

## 31 The Development of Informatics in University of Pécs.

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### Abstract

The University of Pécs has 9 faculties, nearly 28 thousand students and 1,500 professors. Its capacity to offer the complete range of domestic higher education possibilities with its 9 faculties provides the unique cultural positions of the University. The development of the IT network that operates at the Pécs premises of the institution began in 1991 and is subject to continuous improvement and expansion. The presentation will introduce the development targets, the quantitative data, the characteristics of Internet and Network use as well as the current and planned future changes of resource stocks in laboratories.

In the year 2000, all Nobel prizes were granted to scientists who excelled in the development of new tools to be used in the digital, so-called ICT systems and the elaboration of new, computerised economic methods. The EU is funding €100 million worth of developments in this field. Inspired by the completion of IDP and efforts made by the Ministry of Education in the field, the leadership of UP decided to deal with the radical restructuring and improvement of the informatics system along with IT courses and applications. The presentation will elaborate on the strategy of IT education, the SWOT analysis, training targets, organisational changes, consolidations of the subject, financial sources and the expected results of the development planned.

**Keywords:** Informatics, The informatical network

### 1. Evolving of the University of Pécs

Following the university foundation in Pécs in 1367, the University of Pécs, restarting in 1923, has separated into two independent units, a law and a medical university in 1951. Economic education joined to the Law University in 1970s, then the Teacher Training Faculty was set up in 1980 by integration the local Teacher Training College. In addition, in the beginning of 1990s, through development of this college, the Faculties of Fine Arts, Sciences and Liberal Arts was set up. Establishing of the Faculty of Technology was a significant stage of the integration process of the university in 1995, namely the integration of the College of Technology, which works previously as independent institution. At the medical university, the training college for health workers started in 1990, which became independent faculty by 1995. Till now, the last stage of integration was the joining of the Medical University of Pécs, the Janus Pannonius University

with mentioned faculties and the Illyés Gyula Pedagogical College located in Szekszárd as well as the Transferred Branch of Liszt Ferenc College of Music in 2000. At present the University of Pécs has 9 faculty and almost 28 thousand students and 1500 lecturer. The university can present the entire supply of domestic higher education by its 9 faculty underlying its special cultural positions.

### 2. The informatical network in University of Pécs.

Forming of informatical network of the institution working at headquarters in Pécs have been starting in 1991 and it is being extended and developed continuously. The network can be described with the following numerical data:

Type: ETHERNET network, with bandwidth of 100 Mbit.

Length of optical backbone is 17 km. Length of local access networks within the building is approximately 100 km.

