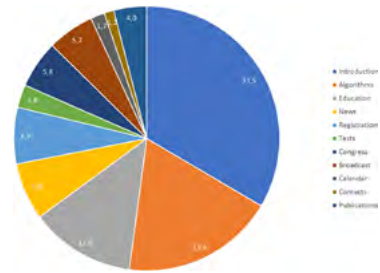

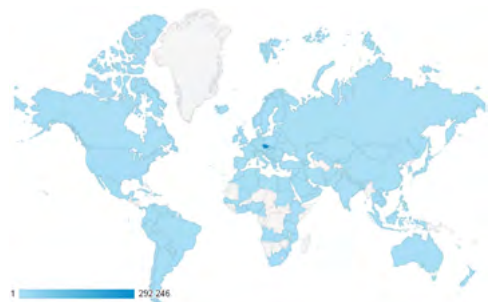Figure 1. The share of representation of individual pages of the AKUTNĚ.CZ portal

Figure 2. Access to the AKUTNĚ.CZ portal worldwide in 2007–2017
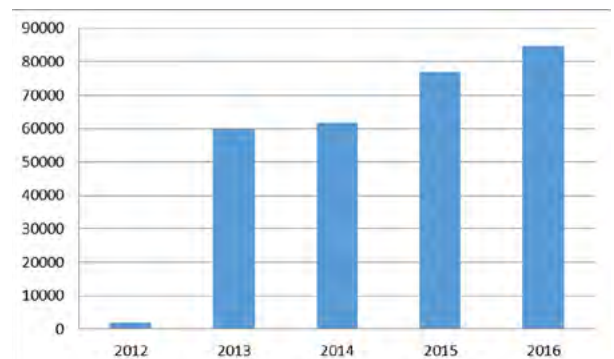

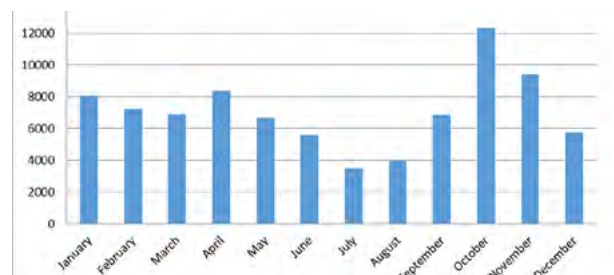Figure 3. Number of visits to the AKUTNĚ.CZ portal in the given years

Figure 4. Number of visits in the months of 20167

The world-wide visibility of the AKUTNĚ.CZ portal is best documented by the world map below with country-by-country views (Figure 2).

Recruiting students for AIM

It is a great appreciation for the AKUTNĚ.CZ portal and its authors from among teachers that over one third of more than 150 FM MU graduates who cooperated with the AKUTNĚ.CZ portal remained faithful to AIM. Professional specialization of our graduates is dealt with in detail by Dr Klincová in her publications. A lot of the graduates remain external collaborators of the portal long after completing their studies. Some have even become members of the portal Management.

Interest of the experts

We have documented the interest in the portal quite convincingly in the previous paragraphs. But let the numbers speak. Throughout the entire period of the existence of the portal, its website has reached the number of 14,297,509 visitors. The accompanying chart even shows how the portal traffic increases each year (Figure 3).

Looking at statistics in more detail, we find that the average traffic per month exceeds 2,300 users. Their priority is clear – interactive algorithms, our flagship, sweep the board. The next chart shows that the traffic increases significantly in October and November (Figure 4), which is undoubtedly due to the interest in the AKUTNĚ.CZ Conference and the activities around the Congress. Our Facebook page already boasts more than 3,200 fans whose number continues to grow. Not only do we appear on Facebook and our website, we also have accounts on Instagram, Twitter, and Google+.

PUBLISHING ACTIVITIES OF AKUTNĚ.CZ MEMBERS

It has already been mentioned above that AKUTNĚ. CZ motivates students towards AIM. Many of them engage themselves in teaching and, patiently enough, build their academic and scientific careers. One of such graduates/doctors is Dr Hana Harazim who worked on the use of remifentanil in obstetric analgesia during her student years. Not only did she rank 2nd at the Students' Scientific Conference of the FM MU, she also won 1st place in the category of free communication at the national ČSARIM Congress 2011. There is also Martina Kosinová, MD whose works were published in prestigious European Journal of Anaesthesiology and the International Journal of Obstetric Anesthesia.

Lots of work have been based on the activities of the AKUTNĚ.CZ portal. Internationally, the most visible one was published in the Journal of Medical Internet Research which, according to the Web of Science, has repeatedly been No. 1 in the Medical Informatics category. The article has been widely quoted by prestigious publications. You can find a more detailed summary of the publishing activities related to the AKUTNĚ.CZ portal in Table 4. Our important publishing partner is the MEFANET Journal (mj.mefanet.cz) which is indexed, for example, in the ERIH+ international database.

Table 4. The publications on the AKUTNĚ.CZ portal (1)

