	University Centre for Informatization University Study-Oriented System	EUNIS 2007
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## 1. Application for the EUNIS Elite Award 2007

The consortium *University Centre for Informatization* (MUCI) which owns *University Study-Oriented System* (USOS) applies for 2007 EUNIS Elite Award for excellence in implementing information systems for higher education. By creating an effective forum for inter-university cooperation we were able to develop high quality, integrated information system for managing administration tasks at educational institutions in Poland.

## 2. Introduction

**University Study-Oriented System** (called **USOS**) is known to EUNIS community. The history of system development has been reported at EUNIS conferences, year by year, starting from the one in Porto in 2002:


- 2002: *Student Management Information System for Polish Universities*
- 2003: *Deploying University Study-Oriented System at Polish Universities*
- 2004: *New Course Registration Module for the University Study-Oriented System*
- 2004: *Student Admission System for Warsaw University*
- 2005: *Computer system support for the Bologna process at Warsaw University*
- 2006: *Central Registry for Results of Maturity Examinations for Student Admission Systems in Poland*
- 2007: *Electronic Student Identity Cards for the University of Warsaw*

USOS is a student management information system used (as for May 2007) in 24 Polish universities, technical universities, higher vocational institutions, university schools of physical education and other types of higher educational institutions. Among these schools are top public universities in Poland, like the University of Warsaw, Jagiellonian University from Kraków, Adam Mickiewicz University from Poznań, and Nicolaus Copernicus University from Toruń.

From the functional point of view USOS is probably a typical software information system supporting management of higher education at university level. What makes it **unique** is the, **unification** of services at **country level** and **integration** achieved from **effective cooperation** of universities who jointly develop and deploy the system on a **scale** hardly to be found not only in Poland, but also other European countries. It is the only system of that kind in Poland, being built **by universities for universities**, with a **business model** acceptable to even the smallest institutions.

This cooperation creates **new quality** in administration of education, since existing processes, rules and documents are discussed, changed, unified, before getting computer system support. System development is driven by user needs reported daily to system developers. Lobby of universities can influence existing law, as some examples demonstrate. Such cooperation has an impact not only on administration of education, but on education itself, mainly by supporting transparency and comparability. These aspects can be regarded as good practices to notice and disseminate.

Building and deploying university information system is a life time project, which never ends. New needs arise every day, law changes, priorities are reevaluated, development of

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information technologies creates new possibilities. The project of that kind should always be regarded as work in progress.

### 3. History of USOS and MUCI

The beginning of USOS dates back to 1999-2001, the days of the New Educational Tools Tempus JEP project, which involved 14 Polish public universities. The project objective was to design and introduce an integrated software system for academic administration, students, and faculty. In two years fully functional software was produced and deployed in some of the faculties of the participating universities. The functionality of USOS at that time was limited to course catalog, course registration, class schedules, student and teacher personal data, study programs and requirements of degree certificates, but anyway the system with central university Oracle database and remote access for all people involved in a didactic process was a great jump comparing with local desktop applications available at universities at that time (if any at all).


At the end of the Tempus project many questions had risen concerning the status and future of USOS. Fortunately Polish universities were not the first to be confronted with such questions. Having in mind an example of LADOK — the consortium of Swedish high education institutions, which was one of the EC partners in the Tempus project — a decision had been made to follow the Swedish solution. It took a year to work out all legal details and finally at the end of 2002 the consortium called MUCI (University Centre for Informatization) had been established. The aims listed in the signed agreement were to coordinate, support and initiate activities such as:

- a. designing and developing computer based information systems,
- b. working out regulations concerning automatization of various administrative procedures,
- c. gathering common funds for IT projects,
- d. representing partner institutions in talks with the Ministry of Education,
- e. negotiating with companies selling IT software and hardware.

Consortium is an open organization in a sense that can be joined by any higher educational institution. 10 universities joined in 2002, 5 more in 2004, than 2 in 2005, 4 in 2006, and (up to now) 3 in 2007, making it 24 altogether.

### 4. Business model of USOS development

USOS had a good start-up thanks to European money of Tempus JEP. Universities which established MUCI developed a new business model. The cost of system maintenance and development is covered from the fees of the member institutions based on the project budget. Every new institution pays some initial share and then an annual fee which depends on its size. Fees are low, within budget of even very small organization. Consortium may also apply for external funds from prospective sponsors in addition to routine annual operating budgets. MUCI is a non-profit organization, meaning that whatever money are gathered are in total spend on systems development.

