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Škole narodnog zdravlja
"Andrija Štampar"



CARNet

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E-ZDRAVLJE I E-EDUKACIJA

KONFERENCIJA POVODOM 75. OBLJETNICE ŠKOLE NARODNOG ZDRAVLJA
"ANDRIJA ŠTAMPAR" MEDICINSKOG FAKULTETA SVEUČILIŠTA U ZAGREBU

Škola narodnog zdravlja "Andrija Štampar" Medicinskog fakulteta Sveučilišta u Zagrebu, Hrvatska akademska i istraživačka mreža CARNet i Hrvatsko društvo za medicinsku informatiku (HDMI) organiziraju 25. rujna 2002., povodom 75. obljetnice Škole narodnog zdravlja "Andrija Štampar" konferenciju *E-zdravlje i E-edukacija*. Konferencija se održava kao posebna priredba u okviru ovogodišnje *CARNet Users Conference CUC 2002*.

Konferencijom *E-zdravlje i E-edukacija* želi se obilježiti i 10. obljetnica veze s Internetom u Hrvatskoj u području medicine i zdravstva. Prvi su počeci bili vezani uz Školu koja je i inače bila središtem informatizacije u znanstvenom području medicine još od osnivanja Sveučilišnog računskog centra (SRCE) početkom sedamdesetih godina XX. stoljeća*.

Podsjetimo u kraćim crtama na ono "predinternetsko" doba. Na Školi je 1973. otvorena terminalna stanica koja je osiguravala korištenje računala SRCA za sve studente i nastavnike Medicinskog fakulteta, kao i istraživače i ostale korisnike u području medicine i zdravstva. Započelo je doba razvoja medicinske informatike u Hrvatskoj, a od samih početaka mislilo se na komuniciranje kao temeljnu pretpostavku za zadovoljavanje informacijskih potreba u medicinskom radu i u edukaciji. Krajem osamdesetih godina terminalna je stanica otvorena i na središnjoj lokaciji Medicinskog fakulteta u Zagrebu na Šalati, čime je prošireno korištenje računalnih kapaciteta SRCA na tamošnje zavode i klinike, te Središnju medicinsku knjižnicu i Tajništvo fakulteta. U ono doba vrlo suvremeni veliki računski centar SRCE bio je značajan impuls razvoju informatike u hrvatskoj akademskoj sredini, jer je putem terminalne mreže povezo sva sveučilišna središta u Hrvatskoj (Osijek, Rijeka, Split, Zagreb), pa je na taj način Medicinski fakultet sa svojom znanstveno-nastavnom bazom u Školi omogućio generacijama studenata medicine i mladih liječnika praktični rad na elektroničkim računalima, u ono doba dostupnim samo profesionalnim informatičarima u računskim centrima koji su se tek počeli otvarati u gospodarstvu i pojedinim ustanovama gradskih i vladinih uprava.

Osnatak CARNeta 1992. dao je novi zamah u razvoju medicinske informatike i primjene informacijskih i komunikacijskih tehnologija u medicini i zdravstvu. Otvorio se računalni "prozor u svijet" i postalo je moguće komunicirati s ljudima i bazama podataka vezanim na računalne mreže bilo gdje na svijetu. CARNetove radne stanice na medicinskim znanstvenim ustanovama imale su važnu ulogu u korištenju Interneta za medicinski znanstveni i stručni rad, te za medicinsku edukaciju, jer je to u ono doba bio jedini način pristupa Internetu. Kasnijom pojavom komercijalnih ponuđača Interneta u Hrvatskoj omogućeno je i drugim zdravstvenim ustanovama izvan sustava znanosti, pa i privatnim osobama, priključivanje na Internet.

Interes za Internet u medicini i zdravstvu tradicionalno je jak zbog velike potrebe za komuniciranjem informacija, kako znanstvenih, tako i onih stvorenih u dnevnom

* Richter B. Kratka povijest razvitka telemedicine u Hrvatskoj. U: Telemedicina u Hrvatskoj - Dostignuća i daljnji razvitak. Zagreb: Akademija medicinskih znanosti Hrvatske; 2001, str. 31-41.