Year	1st author	Citation
2007	Daniel Schwarz	SCHWARZ, Daniel, Pavel ŠEVČÍK, Petr ŠTOURAČ a Roman ŠTOUDEK. Educational portal of Emergency Medicine. In Proceedings of Information and Communication Technologies in Education 2007. 1st edition. Ostrava: University of Ostrava, 2007. pp. 191-193, 3 pp. ISBN 978-80-7368-388-7.
2008	Petr Štourač	ŠTOURAČ, Petr, Roman ŠTOUDEK, Ivo KŘIKAVA, Daniel SCHWARZ, Milan KRATOCHVÍL a Pavel ŠEVČÍK. AKUTNE.CZ – nový publikační formát o akutní medicíně. In Novinky v anesteziologii, intenzivní medicíně a léčbě bolesti 2008. 1st edition. Brno: Galén, 2008. pp. 364-365, 2 pp. ISBN 978-80-7262-589-5.
2009	Petr Štourač	ŠTOURAČ, Petr, Daniel SCHWARZ, Petr BAKALÍK, Roman ŠTOUDEK, Ivo KŘIKAVA, Radim ŠUSTR, Olga SMÉKALOVÁ a Pavel ŠEVČÍK. Multimediální výukové algoritmy na portálu AKUTNE.CZ [ISSN 1803-179X]. In SOJKA, Petr a Jiří RAMBOUSEK. SCO 2009. Brno: Masarykova univerzita, 2009. pp. 53-57, 5 pp. ISBN 978-80-210-4878-2.
2010	Petr Štourač	ŠTOURAČ, Petr, Ivo KŘIKAVA, Daniel SCHWARZ, Roman ŠTOUDEK, Peter BAKALÍK, Olga SMÉKALOVÁ, Lukáš BREYER, Pavel ŠEVČÍK, Ivo ŠNÁBL, Radim ŠUSTR, Zuzana ĎURIŠOVÁ, Jana WOLFOVÁ, Lenka MAKOVÁ, Michal IZAKOVIČ, Miloš HONS, Jan MAYER, Gabriela KOLÁŘOVÁ, Elena KRÁTKA, Martina KOSINOVÁ, Martin CHOVANEC, Zdeněk CHVÁTAL, Michal MALÝ, Eliška KRAJTLOVÁ a Dominik KUCHAŘ. AKUTNE.CZ projects – How to join medical students to e-learning content developing. In MEFANET report 03 – Edukační sborník z 3. konference lékařských fakult ČR a SR s mezinárodní účastí na téma e-learning a zdravotnická informatika ve výuce lékařských oborů. 1st edition. Brno: Masarykova univerzita, 2010. pp. 101-103, 3 pp. ISBN 978-80-210-5302-1.
	Petr Štourač	ŠTOURAČ, Petr. … sejdeme se na AKUTNE.CZ [ISSN 1803-179X]. Naše fakulta, Brno: Lékařská fakulta MU, 2010, vol. 1, No. 1, pp. 18-21.
	Daniel Schwarz	SCHWARZ, Daniel a Petr ŠTOURAČ. Sejdeme se na AKUTNĚ.CZ. MEFANETin, Brno, 2010, year 2010, March, pp. 11-13.
2011	Petr Štourač	ŠTOURAČ, Petr, Zuzana MARKUSEKOVÁ, Hana SUCHOMELOVÁ a Martina KOSINOVÁ. III. konference AKUTNE.CZ. Naše fakulta, Brno: Lékařská fakulta MU, 2011, vol. 2, No. 08, pp. 18-19. ISSN 1805-0131.
	Petr Štourač	ŠTOURAČ, Petr, Zuzana MARKUSEKOVÁ, Hana HARAZIM a Martina KOSINOVÁ. III. konference AKUTNE.CZ. MEFANETin, Brno, 2011, year 2011, No. 03, pp. 43-47. ISSN 1804-8013.
	Kateřina Jedličková	JEDLIČKOVÁ, Kateřina, Anna JANEČKOVÁ, Martina KOSINOVÁ, Olga SMÉKALOVÁ a Petr ŠTOURAČ. Kurz urgentní medicíny 2011. Naše fakulta, Brno: Lékařská fakulta MU, 2011, vol. 2, No. 06, pp. 16-21.
	Kateřina Jedličková	JEDLIČKOVÁ, Kateřina, Anna JANEČKOVÁ, Martina KOSINOVÁ, Olga SMÉKALOVÁ a Petr ŠTOURAČ. Kurz urgentní medicíny pro studenty LF. MEFANETin, Brno, 2011, year 2011, No. 02, pp. 12-15. ISSN 1804-8013.
	Lenka Baláková	BALÁKOVÁ, Lenka, Petr ŠTOURAČ, Ivo KŘIKAVA, Pavel ŠEVČÍK, Daniel SCHWARZ, Ivo ŠNÁBL, Radim ŠUSTR a Petr HOLUB. Využití e-learningového portálu AKUTNE.CZ při studiu medicíny. In Petr Sojka, Martin Kvizda. Sborník SCO 2011. 1st edition. Brno: MUNI Press, 2011. pp. 165-169, 5 pp. ISBN 978-80-210-5528-5.
	Lenka Baláková	BALÁKOVÁ, Lenka, Petr ŠTOURAČ, Ivo KŘIKAVA, Markéta BRANDOVÁ, Anna JANEČKOVÁ, Andrej ČERNÝ, Daniel SCHWARZ, Ivo ŠNÁBL, Radim ŠUSTR a Pavel ŠEVČÍK. Methodical Guidance of Students During Multimedial Algorithm Creation for the portal AKUTNE.CZ. In D. Schwarz, M. Komenda, S. Štípek, V. Mihál, L. Dušek. MEFANET report 04. 1st edition. Brno: Masarykova univerzita, 2011. pp. 24-26, 3 pp. ISBN 978-80-210-5539-1.
2012	Martina Kosinová	KOSINOVÁ, Martina, Markéta BRANDOVÁ, Zuzana MARKUSEKOVÁ, Roman ŠTOUDEK a Petr ŠTOURAČ. Kurz urgentní medicíny 2012...aneb výuka léčby akutních stavů v praxi. MEFANETin, Brno, 2012, year 2012, No. 01, pp. 28-33. ISSN 1804-8013.
	Anna Janečková	JANEČKOVÁ, Anna, Ida ŠALGOVIČOVÁ, Kateřina JEDLIČKOVÁ, Martina KOSINOVÁ a Petr ŠTOURAČ. KURZ URGENTNÍ MEDICÍNY 2012. Naše fakulta, Brno: Lékařská fakulta MU, 2012, vol. 3, No. 2012, pp. 9-12. ISSN 1805-0131.
2013	Petr Štourač	ŠTOURAČ, Petr, Hana HARAZIM, Daniel SCHWARZ, Ivo KŘIKAVA, Martin KOMENDA, Roman ŠTOUDEK, Olga SMÉKALOVÁ, Martina KOSINOVÁ, Richard HŮLEK, Jan MALÁSKA, Radim ŠUSTR, Ivo ŠNÁBL, Ladislav DUŠEK a Roman GÁL. AKUTNE.CZ algorithms and SEPSIS-Q scenarios as interactive tools for problem based learning sessions in medical education. MEFANET Journal, Brno: Facta Medica, 2013, vol. 1, No. 2, pp. 61-73. ISSN 1805-9163.
	Petr Štourač	ŠTOURAČ, Petr, Martina KOSINOVÁ, Hana HARAZIM, Olga SMÉKALOVÁ a Roman GÁL. 5th AKUTNE.CZ Congress. MEFANET Journal, Brno: Facta Medica, 2013, vol. 1, No. 2, pp. 82-84. ISSN 1805-9163.
	Daniel Schwarz	SCHWARZ, Daniel, Hana HARAZIM, Petr ŠTOURAČ, Martin KOMENDA a Ladislav DUŠEK. Infrastructure of clinical cases for medical education. In Information and Communication Technology in Education. Proceedings. first, 2013. Ostrava: University of Ostrava, 2013. pp. 268-273, 320 pp. ISBN 978-80-7464-324-8.
	Daniel Schwarz	SCHWARZ, Daniel, Petr ŠTOURAČ, Martin KOMENDA, Hana HARAZIM, Martina KOSINOVÁ, Jakub GREGOR, Richard HŮLEK, Olga SMÉKALOVÁ, Ivo KŘIKAVA, Roman ŠTOUDEK a Ladislav DUŠEK. Interactive algorithms for teaching and learning acute medicine in the network of medical faculties MEFANET. Journal of medical Internet research, Toronto: JMIR Publications Inc., 2013, vol. 15, No. 7, pp. 298-311. ISSN 1438-8871. doi:10.2196/jmir.2590.
	Martina Kosinová	KOSINOVÁ, Martina, Markéta BRANDOVÁ, Olga SMÉKALOVÁ a Petr ŠTOURAČ. IV. konference AKUTNĚ.CZ. MEFANETin. 2013, 6(1), 26-32. ISSN 1804-8013.
2014	Petr Štourač	ŠTOURAČ, Petr, Martina KOSINOVÁ, Hana HARAZIM, Olga SMÉKALOVÁ, Roman ŠTOUDEK a Roman GÁL. Experience-based teaching of acute medicine for extra motivated medical students and young physicians – 4th Emergency Medicine Course and 6th AKUTNĚ.CZ Congress. MEFANET Journal, Brno: Facta Medica, 2014, vol. 2, No. 2, pp. 79-82. ISSN 1805-9163.
	Martina Kosinová	KOSINOVÁ, Martina, Michaela DRAŠKOVÁ, Hana HARAZIM, Olga SMÉKALOVÁ, Petr ŠTOURAČ a Roman GÁL. Jubilejní V. konference AKUTNĚ.CZ. Naše fakulta. 2014, 5(19), 10-13. ISSN 1805-0131.
	Hana Harazim	HARAZIM, Hana, Martina KOSINOVÁ, Roman ŠTOUDEK a Petr ŠTOURAČ. "Zdravotnická pevnost Boyard" – aneb týmy mediků v biologicky nebezpečné akci. Naše fakulta. 2014, 5(19), 33-36. ISSN 1805-0131.