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This business model is acceptable for small organizations which pay low annual fee and get in return fully operational, mature information system, with all its subsystems and modules. License does not limit a number of end-users or installations. Source code is available on demand. Some institutions participate in development by preparing locally additional reports or functionalities and sharing it with others – these changes after approval get incorporated into an official distribution of USOS.

## 5. MUCI organization

Each participating institution is represented in the MUCI **Council** by rector's plenipotentiary responsible for IT or other authorized person. Each institution has the same voting strength. The Council is responsible for acceptance of the annual report of the board, acceptance of the fiscal balance, election of the board and its chairman, acceptance of new members of the consortium, approval of the budget for the next fiscal year.

**A Board of Directors** consists of 5-11 members. Chairman of the Board of Directors is the chief executive officer of the consortium. The Board is responsible for deciding on the overall direction of activities, budget proposals, production of the annual report and fiscal balance, signing agreements with other companies, supervising Project Commissions etc.

A group of MUCI members may launch a common project. Projects are supervised by **Project Commissions** consisting of representatives of the institutions belonging to the group. The Project Commission decides about the project budget, hires a Working Team which is responsible for carrying out the project, appoints a project leader, sets task and priorities for the team.

USOS is one of such projects (the main one at the moment). The USOS Working Team has been located at the Faculty of Mathematics, Informatics and Mechanics of the University of Warsaw, which is the home for USOS from the very beginning.

The USOS Commission meets once every few months and functions as a forum for information exchange between the users and the USOS Working Team. It is responsible for stating and ranking maintenance duties for the team. Many mail discussion groups exist for people from cooperating universities involved in system deployment and development for daily contact.

## 6. Development team

The USOS Working Team coordinates all design and programming work in accordance with the directives of the USOS Commission, debugs the system, issues new USOS distributions, takes responsibility for development and maintenance of interfaces to other systems, supports help-desk, prepares system documentation and manuals, assists new members with converting data from old databases to USOS database, suggests tasks and ideas for further development, informs other parties about USOS.

Locating development team in university environment has its advantages and disadvantages. As in most countries, salaries at universities can not compete with the ones offered by industry or software companies. On the other hand such environment guarantees the highest

level of expertise on ‘business logic’, i.e. study programs and procedures involved in university management, and daily contact with end-users.

At the beginning students and faculty staff were the main task force of the team, but this model changes. More and more projects are run by programmers hired and paid by MUCI. They usually are employees of partner universities of MUCI.

## 7. Software modules and subsystems of USOS

USOS started as a central Oracle database with an interface for university administration for handling main aspects of university education, like course catalog, course registration, class schedules, students and teachers personal data, study programs and requirements of degree certificates. Steadily new functionalities were added and now USOS is present in almost every area of university administration. Only projects which can be regarded as milestones are listed below.

7.1. Very early it became necessary to add a subsystem for handling financial aid for students on the one hand, and student tuitions supported by speed collect, on the other hand.

7.2. Quality is achieved – among others – by transparency. The data stored in university database can be viewed by students through web based systems. Using USOSweb (see fig. 1 and 2) they can browse information about their study progress and grades, register for courses and particular classes, be informed by lecturers about important events through built-in messaging system, assess courses by an integrated course assessment system etc. Another web-based system supports university-wide so-called token registrations. Yet another implements electronic archive of diploma theses. These applications are oriented towards massive numbers of clients accessing them via web browsers and are made in open-source technology.