Number of LANs connected to backbone network: 38

Number of LANs connected to network via microwave: 4

Number of NetWare subnetworks: 48

Number of Linux subnetworks: 5

Number of user terminals connected to network: 4700

Bandwidth of HBONE connection: 155 Mbit/sec

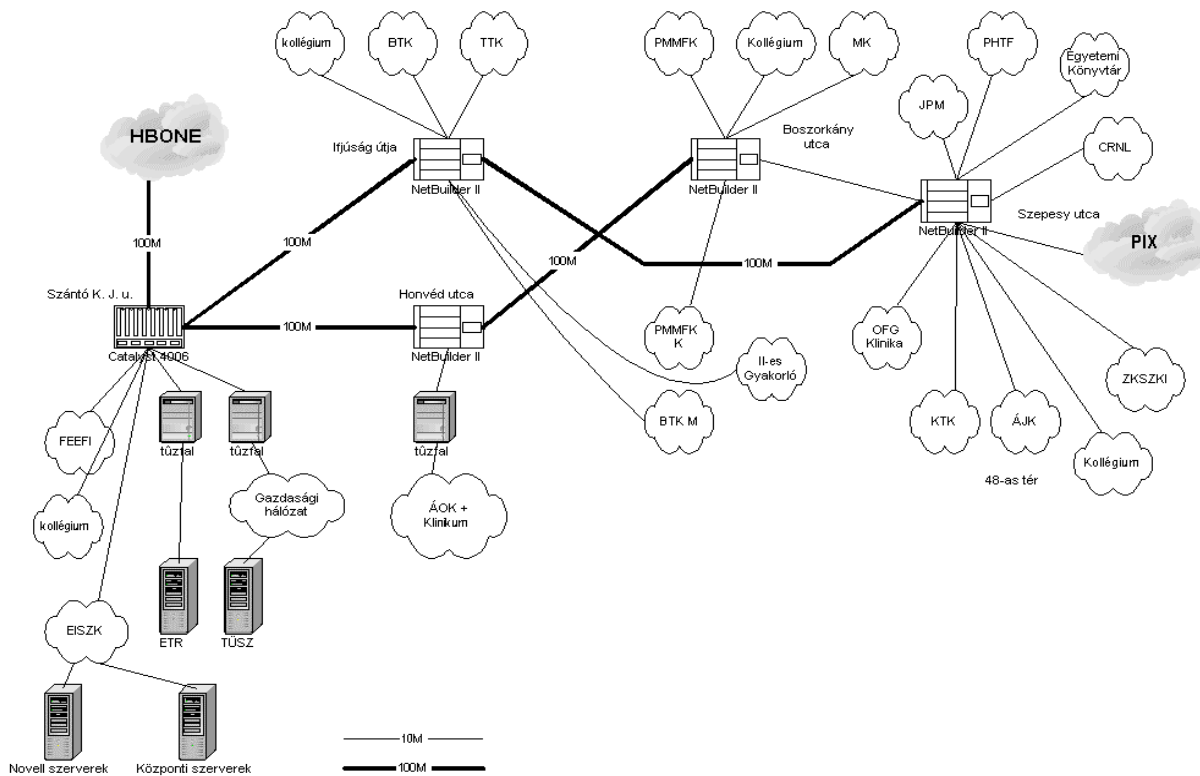
Number of backbone connection routers: 5

Various type and performance of machine tool and characteristic technological difference of local networks built up in various time and colorfulness of applications give rise to complication of the network.

Regrettable circumstances that because of restricted financial means Intranet networks were not built up completely. For similar reason, the building up of the structured networks of a few student hostels and their connection to backbone network are delayed. There is lack in quality informatical connection of the university to its own training schools and teaching hospitals.

Narrow bandwidth not supporting modern applications and running not enough piece of routers that withdrawn from production arise as a special problem in running of optical backbone network. Enlarging of bandwidth is formulated as of primary importance task also for LANs.

Topology of the network is shown in the following Figure:



Each country branch has informational network, which has not connected yet to domestic academic network, HBONE, directly. Networks of sites are mostly Novell subnetworks but works also Linux and NT networks. The building up levels and services of networks show considerable differences. General features are the lack of complexity and demand for technological development as well as qualitative replacing and quantitative enlarging of network resources.

### 3. Use of Internet, network service.

Intensive use of Internet services is almost the only European level grant to the education systems and researchers. The primary reason is the high cost efficiency, wide-range access and existence of state subvention.

Each organizational unit has its own Internet domain and IP address interval according to its current building up level.