Table 4. The publications on the AKUTNĚ.CZ portal (2)

Year	1st author	Citation
2015	Hana Harazim	HARAZIM, Hana, Petr ŠTOURAČ, Martina KOSINOVÁ, Olga SMÉKALOVÁ, Roman ŠTOUDEK, Daniel SCHWARZ, Vít RUSŇÁK a Miloš LIŠKA. Zapojení interaktivní výuky do pregraduálního studia akutní medicíny: virtuální pacient, pokročilé simulace a přenosy z operačních sálů. Anesteziologie & intenzivní medicína, Praha: Česká lékařská společnost J.E. Purkyně, 2015, vol. 26, No. 4, pp. 202-212. ISSN 1214-2158.
	Petr Štourač	ŠTOURAČ, Petr a Daniel SCHWARZ. Služební cesty virtuálního pacienta AKUTNĚ.CZ®. Naše fakulta. 2014, 5(23), 19-21. ISSN 1805-0131.
	Zuzana Markuseková	MARKUSEKOVÁ, Zuzana, Olga SMÉKALOVÁ a Petr ŠTOURAČ. 17. Colours of Sepsis. Antiinfective News. 2015, 6(1), 29-30. ISSN 1804-4212.
	Jitka Chlupová	CHLUPOVÁ, Jitka, Hana HARAZIM, Zuzana MARKUSEKOVÁ, Olga SMÉKALOVÁ a Petr ŠTOURAČ. Víkend plný urgentních zážitků aneb Kurz urgentní medicíny 2015. MEFANETin. 2015, 8(1), 10-12. ISSN 1804-8013.
2016	Jitka Chlupová	CHLUPOVÁ, Jitka, Tereza PROKOPOVÁ, Petr ŠTOURAČ, Hana HARAZIM, Martina KOSINOVÁ, Olga SMÉKALOVÁ, Marek KOVÁŘ a Jan HUDEC. VIII. konference AKUTNĚ.CZ – největší česká odborná událost pro mladé anesteziology a studenty lékařských fakult. Naše fakulta. 2017, 7(33), 10-11. ISSN 1805-0131.
	Petr Štourač	ŠTOURAČ, Petr. VIII. KONFERENCE AKUTNĚ.CZ®. Zpravodaj ČSARIM. 2016, 4-5.

Since 2016, the motivation of young authors in their scientific efforts has been encouraged by the Jiří Mach Prize which is awarded by the Nadační fond AKUTNĚ.CZ for the best original work in acute medicine published in the previous year by an author younger than 35 years of age. The first laureates were Kateřina Růžková, MD and Jozef Klučka, MD.

IMPLEMENTATION TEAM

What remains to be answered is who stands behind the portal. No activities of the portal would be possible without the volunteer work of so many doctors, students, and even lay enthusiasts, often recruiting from the families of AKUTNĚ.CZ supporters. The top management currently consists of an eight-member team providing the portal's ongoing operation and taking care of its economy. The IT support is provided by the team of the Institute of Biostatistics and Analyses of the Medical Faculty of MU. Support to videoconferencing is provided by the team of the Institute of Computer Science of MU. Linguistic (albeit not content) correctness is supervised by a linguist/proofreader. And a large group of remarkably motivated people is made up by our reviewers.

CONCLUSION

Over the past 10 years, the AKUTNĚ.CZ portal has become an important meeting place for those interested in acute medicine, both nationally and internationally. And undoubtedly, many students have successfully been motivated to choose anaesthesia and intensive medicine as their field of study.

… let's meet on AKUTNĚ.CZ

THE USE OF LMS MOODLE AND MOODLE MOBILE APP IN EDUCATIONAL PROCESS AT THE FACULTY OF MEDICINE IN HRADEC KRÁLOVÉ

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ABSTRACT

In the initial part of the contribution the reader is made familiar with the main aim of the project, the individual phases of the project and planned outputs of the project. In the second part of the contribution there is a description of the possibilities of e - learning in general and at the Faculty of Medicine in Hradec Kralove, where the program LMS Moodle has been used for e-learning for 8 years. With regards to the project timetable it´s possible to present to the reader the results of the questionnaire and the elaborated electronic courses. In the part about methods and materials the readers get to know the Moodle Mobile App, there is a description of its possibilities of use when working with the courses and it takes into account the experience of the authors at our faculty. The conclusion of the contribution thus concludes the possibilities of use of the Moodle Mobile App and is different from the project that is in its first phase.