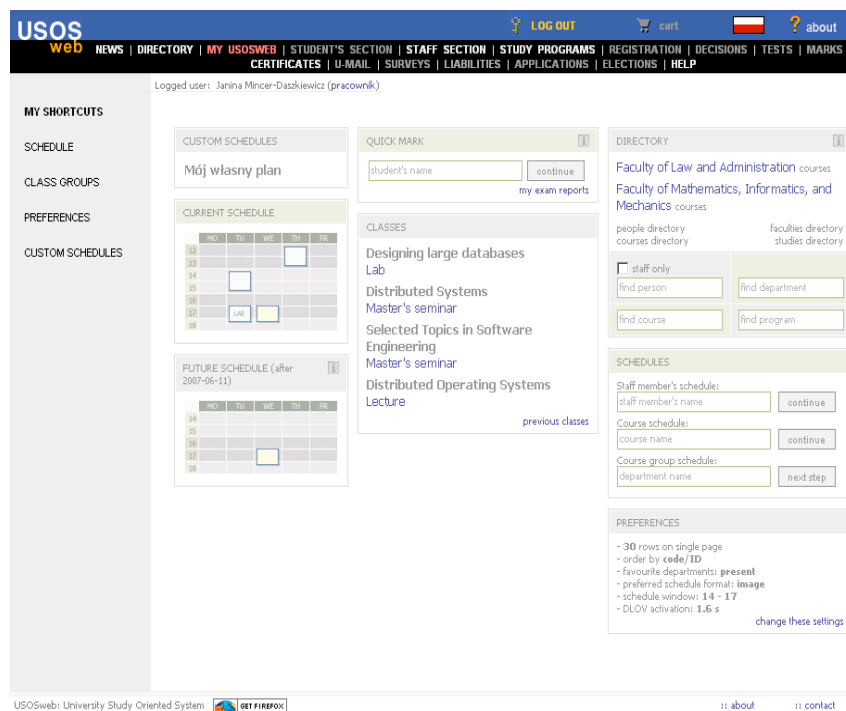


Fig. 1. USOSweb available at <http://usosweb.mimuw.edu.pl> – Page My shortcuts



Fig. 2. USOSweb available at <http://usosweb.mimuw.edu.pl> – Page **Public Directory**

7.3. Poland signed the Bologna Declaration in 1999 and joined European Union on May 1st, 2004. It was necessary to make USOS fully compliant with requirements of the Declaration. USOS supports ECTS credit system and diploma supplements. All web based applications are available in English. An ECTS catalog (fig. 3) is available on-line for foreign students.