zdravstvenom radu. Internet sudjeluje i u razvoju telemedicine, jedne od značajki razvoja medicinske znanosti na prijelazu tisućljeća. Od prvih u nas objavljenih aktivnosti vezanih uz Internet neka bude spomenuto da je 1995. na Školi narodnog zdravlja "Andrija Štampar", a pod pokroviteljstvom časopisa *International Journal of Health Care Quality Assurance*, održana prva virtualna konferencija na Internetu pod naslovom "Kvaliteta zdravstvene zaštite". Iste je godine Sveučilišna klinika za dijabetes i bolesti metabolizma "Vuk Vrhovac" u Zagrebu započela s radom na jednogodišnjem pilot projektu CARNeta "Obrazovni multimedijски prikaz šećerne bolesti". Slijedio je niz drugih projekata s medicinskim sadržajima raznih zdravstvenih ustanova. U našim medicinskim časopisima počinje se pisati o Internetu. Za veliko zanimanje ali i očekivanja koja su vladala u ono vrijeme u medicinskim krugovima karakteristične su zaključne misli u jednom od radova** objavljenih tih dana: "Vrlo skoro Internet će za korisnika biti transparentno računalo, tj. korisnik će imati osjećaj da radi s jednim izuzetno moćnim računalom. To virtualno računalo sadržavati će sve umrežene procesore i baze podataka Interneta. Do toga nas dijeli samo povećanje propusnosti mreže i razvoj protokola koji će omogućiti komunikaciju između različitih procesora i operacijskih sustava." Tehnološki je razvoj uskoro pokazao ispravnost tih predviđanja. Danas svatko može lako koristiti Internet i putem njegova *web*-a komunicirati po cijelom globusu našeg planeta.

Internet je postao važan i za HDMI koje djeluje od 1989. Ne samo da je omogućeno otvaranje *web*-stranice HDMI, već su u suradnji s CARNetom simpoziji medicinske informatike uključili i videokonferencije. Već je 1997. u okviru 3. simpozija HDMI u Splitu održana videokonferencija na relaciji Split-Zagreb, a 4. simpozij donio je i potpunu novost za znanstvene skupove u Hrvatskoj, jer je cijeli simpozij održan kao telekonferencija u četiri naša sveučilišna središta - Osijeku, Rijeci, Splitu i Zagrebu.

Na konferenciji *E-zdravlje i E-edukacija* sudjeluje niz stručnjaka iz raznih medicinskih ustanova u Hrvatskoj, a po jedno izlaganje dolazi nam iz BiH i Slovenije. Oni će prikazati svoja istraživanja, iskustva i razmišljanja u okviru sljedećih tema:

1. Informacijska i komunikacijska tehnologija u svakodnevnoj komunikaciji između davatelja i korisnika zdravstvenih usluga te između studenata i nastavnika;
2. Informacijska i komunikacijska tehnologija u edukaciji studenata medicine i u kontinuiranoj edukaciji za liječnike;
3. Informacijska i komunikacijska tehnologija u sustavu zdravstva.

Konferencija je pobudila zanimanje među zdravstvenim stručnjacima u nas, što je vidljivo iz 20 prijavljenih izlaganja. U njima se ogleda dosta toga što se dogodilo u području medicine i zdravstva u prvom desetljeću veze s Internetom u Hrvatskoj, a posebno u posljednjim godinama tog razdoblja. Izlaganja se mogu ravnomjerno rasporediti u sve tri teme, premda neka od njih nije moguće oštro pridružiti samo jednoj od tema. Naslovi pokazuju prilično širok odabir problema, a u sažecima se već može vidjeti da su u proteklih deset godina u Hrvatskoj u mnogim našim medicinskim ustanovama stečena mnoga vrijedna iskustva u radu s Internetom kao i da su razvijeni zanimljivi projekti. Zbog toga se može očekivati da će konferencija biti uspješna, te da će izlaganja i rasprave stimulirati daljnju primjenu Interneta u području medicine i zdravstva u Hrvatskoj u novom desetljeću.

Gjuro Deželić

** Sapunar D. Cambj-Sapunar L. Internet u medicini. Liječn. Vjesn. 1996; 118: 165-171.

FROM TELEPROCESSING TO INTERNET – MEDICAL INFORMATICS IN SUPPORTING THE DEVELOPMENT OF CROATIAN MEDICINE AND HEALTH CARE

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As everyday medical work is characterized by intensive data handling and processing, medical informatics is to a great part devoted to developing efficient methods for such purposes. In the early seventies of the last century computer technology started to support teleprocessing, allowing early introduction of networking, being very important for health care activities. In these days work on health information systems projecting and development in Croatia included also introduction of computer-based communication. First experience in teleprocessing could be collected in medical research and education after the opening of the University Computing Centre in Zagreb in 1972. Further development included introduction of computerized medical equipment for diagnostic and therapeutic purposes, as well as mini- and microcomputers linked to mainframes, supporting communication in health care. Wide use of personal computers and the development of Internet, especially intensive in the nineties, proved to be an important step in the development of Croatian medicine and health care on the turn to the 21st Century. Further prospects of this development in Croatia are discussed.