INTRODUCTION

The aim of the project is to create e- learning courses optimized for the Moodle Mobile App in biochemistry, biology and biophysics. The reason for the preparation of these courses is the increased interest of our students in mobile applications. Our motivation is thus to provide higher quality of study conditions and materials for our students when self – studying. The topics that were elaborated were chosen according to the questionnaire. The questionnaire was filled in by 1st, 2nd and 3rd year students who chose from the topics that were offered to them, 4 topics from each subject that they would like to be elaborated in the form of e- learning. The results of the questionnaire are available at the time when this article is being prepared. After the questionnaire has been evaluated the resolvers´ team chose four topics with the highest frequency from the three above mentioned subjects. And thus the topics with the highest frequency are as follows,

- Biology: epigenetics, gene therapy, invasiveness and metastasis, fundamentals of biological therapy,
- Biochemistry: vitamins as cofactors for enzymes, biological oxidation + RONS, acid-base balance, composition and basic urinalysis,
- Biophysics: biomechanics of muscle and bone, biomechanics of breathing, astigmatism as the aberration of an optical system, selected chapters of modern physics.

In the second phase of the project the resolvers´ team prepared materials and created e-learning courses optimized for the Moodle Mobile App. The authors took advantage of their experience gained when preparing previous courses. The courses structure will be subject to the optimization for the Moodle Mobile App. And thus the courses structure is as follows:

1. communication with the students - forum, chat
2. study material – book + multiple - choice questions directly in the text of the book
3. summary of the studying material – summary
4. review test – test

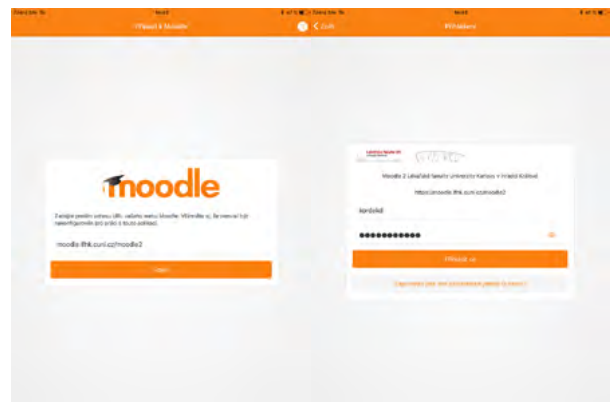*Figure 1. Installation package Moodle Mobile on App Store*

Figure 2. a) Connecting to the Moodle LFHK web server, b) Introducing the login information in the Moodle Mobile App
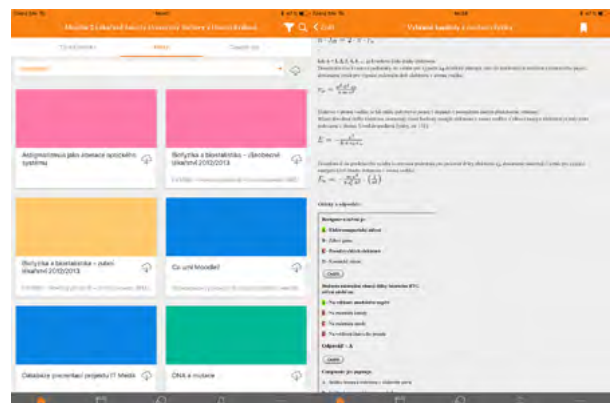

Figure 3. a) Virtual library, b) Interactive complement of the "book"

In the concluding phase of the project the resolvers´ team will create a questionnaire to be filled in by 1st, 2nd and 3rd year students. This questionnaire will provide the authors with an important feedback, especially concerning the comparison of the courses application in LMS Moodle and the Moodle Mobile App. On the basis of the questionnaire results the authors will focus on the courses modification eventually on the Moodle Mobile App modification.

At first it´s necessary to mention the growing influence of mobile devices (e.g. tablets, mobile phones, e-readers,...) in teaching. In general this increase is most evident in lower years of schools. The above mentioned increase is also related to the increased interest of the society in mobile technology and related mobile applications. With regards to education, e-learning is becoming more and more popular. There are more forms of e-learning and it´s not the aim of this article to divide them and characterize them. In this contribution we will only concentrate on the LMS (Learning management system) Moodle and its mobile application Moodle Mobile. It´s an application that contains some online tools for organization of the lessons and communication with the students (e.g. chat, forum, news,...) and it also includes some components that enable to get feedback about students´ knowledge and attitudes (e.g. questionnaire, test, survey, …). It also makes the studying materials available for students (e.g. book, lecture, …).The students can hand in their homework as well. The basic unit is a Moodle course that can include the above mentioned components. If a quality course is created (not only from the point of view of the content), the participation of the pedagogical staff is not necessary when filling in. Our faculty, especially the Department of Medical Biophysics has many years of experience with e-learning as it´s obvious from the papers [1–3].