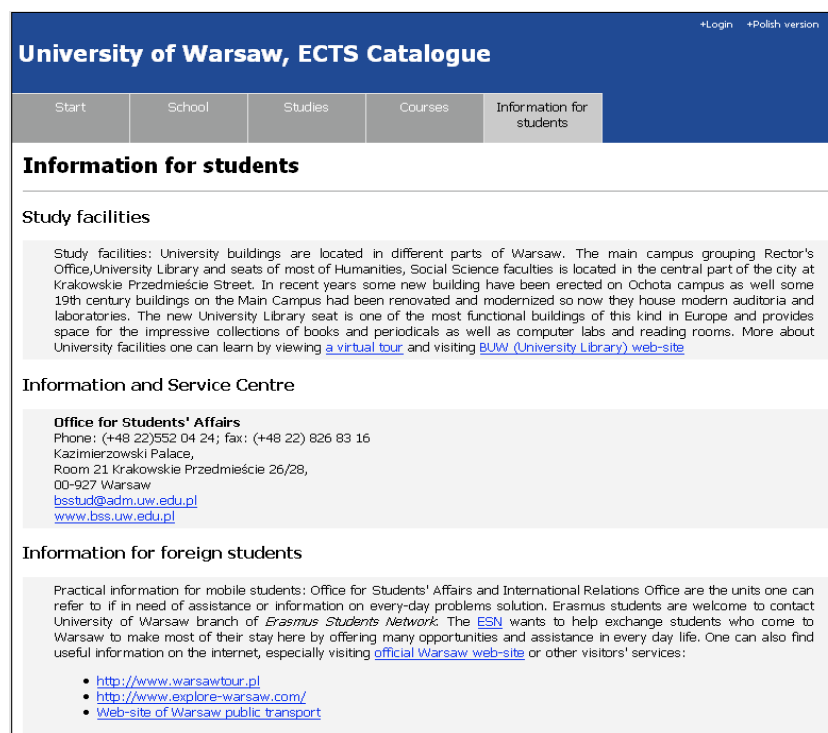


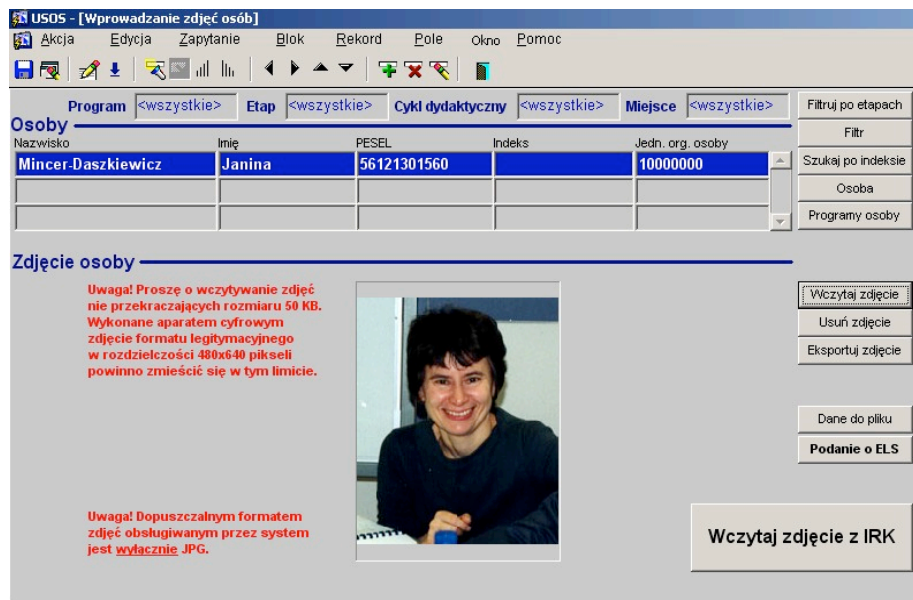
Fig. 3. ECTS catalog available on-line at <http://ects.uw.edu.pl>



7.4. Due to growing popularity of on-line courses USOS was integrated with an e-learning platform based on Moodle. Students register for these courses in a token registration system. Results of language placement tests are transferred from Moodle to a token-registration system via USOS and decide about the possibility to register for language classes.

7.5. Web-based central admission system (IRK) had been in use at the University of Warsaw since 2002. In 2005 the system was offered to MUCI and became a part of USOS distribution. On the first year three other universities decided to use it for admission, next year there were 13, this year 14. IRK is also available in English.

7.6. Year 2006 was the first year of electronic students identity cards on Polish universities. The whole software and hardware infrastructure had to be built from scratch, but now the system supports electronic cards, printers, readers, and digital signatures from various vendors. In some of the cities electronic student identity cards can be used in public transport system as valid ticket holders. For use in libraries a card had been equipped with a contactless-chip and a bar code on the reverse. Photos were gathered via IRK and transferred to USOS (fig. 4).



Nazwisko	Imię	PESEL	Indeks	Jedn. org. osoby
Mincer-Daszekiewicz	Janina	56121301560		10000000

Fig. 4. USOS form for entering photos into the system

7.7. Since Poland joined the European Union, the number of foreign students coming for short-term visits grows rapidly, as well as the number of Polish students going abroad. Support for handling student mobility inside Europe is being added to the system.

7.8. Since the number of web-based applications which together constitute *virtual university* grows steadily, it became necessary to implement user-friendly authorization and authentication system. We started in 2005 by building the central repository of accounts and profiles for users of web-based university applications. The system called CUS gathers accounts of all students and staff and verifies on demand passwords delivered to it by applications (also mail servers). This year we added CAS on top of CUS. CAS is an open source authentication server supporting single sign-on. The project was initiated by Nicolaus Copernicus University from Toruń, which first installed CAS for its own use. All USOS web-based applications were adapted for use with CAS. The solution is now being installed at the University of Warsaw and will become a part of the coming USOS distribution. In the future

CUS will be replaced by an LDAP database. The same authorization system will be used for wireless network.

7.9. Data and statistics are necessary for efficient management at every institution. First pilot Statistics module based on OLAP engine was built (fig. 5).

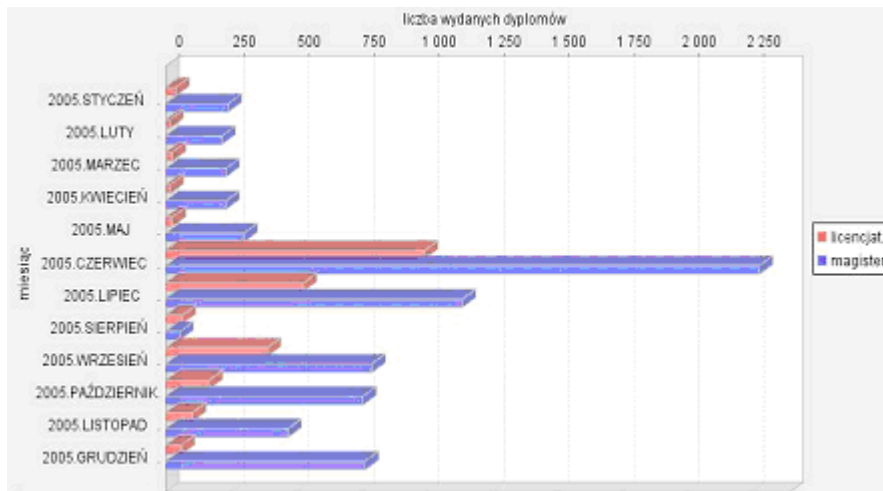


Fig. 5. Number of issued diplomas in the University of Warsaw in 2005 by month and type of certificate (red – bachelor, blue – master)