IT OF THE PRIMARY HEALTH CARE (PHC)

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Ministry of Health of the Republic of Croatia approached the Project of the internetisation of health care system with aim to strengthen collaboration between health care institutions, expert groups and individuals, which care for the health of people. As a vital part of this project, we are currently in the process of tender for IT system for PHC (general practice, pediatrics and gynecology). Besides rationalization of drug use, savings with decreased use of specialized and consular services and hospitalization, important reasons for implementation of this project are better cooperation, task division, multiplication of the results, improvement of the quality of data (standardization), assurance of information – based decision making, etc. PHC teams are spending too much time on administration of the data, which are non-standardized and hard for processing. Although, huge amount of data is collected just a few indicators and important information could be acquired. Health authorities are supposed to decide upon evidence and information but most of their time they spend working with raw data, and after all decide upon data. IT in PHC should enable different approach; PHC teams should be relieved from boring collecting of data while authorities should be enabled to work with information instead of data. IT tender consists of three parts; hardware (5000 personal computers enabled for work with internet), operative system with basic software (editor, etc.) and PHC software for PHC teams. At the national level (National Public Health Informatics System) software platform for collecting, analyzing and distributing of data will be built. Data collecting will be based on ICPC-2 standard. This data standard assure utilization of medical records and quality assessment. System allows bi-directional data exchange between central database and sources on various levels, from basic PHC teams to local authorities. Control of data collecting, comparison with national's average and prompt distribution on Internet will be enabled. Investment in IT is strategic and without alternative, and cost/benefit analysis shows in two years IT in Primary health care system will be worth for. Using new technologies and according to priorities Project is defined (with measurable objectives) in phases. Detailed planning and using of approved methods assures that IT in PHC is good investment.

Key words: Internetisation, Primary Health Care, ICPC-2

PODPORA ELEKTRONSKEGA NAROČANJA, SPREMLJANJA PREISKAV IN POŠILJANJA IZVIDOV MIKROBIOLOŠKEGA LABORATORIJA

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MBX je spletna aplikacija, do katere lahko uporabniki dostopajo prek spletnega portala [InfoMed21](http://www.infomed21.com/) <<http://www.infomed21.com/>>. Namenjena je vsem naročnikom preiskav Mikrobioloških laboratorijev, torej bolnišnicam, zdravstvenim domovom in zasebnim zdravnikom. Naročnikom omogoča neposredno pošiljanje spremnih listov v informacijske sisteme mikrobioloških laboratorijev ter sprejemanje in spremljanje naročil in izvidov kar preko spleta. Uporabnikom je poleg pregleda seznama spremnih listov/izvidov in naročil po raznih kriterijih (datum, status itd.) ter vpogleda v vsebino in možnosti izpisa med drugim na voljo tudi označevanje izvidov (prebran/neprebran) ter prilagajanje kolon in urejenosti na seznamih naročil in izvidov (nastavljanje različnih filtrov). Med glavnimi prednostmi spletne aplikacije **MBX** v primerjavi s klasičnim naročanjem preiskav ter spremljanjem izvidov so predvsem dostop do izvidov mikrobiološkega laboratorija takoj, ko jih v laboratoriju vnesejo in avtorizirajo (ni več čakanja na poštarja ali telefoniranja), enostavno iskanje izgubljenih izvidov ter možnost dostopa do spletnega portala InfoMed21 s kateregakoli računalnika, priključenega na internet (po predhodni namestitvi digitalnega potrdila, seveda). V sistem sta zaenkrat vključena Mikrobiološka laboratorija ZZV Kranj in ZZV Celje.

Celoten sistem je porazdeljen na več lokacij:

- Centralni strežnik MBX aplikacije, ki se nahaja v Infonetu v Kranju.
- Podatkovni MBL (Mikrobiološki IS) strežniki in komunikacijski moduli v Celju in Kranju (ZZV Celje in ZZV Kranj).

Metodologija in orodja:

- Objektni proces razvoja, UML
- Rational Rose
- PowerDesigner za načrt podatkovne baze.

Tehnologija

Strežnik

- Internet Information Server 5.0, kot spletni strežnik, ki streže podatke končnim uporabnikom, hkrati pa preko njega oddaljene lokacije komunicirajo s centralnim podatkovnim skladiščem.
- Cold Fusion Server 4.5, kot aplikacijski strežnik, ki dinamično izvaja in streže spletne strani ter osrednjo aplikacijo, ter hkrati omogoča dostop do podatkovnega skladišča.

- Microsoft SQL Server 2000, kot podatkovni strežnik, ki predstavlja centralno podatkovno skladišče vseh podatkov, ter hkrati tudi centralno skladišče za avtentifikacijo uporabnikov.
- Microsoft Windows 2000 Certificate Services, ki nam služi za izdajanje certifikatov uporabnikom, preko katerih uporabnike enolično identificiramo.
- Microsoft Windows 2000 PPTP Server, ki nam služi za vzpostavljanje varnih, 128-bitno kriptiranih, podatkovnih kanalov med osrednjo lokacijo ter oddaljenimi lokacijami, kar zagotovi, da podatki, ki se prenašajo preko Interneta kot javnega medija, ne morejo biti kompromitirani, ter imajo dostop do njih le pooblašeni uporabniki.

Oddaljene lokacije - laboratoriji

- Delphi 6.0: Poslovni objekti, ki komunicirajo z MBL sistemom in se nahajajo na oddaljenih lokacijah so narejeni v Delphiju.
- Delphi 6.0: Modul za komunikacijo s centralnim strežnikom.