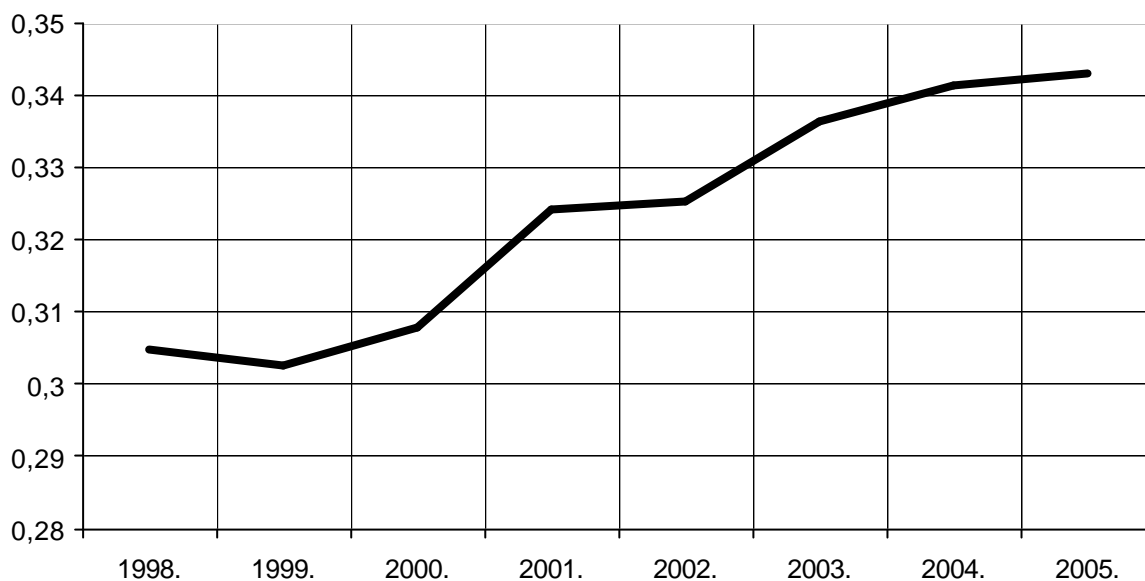
Informational network of organizational units located in various towns are connected to academic network, HBONE, through which the Internet services can be accessed. University is also a regional center of HBONE, its currently bandwidth to Budapest is 155 Mbit/sec. For country branches, narrow bandwidth (64 Kbit/sec) has considerable effect on quality of connection. This makes such form of communication with basic institution also questionable although this question plays significant role in reasonable use of information system

supporting the management, running of institution. This communication connection now realized experimentally on lines rented from MATÁV.

Among network services, the WEB service is of overriding importance. Recognizing the continually increasing significance of the Internet as a medium, coordinated, well-ordered renewal of web sites that represent the institution, becomes important purpose for University of Pécs as a whole.

Technology plays also increasingly dominant role in providing various services. Inner Intranet means tremendous growth in running the information system of UP, while external access represents as powerful marketing channel for regular and part-time student market, scientific life and university management.

**Growth of computer technique assets in UP (computer-terminal/student)**



Quick growth of computer technique assets is shown in the above Figure.

Use of Intranet and the university network is well described by the following numerical data:

**Characteristic features of use of Internet and Intranet in 2000:**

Average quantity of incoming data from Internet per day	Average quantity of outgoing data to Internet per day	Average quantity of inner network turnover per day
32Gbyte	12Gbyte	19Gbyte

Importance of informatics as independent and applied science is well represented in current, and even more in planned, training program of the university. General purpose and special oriented informatical labors provide the acquisition of professional knowledge, till now also organizational units make every efforts in the interest of development and running them. Following table contains current distribution of piece of labors among educational units:

Educational unit	Total number of workstation (piece)
ÁJK Faculty of Law and Political Science	36
ÁOK Faculty of Medical Science	62
BTK Faculty of Liberal Arts	30
EFK Training College Faculty for Health Workers	12
IGYFK Illyés Gyula Pedagogical College	72
MK Faculty of Fine Arts	14
PMMFK Pollack Mihály Tech. College Faculty	243
TTK Faculty of Science	324
<b>Total</b>	<b>835</b>

Resource of labors strongly differ, they have typically few number of assets supporting the modern applications (multimedia applications, landinformatics, teleteaching etc.). Because number of expert staff is low, continuous opening of labors is not solved.

Figures in the table clearly show also that our university not possesses continually working informatical centers with large capacity promoting individual learning, professional preparation of students. This question closely related also to

provisions of informatical assets of student hostels. We do not might say that informatical provisions of such complexes are insufficient, nevertheless, it requires significant improvement. Buildings of student hostels are integrated to network system, they bandwidth are narrow, network configuration inside the buildings are not complex and they quality are also objectionable. It provides access to network services only for those students who have they own informatical resources.