At the faculty e-learning in Moodle is carried out at the address moodle.lfhk.cuni.cz. The students have access to all e-learning courses at this address. In these courses there are e.g. interactive manuals for practical exercises, in which the scientific and didactic attitudes to the given problem are combined. As an example e.g. laboratory assignment of measuring rigidity of a nitinol stent, where the theory of this assignment is based on [4,5].
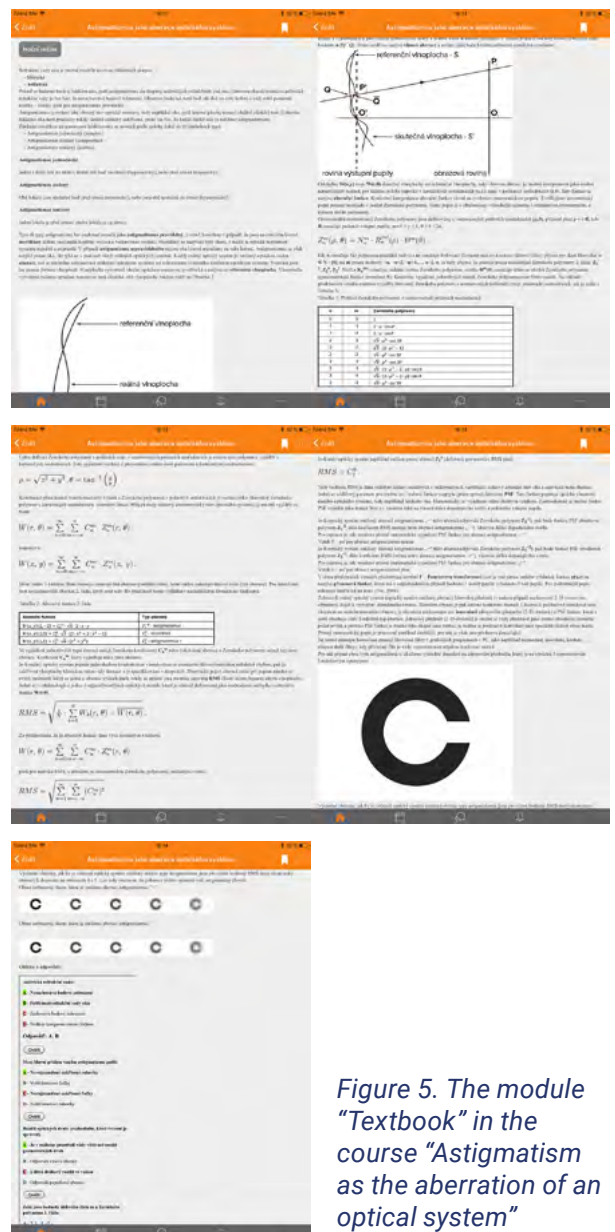

Figure 4. Test in the Moodle Mobile App

Figure 5. The module "Textbook" in the course "Astigmatism as the aberration of an optical system"

This practical assignment is carried out at the Department of Medical Biophysics. Furthermore seminar materials are included. The courses may also cover optional courses.

MATERIALS AND METHODS

The Moodle LFHK portal is divided into several basic categories: Czech courses, English courses, Preparatory course, the Dean's Advisory board, Study Division and u3v. The Czech and English courses are important for medical students. In both categories there are subcategories called according to individual workplaces in alphabetical order. The workplaces are in charge of managing the categories and its courses. However the Moodle LFHK is not optimized for mobile devices and thus is not really appropriate e.g. for the use on a mobile phone, especially because of a long list of workplaces that can be further divided into subcategories. The student can see all categories and courses including those that they don´t need yet. If the students want to use the courses in a comfortable and effective way in a mobile device, it´s better to use the mobile application Moodle Mobile app. This application is an application that is very well optimized for Android OS and iOS. The student can get the application for free through Google Play or App Store. Or it´s possible to get access to the application at the link https://download.moodle.org/mobile/, where is also some general information about the application (Figure 1).

Installation of the Moodle Mobile app is a standard installation for both supported OS. After successfully installing the application into the mobile device the student must fill in the webpage address moodle.lfhk.cuni.cz/moodle2 on the initial screen of the application and then click on "connect" as can be seen in Figure 2a. As the next step the students must introduce their username, that they use to log in the web Moodle and password, as in Figure 2b.

Once the student has logged in the Moodle LFHK the home page appears, where after clicking on the "courses" button the student can see all courses in which they have enrolled (My courses). The student can only see courses in which they had previously enrolled and thus they have a virtual library of their courses in web Moodle LFHK. Furthermore the student can use the application to send messages to other students or teachers. They can thus interact with other participants of the course without logging out of the application. They can also see their evaluation and the events in the calendar. Besides that the application offers the possibility to save the so called personal files in one´s profile and to download files from individual courses from the so called public files. The above mentioned virtual library of courses "My courses" is essential for the use of the application. It is a list of enrolled courses of the student and thus each student may have a different list. An example of a virtual library can be seen in Figure 3a.

If the study material "book" is part of the course, the student can see this component Moodle directly in the application. Internet connection is necessary for initial loading of the book. However the advantage of the application is that when reloading the book in the given course, the student doesn´t need the Internet connection anymore. The study materials in the form of a book are available in the students´ mobile device.

As a part of the module "book" the authors of the courses are offered a created complement that enables to include multiple choice questions in the book that the student can answer in an interactive way anywhere in the text of the book. An example of this complement is available in Figure 3b. The version Moodle 3.1 (and higher version) enables to fill the tests in individual courses in the Moodle Mobile app. There was not this function in the previous versions and thus the student was redirected by the application to the web Moodle LFHK, where filling the test on a mobile device is not as optimized as in the application. And so this possibility can be considered another undeniable advantage of the Moodle Mobile app. Now it is also possible to attend a module „lecture" in this application. The lecture is among the activities in Moodle, in which the presence of the teacher is not necessary, but even so the student can go through the whole topic including feedback. An example of a module "test" can be seen in Figure 4.

RESULTS

An example of a completed course can be seen in Figure 5.

CONCLUSION

With regards to the students´ feedback, the Moodle Mobile app is a welcome complement for their self – study. However it´s necessary to be very careful while creating the courses optimized for Moodle Mobile, especially when inserting pictures and videos directly into the study materials "book". The pictures inserted in the text should have good resolution. Of course the pictures adapt to the tablet or mobile phone display, but as it has been already said, the book is downloaded into the device for offline use. Besides that, it is thus recommended to insert all pictures and videos in full resolution as independent files. The student doesn´t have to download the files, when they don´t need them and save the memory of their phones. Obviously, the applica-tion is not intended for creating courses, the author must create them in the web environment Moodle. However, the application is very useful especially for institutions, where they don´t have a computer classroom and the teachers want to write a test in Moodle with their students. They can just lend the students tablets and it´s possible to write the test e.g. in a microscopic laboratory or an ordinary classroom.

E.g. the Department of Histology and Embryology at our faculty do just that.

ACKNOWLEDGEMENT

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MEFANET 2017 CONFERENCE:

SIMULATION WITHOUT PENALTY

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ABSTRACT

Football and medical education have at least one thing in common: simulation either already is or slowly becomes inseparable from it. This phenomenon might be tolerated – to put it mildly – in football; by contrast, it is highly desirable and actively promoted in medical education. Not surprisingly then, "simulation" was one of the most frequent buzzwords at the 11th year of the MEFANET conference.