IMPLEMENTATION OF OPENSOURCE SOFTWARE IN GENERAL COUNTY HOSPITAL POZEGA

Nikola Gotovac, MD

At the beginning of the year 2002, our hospital purchased some 20 new PC's for administrative purposes. In the process, the question of office package for those computers was solved by acquiring an OpenSource solution. Although the process of testing and evaluating StarOffice, and OpenOffice took considerably longer time than six months, we have evaluated StarOffice versions from 5.2 to 6.0, and similar versions of OpenOffice. The choice of OpenOffice turned out to be a good one.

This was not the first time that our hospital uses OpenSource and In-House developed applications, and we have some interesting observations concerning people that are involved in choosing and using the software. It is our intention to share our experiences, both good and bad concerning this particular case, as well as some other "open" solutions that have emerged in our hospital in recent years.

HEALTHCARE INFORMATION SYSTEM IN THE INSTITUTE FOR CARDIOVASCULAR PREVENTION AND REHABILITATION

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In this paper we wished to present the medical portion of the information system in the Institute for cardiovascular prevention and rehabilitation in Zagreb. It consists of the medical software in the Out-patient Department, Out-patient Rehabilitation Department and Epidemiology Department. The work processes are organised differently in each of these respective departments as is the medical software. The communication among these departments is achieved by local network and software which enables communication where this is necessary. There are shared databases used by different departments. The input of data is carried out on the spot where the examination is performed in order to save time. Further, the availability of data is strictly determined. Data are secure from any changes. Cardiologists have access to the results of examinations only for their patients and can only view, but not change, the results of examinations of other cardiologist's patients. The cardiologist can include summarised results of examinations in his medical report or discharge summary. There is the possibility to connect data registered earlier about a patient with new data. There is an automatic storage of data in the archive. The last phase of the medical software includes different analytical reports based on the stored data.

Key words: healthcare information system

ONLINE BIBLIOGRAPHY OF PSYCHIATRIC HOSPITAL VRAPČE

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Psychiatric Hospital Vrapče has a 120-year history, through which time a large number of published scientific and professional papers, as well as doctoral theses, were written. All this material was being collected and organized more than once, each time in a different way with its limitations in searching information. The last printed issue of bibliography was prepared from the very beginning in such a way that it could be presented online (www.bolnica-vrapce.hr). The advantages of such digitally published Bibliography are the opportunity of getting the information regardless of space and time, possibility of searching the key words, searching the first author or authors, sort of article, year of publication, place of publication, title of the work, and the employees and associates of the Hospital. The Online Bibliography of Psychiatric Hospital Vrapče contains information on 1400 references, the list of 450 authors, the list of employees and associates of the Hospital, 750 key words from medicine, especially psychiatry and neurology. Permanent extension and completion of the data base for Bibliography enables following up scientific production and its chronology of both the institution and the individuals. Modern medicine, the activity of which is based on facts, certainly needs quick and accurate publishing and following of the results of scientific researches and professional progress. Such digital way of organization and publishing the information about scientific activities will definitely contribute to improvement of the profession, and, consequently, health status of the patients.

SECURITY AND LOCALIZATION: WHAT IS, WHAT CAN AND WHAT MUST BE OBVIOUSLY DONE IN SOFTWARE IMPLEMENTATION AT LOCAL COMMUNITY; EXAMPLES FOR CROATIAN COMMUNITY

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Everyone who needs relevant response must invest in security and so call reliability for public content at local level; see:

<http://www.kbsm.hr/PredstavljanjeZnanja/03SazeciPredstavljanjeZnanja.htm#Bengez,Zagreb>, 2002. But, everyone who need at local usage higher-level discourse features, better focusing of information and optimal response (education, public health prevention, many aspect of creation, games and kids interfaces, search engines) today try to use or need to use localization in software user interface. Few years before authors gives on many places ignorant answers about localization needs. Times are changing and localization possibilities for relative small communities are more or less waiting in software products as option for implementing in user interfaces. Although open source Mozilla web browser and their localization project with concept of reusable widget - based on W3C markup languages standard; gave the mostimpressive adaptive interface and may be one day recognized as the most bugles application programmers way, there are also other possibilities for localization. We point at

http://www.carnet.hr/cuc/cuc2000/radovi/prezentacije/D/D3/index_f.html, Zagreb 2001 about possibilities of speech generation technologies on Croatian (based on work of Belgian Faculty Polytechnique de Mons, Festival speech synthesis system and Zagreb Phonetic school), operation system arecoming with graphical user interfaces level on Croatian: some Linux, and Windows XP GUI's, text processing interfaces - MS Office, Kword, Croatian MSWord /6/7/97/2000/XP spelling checker; see <http://www.filos.com/index.htm>, local and some global oriented web-serviceinterfaces - http://www.google.com/language_tools?hl=hr. Croatian options in Web mail SquirrelMail well implemented at University hospital "Sestre milosrdnice" Zagreb (<http://www.kbsm.hr>), etc.