In era of globalization and laying the foundation of information society, the informatical infrastructure becomes strategic factor. Its state of development fundamentally determines the working capability, competitiveness of economic, cultural and *educational system* in a country both nowadays and, in increased degree, in the future.

Because of changes, the main direction of educational activity unambiguously determined by **demand of labor market, social requirements**. General tendency in is high education all over the world, the appearance of requirements of **qualitative mass education, lifelong learning**, which can be satisfied, on appropriate standard and level, only by new type education supply with up-to-date structure and methodology. In this process, the application of modern results provided by *information technology, technical modernization of educational process* is essential.

Priority of the latter topic is emphasized by recently accomplished institutional integration, which is destined to form the “UNIVERSITY OF THE FUTURE” and closeness of joining to the European Union only strengthens this process.

Following table contains our purpose in informatical development.

Informatical developments based on IDP
Informatical investments
Informatical network
Network services
Informatical labors, teaching rooms
Software legalization
Telephone system
Information system
Library informatics

#### 4.Development of informatical training.

In 2000, without exception, such researchers have been awarded the Nobel price who shine in development devices that can be applied in digital, so-called “ICT” systems and in working out new computational economic methods respectively. The EU finances developments of hundred millions Euros in this field.

The management of UP, in connection with completion of IDP and in line with expressed purposes of OM, Ministry of Education, has decided to deal with fundamental improving and reshaping informatical *teachings* and *applications*, the state of *information system*. Reasons for this can be supported as follows

- communication and management information system of organization of the university with increased size and complexity can not be run without significant informatical support,
- schooling environment of UP demands new type of informatical and informatical-applying teachings (courses) so far there is great domestic and foreign manpower shortage in these fields,
- applied researches in informatics in environment of other universities happen in significant cooperation, through new faculties-institutes, with sponsorship of corporations.

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UP can do other than to set the following tasks

- ❑ making mass schooling in informatical professions in 4-5 new specialization, in university, college and part-time teaching fields, providing usual resources
- ❑ beginning qualitative elite training in one-two specialization (university specialization PhD program) and providing them with excellent resources
- ❑ coordination of applied researches, multiplying their volumes according to regional conditions
- ❑ providing uniform, consistent information services for education and research on higher level
- ❑ and up-to-dating the information system of inner management, development its running to level of country average with support of informatics.

#### 4.1. Possibilities of model variations

In the course of program, we have analyzed several possibilities, as a results of this the following opinion has been formed:

- continuation courses mean important income source for university, faculties, participant in work,
- continuation courses open possibilities to tie alumni to university, who, thorough their role as lobbyist, liquidity, recommendations, increase of the goodwill, number of students and funds of the university,
- postgraduate studies – as one of crucial points of cooperation – are also appropriate for connecting university and the region, the social environment,
- social building function of university is fulfilled through achieving such target groups that did not addressed previously.

We recommend that the organization of continuation courses of integrated universities form such organizational-managerial structure which combine the advantages of “professional” bureaucracy and “divisional” organizing.

The pattern is shown in Figure entitled “System of continuation courses of integrated universities”

It can be seen that certain activity is reasonably assigned to a “center”, basically as a service, in demand-following manner with flexible resource allocation, while the others – typically customer-close activity and arrangement of teaching – is mostly assigned to decenters.

Consider that, as all separated economic units, also IETR must take part in *budget planning*, work out its own plans. For this purpose, running its own, centralized information system, gathering and analysing managerial, financial information are essential. Planning can be done at strategic level where the most significant changes (types of teachings, courses, new markets, new projects, investments) are taken into account, and we attempt to outline the developmental process for long term, 4-5 years. Yearly planning is more specific: planner can move at level of new products, changes inside the portfolio, market organizing projects, changes of organization. In both cases, simple financial models can be prepared trough that the effects of different financial variations can be demonstrated to decision-makers.