Nevertheless, the annual meeting of representatives from medical faculties and healthcare faculties from across the Czech Republic and Slovakia, whose impact extended beyond these two countries and which was held in November 2017 in the pleasant premises of the Hotel Continental in Brno, was very non-simulated and real. One of the two introductory workshops, entitled "Integration of low- and hi-fidelity simulations to maximise the pedagogical value of educational medical simulation centres", was entirely dedicated to various types of simulation technology and innovative teaching approaches in the education of medical and healthcare disciplines. The workshop was led by representatives of two large projects: SIMU+ (Masaryk University Strategic Investments in Education) and WAVES (Widening Access to Virtual Educational Scenarios). The latter is a European project which is solved within an Erasmus+ Knowledge Alliance and aims to interconnect academic educational institutions with the commercial sector. Prof Terry Poulton, one of the workshop guarantors, also gave a lecture intended for employees and students of the Faculty of Medicine of the Masaryk University, which took place in the University Campus at Bohunice, not far away from the conference venue.

Invited speakers, namely Inga Hege from the Ludwig Maximilian University of Munich (Germany) and Sascha Benjamin Cohen from the UCSF School of Medicine (USA) gave a more general insight into the integration of virtual and simulation technology into the education (I. Hege) and into mapping of medical curricula (S. B. Cohen). Both speakers are leading experts in their fields: Inga Hege has been researching clinical reasoning in medical education for many years, whereas Sascha Benjamin Cohen is the lead developer of the Ilios curriculum management system.

Each year, one section of the MEFANET conference is dedicated to a selected medical specialty or, more precisely, the impact of modern information technology on the education in that specialty. In this regard, the MEFANET 2017 conference was focused on obstetrics and gynaecology. Lecturers from Brno, Prague and Olomouc presented various teaching approaches in this field that are used in their respective medical faculties, including interactive items. Professor Martin Huser, MD, PhD, was the representative of the Faculty of Medicine of the Masaryk University.

An interesting innovation was introduced in the poster session: led by two chairpersons, the participants gathered in informal groups around presented posters while authors were given a few minutes each to explain their message. This approach facilitated much fruitful discussions on given topics. Although this way of poster presentation was entirely new, conference organisers were very satisfied with the session itself and the subsequent feedback; it is therefore very likely that this approach will be adopted again in 2018.

The topics presented in the MEFANET 2017 conference demonstrated once again how quickly the way of teaching medicine evolves in the 21st century. Physicians-to-be will indisputably gain most experience and skills only later, in real clinical situations; however, virtual technology and simulations can help medical students to be much better prepared.

More details on the conference, including a photo gallery and presentations for download, are available at http://www.mefanet.cz/index-en.php?pg=conference.

Figure 1. A workshop on low- and hi-fidelity simulations organised by WAVES and SIMU+ groups

Figure 2. Inga Hege

Figure 3. Commented poster session

Figure 4. Low or high level of fidelity?

COOPERATION BETWEEN EUROPEAN COUNTRIES AND WESTERN BALKAN AT THE MODIFICATION OF NURSING STUDY PROGRAM

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ABSTRACT

Introduction

Project TEMPUS IV – CCNURCA (Competency Based Curriculum Reform in Nursing and Caring in Western Balkan Universities) is currently under way in the international cooperation, which initiates European standards in order to innovation the content of training in nursing. The main objective of this paper is presentation of transforming education in European countries and supporting the modernization of higher education. It also focuses on the cooperation and modernization of higher education in partner countries in the wider neighborhood.

Methods:

Methodology for theoretical education in study program nursing includes working groups were created and questionnaire was implemented a survey in order to fulfill the objectives of the project.

Results:

The evaluation of a curriculum and the schedule of a study program of nursing were running in the theoretical level. The activity to support the education of teachers themselves, so-called program TOT (Training of Trainers), where the participating specialists from the ranks of teachers were giving trainings in new techniques within the theoretical and practical training to each other, was deemed inspirational.

Discussion:

The new program in nursing was verified in this way and monitored the suitability of students, self-evaluation and teacher satisfaction. Results of the project consortia CCNURCA represent innovative changes for the countries of Western Balkan. Educational institutions, health care institutions and government organizations shall unite their efforts for the sake of reforming the curriculum.

INTRODUCTION

The transformation of education in the European Union has led to many changes in the modification of teaching, curriculum and the allocation of hours within courses, the introduction of new teaching methods into studies [1].

The project TEMPUS IV - CCNURCA (Competency Based Curriculum Reform in Nursing and Healthcare in Western Balkan Universities, No. 544169-TEMPUS-1-2013-1-BE-TEMPUS-JPCR) was implemented within the framework of international cooperation, the main aim of which was to use methods, and activities to modernize the curriculum in nursing.

The profile of the study program in Slovakia (at the Faculty of Health Care of Presov, University of Presov and other faculties) meets the criteria recommended by the standards of the European Union, the recommendations of the Munich Declaration (2000) and the criteria of the Bologna Declaration (1999). The key competencies for nursing as recommended by the European Union are: communication skills and competences, critical thinking skills and effective problem solving skills, ability to use modern information technologies, ability to adapt to the role of teacher, consultant, lawyer, patient lawyer, and personal and interpersonal skills [2].

The range of time allocation for the nursing study department is total 4,600 hours, where half of it is practical education (2,300 hours). The student's workload is the ratio between contact and non-contact hours in accordance with the EU directives [3]. Reforming the curriculum for adapting, upgrading and restructuring existing curricula focuses on developing, testing, creating / accrediting new curricula, and disseminating results. The curriculum reform will also focus on the content, structure, teaching methods and use of new learning materials in the context of the program, and the modernization of European higher education (Europe 2020 Strategy, Strategic Framework for European Cooperation in Education and Training (ET 2020) and Bologna Process).

The aim of the transformation of education is to develop and introduce study programs and recognition agreements between higher education institutions in the European Union and in partner countries. The newly opened courses must be structured according to the three-cycle system and must use the European Credit Transfer System (ECTS) and mechanisms for recognizing different levels of education.

METHODS

The aim of transforming education in European countries is to support the modernization of higher education. It also focuses on the cooperation and modernization of higher education in partner countries in the wider neighborhood. In particular, the program supports voluntary convergence with developments in higher education in the European Union, stemming from the Europe 2020 strategy, the Strategic framework for European Cooperation in education and training and the Bologna process.

This paper deals with TEMPUS IV – CCNURCA, the specific aim of which was to implement current European requirements in nursing education and to analyze curriculum at nursing institutions in the countries of the Western Balkans (WB). Another objective of the project was to propose a framework for nursing education that would be in according with the Bologna Declaration and European standards that would include ECTS credits in the curriculum of the nursing study program.