However, in many cases more positive view and organization are needed for implementing more security and better localization for local and global goods, which cannot be done only at global level.

MEDICAL INFORMATICS COURSE AT THE CROATIAN MEDICAL SCHOOLS

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Rijeka, Zagreb, Split and Osijek University Medical Schools

Medical Informatics is an obligatory course in the medical curriculum for undergraduate students at all four Croatian university medical schools (Osijek, Rijeka, Split, and Zagreb), but organization of the course is not the same. In Zagreb, where teaching of medical and health informatics originates from the early 1970 with “Usage of Computers in Health Care”, organized by Prof. Gjuro Deželić from Andrija Štampar School of Public Health, students have 15 hours of lectures, seminars and practicals during the third study year. Osijek has exactly the same organization. In Rijeka, students have 30 hours of seminars and practicals, starting from 1977 with “Informatics”, and students in Split have 40 hours mostly of practicals. Although consisting of different number of teaching hours, the course in Medical Informatics is basically the same in all universities, teaching students from basic skills of using computers to understanding complex problems in highly sophisticated areas as decision making theory, modeling and simulations, or information and communication systems. IMIA, International Medical Informatics Association, has recently published a paper proposing general rules on knowledge and skills education in medical informatics for different health professionals. The paper has been translated into Croatian and published in 2001 as a special edition of the CSMI Bulletin and on the web site of the CSMI. Our intention is to make that proposal a reality in Croatia, i.e. to teach our medical students the same they learn in other countries. The next step towards that idea is our recent decision to write the first Croatian handbook of Medical Informatics, with authors from all four universities.

INTERNET COMMUNICATION - ONE OF THE THEMATIC ENTITIES OF THE SUBJECT «INFORMATICS» AT THE SCHOOL OF HEALTH STUDIES IN ZAGREB

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As the informatic technology has been progressing at the rapid pace it is necessary for the health professionals to get to know well the (medical) informatics in order to improve their practice. It is of special importance that beside the elementary informatic «literacy» they could also use internet communication.

In the medical practice internet could be used:

- in everyday practical medical work
- for personal use: for additional education and information, to search for literature, etc.

This need for the internet use in the work of health professionals has been also recognized at the School of Health Studies in Zagreb. So the subject «Informatics» has been included in the first semester curriculum of all studies which are taken by the students during three years (six semesters) such as:

1. nurses
2. medical – laboratory diagnostics
3. medical radiology
4. physiotherapy
5. sanitary health
6. work therapy

The subject «Informatics» includes 10 hours of lecture and 20 hours of practical work. It encompasses three main thematic entities:

- basics (personal computer, Windows operating system, word-processing, spreadsheets)
- internet communication and information sources (electronic mail, World Wide Web – searching for information with search engines)
- basic knowledge of medical informatics (electronic patient records, databases, telemedicine ...)

The practical work is carried out in the computer room with 12 linked PC-s where every two students can use one computer. The same facility could be used by students for their personal use in Internet communication and information sources.

The students, after getting acquainted with the internet technology already during their first year of studying, can apply this knowledge during their further studies in various fields. So after graduating, they become modern, well informed young professionals.

DISTANCE LEARNING IN THE MEDICAL EDUCATION IN B&H

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Distance learning or learning from the distance represents the educative technique which occupies all more significant places in the actual medical education of the healthcare workers at the international plan, specially in the domains of the postgraduate and continuous medical education. It represents the educative technique of the significant effectiveness, which has to have at the disposal both the adequate technological infrastructure as well as the previous education of the lecturer and user, adapted the teaching plans and the evaluation mechanisms of knowledge. By use of the rich choice of technological models, in relation to the traditional method of learning, enables the simultaneous education to the great number of students of the various profiles, the approach to all the relevant forms of data basis as well as the mechanisms of the evaluation by the eminent institutions and the lectures.

In the field of the telematics at the Medical faculty of Sarajevo the up-to now activities have been led down at the theorization in this domain and the approximation of the this material to the students through the presentation of the ready made segments of the research. Also, in the past calendar year the students have in the frame of the practical institution from the medical informatics three days were included into the health – forum organized through the Internet, and in which participated three hundred world researchers from the whole world. Also was presented and published several expert articles, and to the telematics application and the telemedicine in the war conditions at the field of the former Yugoslavia, and not at the basis of the experiences and the reports of the sanitary equip of SFOR and the field of former Yugoslavia.

Recently at the Chair for the medical informatics began the realization of the Project "The possibilities of the introduction of learning at distance into the medical curriculum" of the allowed by the Ministry of the education of FB&H and which in the next two school years should include several groups of the activities directed with the aim of the application of the corresponding methods and methodologies in the field of learning at distance, how are experience – standardized in the developed countries of the world. The educative part of this project would lead in the frame of the subject "Medical informatics" at the medical faculties in B&H (in the course of the performances of the pilot, that is the feasibility of the study and the project task), and after that would, after the collected corresponding computer equipment necessary for the realization of this project at the necessary for the realization of this project at the mentioned faculties and prepared the adequate applicative software. In the project are included the referent experts from the University of Sarajevo, Zagreb and of Ljubljana, which would perform the estimation of the performing project and would determine the standards for their application.