In addition, the Center collects the documentation of relevant laws, orders and inner regulator decrees. Faculty executive

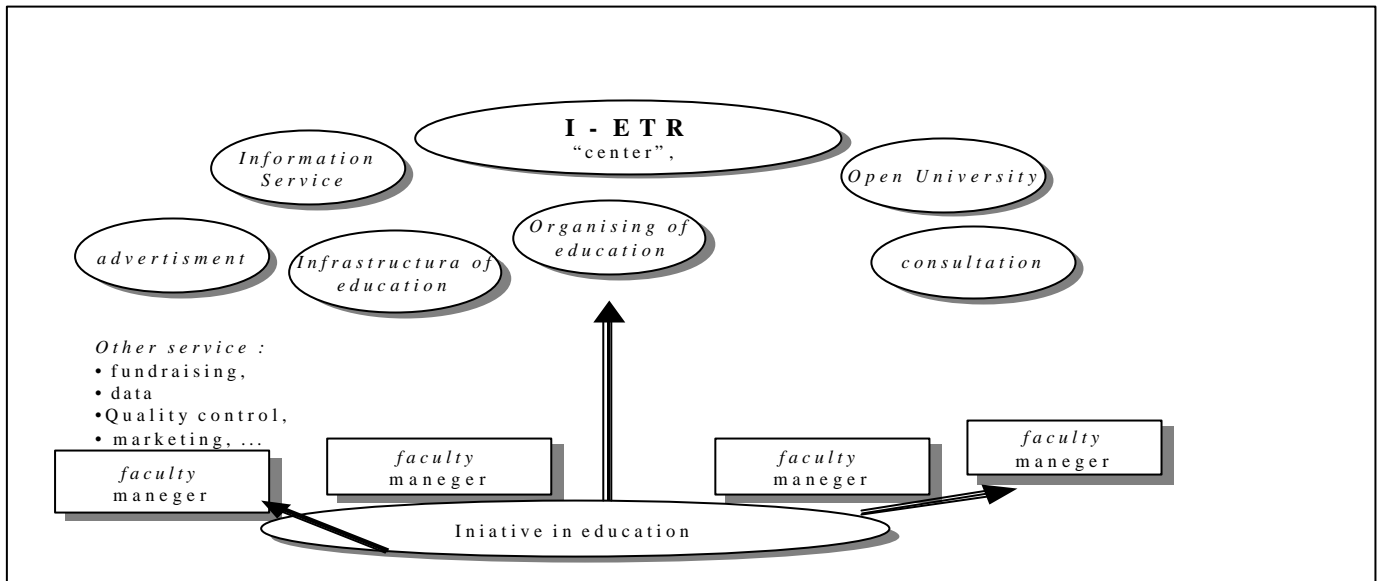
officers are in relation to the departments, they forward, analyze regularly ideas, suggestion accumulated here in form team decision making.

The strategy of University of Pécs shall be based on the combined system of external and internal challenges, where external challenges are presented by the society, the economy and the labour market, and while internal challenges are set by the demands of the current citizens of the University. The necessary measurings and surveys to map external and internal challenges have been performed. The challenges related to the different functions of the University may be elaborated by building on these results. The main path of the education activities is unambiguously determined by the demand of the labour market and the society. A general tendency in higher education world-wide is the appearance of a demand for quality education of masses. It is a huge challenge for UP to react to this trend. The dramatic increase in quantity (50% of the age group) may only be met on a satisfactory level by offering education of new type and structure and up-to-date methodology. The labour market has restructured significantly in the past decade. Driving professions have developed and, in a parallel path, a significant decrease of demand has taken place for other professions and specialised fields. Hungarian higher education, including the legal predecessor institutions of University of Pécs, has executed the significant output increase by partially preserving the previous programme structure that has become unmarketable by today.