The implementation of the pilot phase of the new curriculum in accordance with good educational standards, the introduction of new methods in nursing education and the attempt to outline proposals for new legislation corresponding to changes in nursing education programs within the trans-European network is essential.

The aim of the project is to ensure successful evaluation and accreditation of the new study program of nursing and the subsequent changes in legislative standards of the countries involved in the project [4]. Strengthening networking between higher education institutions and research institutions in partner countries and European Member States is also essential.

As part of the planned activities of the international project TEMPUS IV – CCNURCA, consortiums were conducted on the territory of participating countries, during which seminars, workshops, and working meetings were held.

Working groups, whose task was to jointly develop modifications to the content of the curriculum in accordance with the partner countries, were created in the initiation phase of the project. In the next phase of the project, questionnaires focusing on research itself, teaching and teaching methods were distributed in order to fulfil the objectives of the project. Training courses for teachers were being carried out in order to innovate the technical education in the study program of nursing.

The leader of the project is educational institution Odisee in Belgium (older name is HUB-KAHO) and co-operative institutions are Department of Nursing, Faculty of Health Care University of Presov in Presov (Slovak Republic) and other 15 participating partners from Albania, Bosnia and Herzegovina, Switzerland, Netherlands, Serbia and Montenegro [5].

RESULTS

The outcome of the solution for the studied issues in nursing education in the WB countries was the international profile of the nurses training within selected European countries (see Table 1) [6].

Table 1. Higher education of nursing in selected European countries [4]/em>

Country	1st degree of nursing study					2nd degree of nursing study	
	Sector		Length of study in years	Qual	General /specialist	Title	Length of study in years
Belgium	HE	SN in UC sector	3	Degree	General	Diploma	3
Denmark	HE	SN in UC sector	3.5	Degree	General		
Finland	HE	Polytechnics	3.5	Degree	General	Practical	3
France	FE	SN	3	Diploma	General		
Germany	FE	SN	3	Diploma	DE	Nurse assistant	1
Ireland	HE	University	4	Degree	DE		
Italy	HE	University	3	Degree	General (some DE)		
Netherlands	HE	SN	4	Degree	General	MBOV	4
Norway	HE	University/UC	3	Degree	General		
Spain	HE	University	3	Degree	General		
Sweden	HE	University	3	Diploma	General	Licensed	3
Switzerland	Voc	SN	3	Diploma	General		
UK	HE	University	3	Diploma and degree	Branch		

HE: higher education; SN: school of nursing; UC: university college; DE: direct entry; FE: further education; Voc: vocational.

From the data collected, it is evident that five of the thirteen EU countries (Belgium, Finland, Germany, Netherlands and Sweden) provide two-degree nursing education. United Kingdom among other countries of the European Union is characterized by the fact that the education of nurses moved to the university degree. France, Germany and Switzerland offer the training of nurses in nursing schools and in France, a campaign for nurses is running in order to transfer the nursing education to a higher education [7,8].

Nursing education in the WB countries is in the transition period: implementation of new methods, development of new methods based on existing competences, creation of joint programs with other institutions. There are differences in the basic training of nurses (bachelor studies). Impact on nursing education is represented the establishment of private universities offering education programs in nursing with a different standard than the public universities. This creates a room for improvement in theoretical and practical fields. The current study programs are oriented towards biomedical way and not holistically. Most systems do not cover the required allocation - 4600 hours of education (including half of them in the clinical conditions). Methods for theoretical and practical training required innovation [9].

Despite these deficiencies, there are also positive trends in nursing education, such as the ongoing reforms in the context of European criteria for the higher education, implementation of new strategies and cooperation with the concerned organizations, cooperation within individual faculties, investments in the material equipment of educational institutions, and, finally, national projects in the interest of the innovation of nursing education. CCNURCA project represents a dominant basis for resolving these issues [5].

Inspired by the knowledge and insights gathered during the former meetings and supported by the strategic document on competences, goals and outcomes for new nursing curriculum on the WB universities, each WB partner sent a proposal with the competences to their mentoring European partners. Following core competences were identified and agreed upon: Management of patients health; Quality of care; Management competences; Educational and legal issues; Ethics; Research; Administration of documentation; Communication skills; Teamwork competences. In general it can be stated that the curriculum reform for the WB needs to focus on: practical skills; communication skills, nursing concepts (e.g. nursing diagnoses), problem based critical thinking, integrated learning (integration of theory and practice) and Evidence Based Practice [10].

Survey on project progress

CCNURCA: 544169–TEMPUS–1–2013-1-BE-TEMPUS-JPCR

Dear CCNURCA partner,

it has been more than three months that we are working together on implementation of the CCNURCA project and we would like to ask you to help us further improving the alignment of project events with your needs. Therefore we would ask you to participate in this survey and share your experiences and any suggestions you might have..

Thank you for your cooperation

1. **General information about you**

Your role within your HEI:

☐ Member of Rectorate ☐ Dean of Nurse Department ☐ QM-coordinator

☐ Member of Ministry ☐ Academic Staff in Nurse Departement ☐ International Office staff

☐ Other:

2. **Relevance of the project contents for your own work**

	Totally disagree				Totally agree	No answer
The themes and content of the project are important for my work.	☐ ☐ ☐ ☐ ☐ ☐					☐
The content of the project activities successfully met my expectations.	☐ ☐ ☐ ☐ ☐ ☐					☐
I was able to gain new knowledge.	☐ ☐ ☐ ☐ ☐ ☐					☐
I benefited from the experience of other participants.	☐ ☐ ☐ ☐ ☐ ☐					☐
I will continue to work on CCNURCA with other participants.	☐ ☐ ☐ ☐ ☐ ☐					☐

3. **What is your motivation for taking part in the CCNURCA project (several motivations are possible)?**
.....

Figure 1. Questionnaire on CCNURCA - display

The staff of the WB partners involved in the training have active roles in teaching in nursing education and are closely involved in the modification of the existing curriculum. There was presence of hierarchical officers to ensure and support dissemination of the experience gained at department and faculty level upon their return. The evaluation of a curriculum and the schedule of a study program of nursing were running in the theoretical level. The activity to support the education of teachers themselves, so-called program TOT (Training of Trainers), where the participating specialists from the ranks of teachers were giving trainings in new techniques within the theoretical and practical training to each other, was deemed inspirational [4].

Questionnaires (Figure 1) evaluated mittings and workshops they were implemented in partner countries and focused on:

- progress of project in general,
- program Training of Trainers,
- relevance of the project contents for your own work,
- organization the overall project management,
- feedback in general and recommendations.