Key words: distance learning, education.

WEB SITE OF THE SCIENTIFIC POSTGRADUATE STUDY "MEDICAL SCIENCES"

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Web site of the scientific postgraduate study Medical sciences was launched in the academic year 1998/99 along with the second generation of students at URL <http://bio.mef.hr> (bio.mef.hr) and since that time it does not change neither its appearance nor content. It includes the following components: informations about the study, list of all subjects including their contents, list of subjects coordinators and teachers together with their CVs, propositions and other study documents, informations regarding time schedules of lectures, enrolment and announcements for interesting events and lectures. It was aimed that each subject should be accompanied with links to teaching materials available on-line, those written for that subject as well as those otherwise available and pointed out from teachers as appropriate for that subject, but only a few teaching materials were included. The results of the questionnaires aimed to investigate the students meaning about the quality of teaching of each subject are also published at the web. The list of students accompanied with the important data about students, their work places and their personal photos are completed only for a single generation. The pages are updated regularly, especially announcements, and during two academic years (1999/00 and 2000/01) the web discussion list was activate and used by students for questions, and by teachers for informations and announcements. In the absence of the list, all the informations the teacher needs to convey to the students are transferred by the editor and web-master. Among the informations the changes in time schedule for lectures are most common. Today the main part of the communication with students are going through the web site although at the beginning of the academic year the letter with time schedule is sent to them. Atarting from this year we introduce a survey which included questions about general Internet use, the frequency of visits to the studys pages as well as the question what the students would add to the pages. The survey's results are: almost all students use the Internet from their home, only half of them have the access to the Internet from their work-places, and all of them are visiting the web site bio.mef.hr with a weekly or a several times per month, alhtouh only half of them assume that way of communication better than the conventional one. The majority of them is satisfied with the content and updating of web site bio.mef.hr, and they think that this web site includes all the important and updated informations. When they were asked what would be necessary to add to the web site, the majhority answered that teaching materials should be added. The majority would aslo include the web discussion list, one that existed once (today we will call it Forum). The content of the web site and its way of operation will be described and presented much more detailed as well as the results of survey among students and interviews among teachers.

BUILDING A WEB-BASED EDUCATION SYSTEM

(<http://web.mef.hr/>)

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This presentation will assist educators as they face the challenge of integrating information technology tools into teaching and into managing of Web sites of educational organizations. While many World Wide Web pages concerning distance education and learning already exist, this paper on distance education focuses on the technologies used to make distance education possible. There is a symbiotic relationship between the development of technology to provide the possibility of distance education and the rising interest in its use. The growth of access to computers and the world's largest computer network, the Internet, has created more learning possibilities for distance education. More and more institutions offer courses and complete undergraduate and graduate programs which solely rely on computer-based resources.

Many faculty members may find the thought of adapting their courses for an online learning environment intimidating at first. After all, we have become content experts in our chosen fields of study, not technology wizards. Many software developers and commercial companies are creating very sophisticated interactive applications and tools for online course delivery. Variation between different kinds of software may be significant, making the selection of appropriate software important and very difficult. Instructional tools that are too complex to learn or too time consuming are less attractive for instructors than those that are more intuitive and easy to use.

I will present my project of building Web.mef site (<http://web.mef.hr/>). This is an experimental collaborative and informational system for students and teachers of Medical Faculty of Zagreb. OpenSource technologies (Linux, PHP, Apache, Perl, C, Java, J2EE, MySQL, PostgreSQL, Ant, Smarty) are used for all system development. The biggest advantage of such software is that you have a copy of the source code and a license that allows you to modify it! For now I chose and adapted few OpenSource/Higher Education programs for our course delivery and few web content management system. All of them are free system of database-driven class websites that can be administered by instructors using a standard web browser. Programs let instructors easily create and control a class website without learning HTML, FTP or getting a UNIX account. We have content management systems, forums, chats, news, announcements, student administrations, tracking students, exams, etc.

Looking beyond traditional content objectives, problem-based learning and information technology together provide exciting new contexts for achieving active learning. Integrating technology and problem-based learning is a winning strategy and is well worth the investment of faculty time and energy to benefit student learning in our classrooms and courses. The biggest problem and challenge facing most Web learning sites, and of course our Web.mef site, is simply getting people to use them and to visit them regular. The World Wide Web is ready for serious distance education delivery, but it's not technology, it's what we do with it!?

TEACHING & LEARNING ACID-BASE PHYSIOLOGY WITH WEB-BASED TECHNOLOGY

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The traditional way of education often uses a "surface" approach to learning, resulting with students' superficial understanding of the subject and the memorization of definitions and examples to pass the exam. Problem-based learning courses offer an alternative mode of teaching that emphasizes development of a different range of skills such as analytical and critical thinking, research skills, communication skills, and the ability to work productively in a team. Traditionally, problem-based learning participants have been required to be in the same place at the same time, but now the Internet enables interpersonal interaction that is independent of time and place.