Regarding its education activity, aims to become **market leader in Hungary**, a **decisive player in the Central-Eastern European region**, and a **significant in Europe** in the coming 10 years regarding the number of students and the multi-coloured nature of the training fields. In its education activity, the University aims to retain its multidisciplinary nature, intensifying the interdisciplinary content of the offered fields. In the future, the University aims to perform education activities in the following fields:

Information technology	State administration and law
Economy	Health sciences
Technical sciences	Natural sciences of living and inert things
Arts	Education sciences

Organization chart of suggested “model of Pécs”



<b>IDP SWOT ANALYSIS</b>	
UP	UP
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Strengths</div> <p>Multi-faculty university with a wide spectrum of educational, research and artistic activities</p> <p>The largest university and the most significant employer of the region</p> <p>Student base reaching over the region, with different educational forms</p> <p>Potential in education, science, arts and health care significant even on national level</p> <p>Organisationally mostly integrated decision-making and central administration</p> <p>Existing traditions of internal co-operation in some fields</p> <p>Internationally renowned education programmes in English (FoGM, FoES)</p> <p>The only complex education of arts in rural higher-education</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Weaknesses</div> <p>Divided geographically and locally</p> <p>Lack of capitalizing on the opportunities of internal co-operation (education, research, arts, administration)</p> <p>Internal mechanisms of distribution not supporting internal co-operation</p> <p>Lack of social and economic relations</p> <p>Lack of weight-proportionate interest enforcement at national forums</p> <p>Lack of unified quality assurance</p> <p>Narrow range of internal and external services</p> <p>Slowly adapting, inflexible organisation and, occasionally, education portfolio. Heterogenously developed faculties</p> <p>Rivalry between organisational units instead of co-operation</p> <p>Lack of clear internal settlement system and resource allocation</p> <p>Complex demands against physical limitations (unified library)</p> <p>Disregarding existing real values, slow reaction to market interests</p>
<p>Potential student base with demands for quality mass-education</p> <p>Large demand from IT society for professionals</p> <p>Opportunities in accession to EU. Demand for EU-experts.</p> <p>Utilisation of increasing student mobility (e.g. EU, across-the-border Hungarians). Increasing opportunities for Hungarian professionals to enter international labour markets</p> <p>Involvement in R&amp;D activities of multinational companies entering into Hungary and the region, as well as of domestic companies</p> <p>Increasing social demand for the services providable by the University</p> <p>With nationally improving economic situation, increasing effective demand for market-oriented trainings</p>	<p>Economic and industrial development level and infrastructural conditions of the region</p> <p>Strengthening of national (Szeged, Debrecen) and regional (Kaposvár) competitors. Appearance of private higher education as a new type of competitor</p> <p>State support is uncertain in the long run</p> <p>Brain drain by international markets and business sector</p> <p>Danger of mass education to quality</p>
<div style="border: 1px solid black; padding: 2px;">Opportunities</div>	<div style="border: 1px solid black; padding: 2px;">Threats</div>

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SWOT analysis of informatical training

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STARATEGIC NOVELTY, in respect of future important innovative initiative, so far experimental task, “essential investment” must be stimulated

FOR EXAMPLE:

- ❑ short informatical continuation courses
- ❑ a day manager training, “consultation” in high segment
- ❑ “professional weekend” in any field
- ❑ “university week” competence
- ❑ sandwich courses, practical courses with corporate participation
- ❑ inter-faculty courses in foreign languages for foreigners
- ❑ new “literacy”-type mixed courses in any topic. “What is the geology?”, or “Baroque buildings of Pécs”

ROUTINE-LIKE, MASS training, with small novelty-value, with big profits: probably must be reevaluated, make decide on market position

PROMISING STARTING, elaborated program, after the initial innovation, return of investment be expected shortly, activity must be strengthened

FOR EXAMPLE:

- ❑ certain language continuation courses
- ❑ certified informatical examinations e. g. ECDL
- ❑ postgraduate courses in foreign languages with foreign degree
- ❑ new type economic courses, e. g. MBA
- ❑ professional training in new techniques
- ❑ qualifications in new teacher training courses
- ❑ new administrative training prescribed by authorities or government
- ❑ building up in training system of large enterprises
- ❑ all courses in teleteaching form
- ❑ all courses via Internet

IT MUST BE CUT DOWN, ORGANIZED OUT, activities yielding non significant profit, with small prestige value

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## References

Béla Sipos ed. (2002). Institutional development plan of UP. pp. 86.