Demonstrations, discussions and mutual exchange of knowledge were highly appreciated by all participating partners.

Trainings and training sessions focused on the content of the practical training in nursing among the partners of the EU and WB were held, likewise, the very management of capabilities and skills within the practical training, its organization and the possibilities of e-learning in the education of students. It was necessary to monitor the feedback of a practical training and training evaluation in the clinical environment. The evaluation of a curriculum and the schedule of a study program of nursing were running in the theoretical level. The activity to support the education of teachers themselves, so-called program TOT (training of trainers), where the participating specialists from the ranks of teachers were giving trainings in new techniques within the theoretical and practical training to each other, was deemed inspirational [4].

During consortium, theoretical methodology of teaching in nursing, the use of traditional and innovative methods, such as: lecture, group instruction strategies: snowball, learning based on problems,

role playing methods, simulations, etc., were presented. The evolution of evaluating the capabilities and skills of students in the clinical environment was presented from the historical perspective (a detailed description of the schedule for the study program of nursing) [11].

The comparison of individual study programs in terms of allocated hours, the ratio of theoretical and practical training, qualifications of mentors of the practical training, a description of ECTS credits, defining competencies and learning outcomes, and others, were required. The action plan shall be designed to be able to implement new teaching methods and evaluation procedures in the study program [15].

In the future we will prepare bilateral agreements regarding the placement of students and teachers and participation in joint international projects.

DISCUSSION

The evolution of evaluating the capabilities and skills of students in the clinical environment was presented from the historical perspective (a detailed description of the schedule for the study program of nursing) [11].

Representatives from WB countries formed working groups with the project co-workers from European countries, where each group worked on the creation of the matrix of students´ competences and skills, time allocation for the course, creation of adequate workload for a student and analysis of study program schedule. The comparison of individual study programs in terms of allocated hours, the ratio of theoretical and practical training, qualifications of mentors of the practical training a description of ECTS credits, defining competencies and learning outcomes and others, were required. Studied curriculum proposals, information sheets and study plans were discussed with experts from European countries and then modified according to the recommendations [12].

The meetings of representatives of the countries involved in the project supported the presentation of alternative teaching methods with regard to the learning process. At the same time, thought maps were presented that promote critical thinking, the ability to see problems and improve the patient's

capacity for creativity among students. Simulation methods have been presented in order to innovate technical skills [13].

Presented suggestions within the pilot program, such as learning objectives, learning outcomes, theoretical and practical competences, teaching methods, the methodology of evaluation, and ECTS credits (program guide, curriculum handouts), were implemented in the new curriculum and were offered in the study programs of nursing and midwifery in the countries of the Western Balkan.

CCNURCA project leaders recommended to implement a curriculum reform in the education of the health care as a national priority for the three partner countries - Montenegro, Bosnia and Herzegovina and Albania, whereas the main objective of the project is to reform the curriculum in nursing, which is also in line with the Bologna Declaration [14]. The validation of the curriculum as a pilot project and the translation of materials into English and German were carried out. A pilot project aimed at testing new curriculum was planned for the academic year 2015-2016.

The new program in nursing was verified in this way and monitored the suitability of students, self-evaluation and teacher satisfaction. All stakeholders - teachers, coordinators, representatives of ministries worked closely together to implement of the project. In the last phase of the project, the partial results of a questionnaire survey focused on the innovation of the teaching itself were evaluated. The action plan is designed for pedagogical practice to be able to implement new study methods and assessment procedures in the study program [15].

The implementation of learning outcomes at the level of study courses is clearly linked to their definition within the content of information sheets of the particular courses in the study programs. The full content of learning outcomes in the curriculum is primarily based on revised Bloom's taxonomy [16].

The education of nurses in Slovakia shall be compatible with European criteria, the curriculum shall be oriented to the whole personality of the patient, not just the process of a disease treatment. Basic principles of nursing training in European countries are based on the principles of the European Federation of Associations of Nursing (EFAN), International Council of Nursing (ICN) and the Wor-

ld Health Organization (WHO) (Regulation (EC) No. 1638/2006, Regulation (EC) No. 1905 / 2006) [17,18,19,20].

In the future, the intention of the current cooperation between the countries within the consortium is to prepare bilateral agreements regarding the placement of students and teachers and participation in joint international projects.

CONCLUSIONS

The project TEMPUS IV − CCNURCA promotes institutional cooperation and focuses on the reform and modernization of higher education systems in the partner countries. It contributes to an area of cooperation in the field of higher education involving the European Union and partner countries in the surrounding area.

Project is implemented in close coordination with the program Erasmus Mundus which provides scholarships to third country students allowing them to participate in top level master courses and doctorate programs inside the European Union. With regards to the Western Balkans, project TEMPUS contributes to preparing the candidate countries and potential candidates for a participation in the integrated Lifelong Learning Program.

As project TEMPUS IV is designed to support the modernization of higher education systems in the partner countries, its themes are structured around the main policy areas governing the current trends of higher education worldwide. The themes for cooperation are structured in the following three building blocks:

1. Curricular Reform - modernization of curricula in academic disciplines identified as priorities by the partner countries, using the European Credit Transfer System , the three cycle system and the recognition of degrees.

2. Governance Reform - university management and services for students, introduction of quality assurance, institutional and financial autonomy and accountability, equal and transparent access to higher education, development of international relations.

Higher education and society include: training of non-university teachers; development of partnerships with enterprises; knowledge triangle: education-research-innovation; training courses for public services (ministries, regional/local authorities); development of lifelong learning in society at large and qualifications frameworks [8].

Dissemination of the project tasks results and publication of created and modified teaching materials is scheduled in the specified time period. Establishment of a network among the participating countries of the European Union and WB assumes the planning of modifications in legislative standards [10]. The results and ongoing information are exchanged by the participating countries on various meetings and consortia, which are simultaneously a prerequisite to stimulating proposals and planned changes. The domain of education shall be the evidence-based practice, taking into account the specification of each individual and creating professional nursing standards in nursing.

Results of the project consortia CCNURCA represent innovative changes for the countries of the Western Balkan. Educational institutions, health care institutions and government organizations shall unite their efforts for the sake of reforming the curriculum. European partner countries represent a supervisor role and support participating countries in the innovation of study programs.

CONFLICT OF INTEREST

Neither author has any financial or personal relationship with people or organizations that could inappropriately influence their work.

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