## 8. Impact of an information system on functioning of the university

Development of a software system is driven by needs of its users. However, the opposite relation is also true. Deployment of USOS had an enormous impact on functioning of the University of Warsaw and other cooperating universities. The effort of deployment is substantial and proportional to the size of the organization. Some effects are observable almost immediately, e.g. students all over university get the same types of documents or certificates (in fact: all over USOS universities). Others come out after many years of system functioning, e.g. in force are common rules of course registration for all faculties of the university, students and staff are obliged to have unified email addresses, stored in USOS and used in all university correspondence (also to created various group aliases). Data obtained from USOS on courses and classes are used to obtain the authorized number of work hours for academic teachers and the number of hours faculties spend on courses dedicated to other faculties (which should be reimbursed). New students of the university are offered introductory courses on information technology, to help them get around at the academia and in future professional careers.

Recently universities in Poland were obligated by law to prepare new Study Regulations. In Warsaw Chief USOS specialist was a member of the Editorial team. Some USOS-driven rules were added to these regulations, like unification of course organization (e.g. length and number of hours), possible assessment results, ways of calculating study averages etc. In particular statistical data obtained from USOS was used to support some decisions, like changing rules for calculating final grades for university diploma.

## 9. Inter-university initiatives and software projects

USOS and its subsystems are installed locally at each university, member of MUCI. Cooperation on USOS development gave impulse for cooperation in other fields. In 2006 the University of Warsaw came up with an initiative to build Country Registry of Maturity Examinations (KReM). Due to some legal aspects such registry could neither be offered by Central Examination Commission, nor by any particular university. It could however be created as a common project of all higher education institutions in Poland, every one who would sign an agreement. KReM is the first service to be offered to all universities in Poland.

But not the last. We have some plans for the future. The project on creating an application which would support offices of career services of all Polish universities has already been started. The aim is to create a virtual ‘meeting place’ with the job market for students and alumni of all higher education institutions in Poland. The new service will offer authorized data (imported from USOS) on academic career of prospective employees to prospective employers. After some years data gathered in a database would deliver a valuable statistics on professional careers of graduates and effectiveness of Polish higher education system.

The other plan concerns building an electronic archive of signed documents (to replace – in the future – paper archives). Universities are obliged by law to keep an enormous amount of paper documentation. University administration has already been equipped with digital signatures for signing electronic student identity cards. They could also be used for signing documents stored in the archive. The law would have to be changed to admit electronic archives in place of paper ones, but that will be easier to achieve through a common initiative of Polish universities.

## 10. Conclusions

From the stone age of computerization we had in Poland at the turn of the century, in 6 years we came up to the era of electronic identity cards, digital signatures, and the network of applications accessible on a single sign-on basis with one account stored at a central authorization server. From the era of universities as islands with own rules and procedures we came up to the consortium of cooperating partners supporting themselves in daily routines and contacts with the external world. USOS is gradually gaining the reputation of a ‘standard’ solution for a higher education institution in Poland. Source code is open, which helps to keep good quality and debug it faster. The system grows steadily achieving higher level of integration. Inter-university initiatives stimulate new activities, giving rise to new quality solutions.

## 11. URLs from installation of USOS at the University of Warsaw

<a href="http://usos.uw.edu.pl">http://usos.uw.edu.pl</a> <a href="http://usosweb.mimuw.edu.pl">http://usosweb.mimuw.edu.pl</a> <a href="http://rejestracja.uw.edu.pl">http://rejestracja.uw.edu.pl</a> <a href="http://apd.uw.edu.pl">http://apd.uw.edu.pl</a> <a href="http://ects.uw.edu.pl">http://ects.uw.edu.pl</a> <a href="http://irk.uw.edu.pl">http://irk.uw.edu.pl</a> <a href="https://krem.uw.edu.pl">https://krem.uw.edu.pl</a>	Home Page of USOS USOSweb Central University Registration System Central Electronic Archive of Diplomas ECTS Catalog Admission System Country Registry of Maturity Examinations
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