Web-based course management tools provide simple, yet elegant vehicles to create course infrastructures to promote knowledge transfer to "deep" approaches to learning within which students can solve problems, investigate issues, conduct Internet research and interact by using electronic chats, whiteboards or/and other types of enhanced communication applets.

Acid-base homeostasis is one of the most difficult parts of physiology for medical students to master. Students realize that understanding a blood gas analysis is not simply dependent on quantitative relations between acids and bases, but is strongly influenced by respiratory control of gas exchange, kidney control of hydrogen ion excretion, dynamics of electrolyte and water movement and blood composition. Second year medical students learning acid-base physiology for the first time are often unprepared in many of these topics. Our major goal is to assist students in developing a(n) good approach to acid-base problems.

The presentation describes the experience we made by 1) creating an online course for teaching and learning acid-base homeostasis using *WebCT* as a web-based learning course creation tool, and 2) using the online interactive module in teaching acid-base balance. This first web-based elective course in the curriculum of our Medical School was attended by 13 second-year medical students. The authors also report on students' reactions to this new web-based method of learning acid-base homeostasis.

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ELECTRONIC HEALTH CENTER (EHC): INTEGRATED WEB SERVICE FOR CONTINUOUS MEDICAL EDUCATION, INFORMATION AND COMMUNICATION FOR GENERAL PRACTITIONERS IN CROATIA

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Zdravko Ebling, Josipa Kern, Luka Kovačić

The Electronic Health Center (eHC) is aimed as an Internet service for continuing medical education of general practitioners (GPs) at the national level. It integrates education, access to relevant and trusted information sources and group communication in order to meet the needs of both daily work and continuing education at home. The project goal is to establish information infrastructure which will enable and support the individual activities of GPs and their collaborators on continuing education and communication, focusing on problems of daily practice. In the future it is planned to integrate eHC into the existing accreditation system. The very first version of eHC was launched in the fall of 2000 and hosted at the Andrija Stampar School of Public Health server, URL: <http://www.snz.hr/edz>. The project was accepted and supported by one-year grant from the Ministry of Science and Technology of the Republic of Croatia within the framework of IT Implementation in October 2001. In order to fulfill eHC objectives the content has been structured in several modules: Teaching room, Links, Address book, Forum, Counseling for patients, Calendar of events, and Contacts. Gradually, new components would be added depending on interest like teleconferences, streamed video, chat, etc. Registration procedure for module Forum would be necessary and its implementation is now under way. It is necessary to ensure hiding of patient data from patients (although cases are presented without personal data).

CYBERMED – THE FIRST INTERACTIVE HEALTH PORTAL IN CROATIA – OUR EXPERIENCE

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Quality of healthcare depends on the clarity of communication. How can both the patient and health professionals achieve “good” communication? Internet is one of the ways to establish good communication, not only between a patient and a health professional but also among health professionals, by providing specific health information that will help patients to be more active in caring for their own health and to health professionals to develop and improve their skills.

Health portal Cybermed (www.cybermed.hr) is the first interactive health portal in Croatia with forums for patients, forum for abused and neglected children and forum for pharmacists, physicians and dentists whose scope is to improve health and healthcare. Presently, 4 projects within health portal Cybermed are available:

- Portal for patients
- Hrabri (brave) – Forum for abused and neglected children
- Portal for pharmacists, physicians and dentists
- Forum for pharmacists, physicians and dentists.

In the project Cybermed participate 60 prominent experts in the field of medicine, pharmacy and dental medicine. Public interest in portal Cybermed is big. The numbers speak for themselves: over the past 13 months there were more than 14.000 questions and answers.

Key words: Internet health portal – forum – health information

VIRTUAL BREAST CANCER CENTAR
[HTTP://WWW.KBSPLIT.HR/RAKDOJKE/INDEX.HTM](http://www.kbsplit.hr/RAKDOJKE/INDEX.HTM)

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The “Breast Cancer” project is being realized by the support of CARNet (Croatian Academic and Research Network). This site offers multimedia review of recent breast cancer data, not only for doctors but for patients, too. Agatha club (Agatha is a saint, martyr and the patroness of breast illness) makes this project original, i.e. unique in the world. The project is dedicated to the people who suffer from breast cancer. To become the club member you need to fill out a form that contains personal questions, as well as those about your illness. All members are anonymous and mutual communication among them is allowed. For example, database contains following member’s data: country of origin, city, age and gender, as well as TNM classification of breast cancer. That gives them a chance to communicate with each other about their problems, for example, which surgeon to choose, where and what kind of implant to get, exchange their experiences of psychological problems etc. Members have also the advantage of consulting, free of charge, known specialists (oncologists, gynecologists, surgeons and psychiatrists) about their disease. This database is beneficial for those with breast cancer and will also become the source of the information for epidemiological studies which will be published in the international scientific journals and will clarify epidemiological-etiological factors of breast cancer.

TELECONSULTATION – EXPERIENCE OF A PEDIATRICIAN

Denis Mladinić-Vulić

In the present paper the possibilities of teleconsultations are presented i.e. the consultations between doctor and doctor, but also between doctor and patient. A teleconsultation can be in real time or a delayed one.

First teleconsultation in real time I have done in 1997 when I have presented my patient with talasemia directly from my office at the American Academy of Pediatrics in San Diego, USA. Prof. Bert Lubin analysed presented case and advise about further diagnostic facilitated final diagnosis. Since then I participated many times in lectures given by experts organized by Association of Pediatricians for communication through Internet and I exchanged experience with colleagues about diagnosis and therapy of children diseases. The majority of teleconsultations in primary health care can be delayed. For such delayed consultations one can use e-mail or a forum. Very often I asked for advice by e-mail, and I have got very good ones. I would like to present the teleconsultations about vaccine, therapy of rheumatoid arthritis and bronchiolitis. I am going to present the radiograms sent together with the description of patient to the specialist rheumathologist in USA. I am also going to present a case of child with unclear diagnosis of skin disease who was referred together with her mother to the specialist in Zagreb. Was it possible to make such consultation by Internet?

During the last two years the parents of every newborn coming for the first check up to my pediatric unit receive a sheet with the address and other data about the pediatric unit but also an e-mail address which they can use to ask the advice from pediatrician free-of-charge. Only five out of 300 parents use this service regularly.

Key words: consultation, Internet

QUALITY OF PATIENT INFORMATION ON THE INTERNET: READABILITY SCORES

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Patient information posted on the Internet has become a popular mode of communication with the population at large. With more than 35% of patients searching the Internet for health and medical information worldwide, that makes the quality of patient information on the Internet a critical issue. Readability could be seen as the first prerequisite in understanding written materials. Many studies on readability have shown that patient information is frequently written at the reading level too high for the average population to understand. The aim of this study was to determine the reading level of patient information found on the Croatian Web sites and written in Croatian language. The topic of diabetes was selected as very frequent in patient education materials. Patient information on diabetes from 10 Croatian Web sites was tested for readability using the SMOG formula. The readability scores of the tested materials ranged from 11 to 15, which showed that these materials would not be understood by at least 80% of the Croatian adult population. Educational attainment data from 1991 and 2001 Censuses are compared, showing slight differences, but the results still showed that 60% of the tested materials would be understood by only 10% of the adult Croatian population.

NURSES EDUCATION MAGAZINE – ONLINE PORTAL

Aleksandar Radenović

Nursing Informatics (NI) in Croatia isn't completely deployed and recognized as discipline. Mostly is based on activities that have been conducted by individuals. Also, Nursing Informatics as a curricular isn't provided in education program of nursing schools in the country. In education program is only included education about health care system and basic computing skills. Internet, future media, gives big opportunities for education and online virtual communities.

The precursor of all Nursing Informatics activities is project “*Nursing Education Magazine – online portal*”, the first Croatian online magazine and virtual community for all nurses. Nurse Education Magazine is a nurse-oriented professional information source, and is produced by group of nursing students on High School of Health Studies. Its presence only on Internet will have the purpose to demonstrate the Nursing Informatics in action and possibilities of online learning method.

One of main goals of Nurses Education Magazine is to provide the online knowledge database for all nurses with emphasis on connect information science and nursing. Special accent is on education in nursing informatics. This database must be upgrading continually with new education materials, which will be provided by education institutions and association. Corresponding between authors of the database context is essential for providing quality through this Education Online System. Main idea was to incorporate students and educators works together in one context and publish to Internet like Library for long distance learning. This project is the precursor of *Long Distance Education Program for Nurses*, which isn't born in Croatia yet.

Keywords: Nursing Informatics, Internet, Online Portal, Nurse, Education

WEB-BASED EDUCATION IN GASTROENTEROLOGY – THE TIGEL PROJECT

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It is postulated that World Wide Web has enormous potential to improve provision of medical education. Improvement is conceived not only through rapid dissemination of newly generated knowledge, but also through innovative multimedia and interactive approach, establishing a student-centered learning environment.

Bearing that in mind, a project entitled 'Teleinterventional Gastroenterology (TIGEL)' has been designed at the Center of Interventional Gastroenterology, Zagreb University Hospital. The aim of the project, supported by the grant from the Ministry of Science and Technology of the Republic of Croatia, is to develop a web-based system of continuous medical education for specialists in gastroenterology.

Within the project, a web site has been published at the server of the Zagreb Medical School (www.mef.hr/edumed/gastro/). Main feature of the web site comprises educational materials as well as the e-mail based clinical consultation service for practicing gastroenterology specialists and family physicians in Croatia.

Experiences in the provision of such integrated educational – consultation approach to the physicians will be presented.