Kandó Kálmán Faculty of Electrical Engineering

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1 Introduction

The Institute of Human Resource Development and Methodology (hereafter the Institute) is a centre of engineering teacher and technical lecturer training at Budapest Tech, which has a past of over four decades. Simultaneously it is one of the main pillars, considering both its education scope and the wide range of international and domestic relations and also the position which the Institute has gained in the professional sphere.

In harmony with its traditions of long standing, the Institutes still aspires to create an up-to-date teacher training which always meets the social and economic requirements. Ever since the foundation of the Institute, its credo has been that higher education is supposed to serve users' demands, a motto that is generally agreed today. Graduates qualifying at the Institute are mostly employed in the system of integrated vocational training (secondary vocational schools and trade schools) as well as in adult training (regional training centres, educational enterprises, factory internship training schools).

So that it be achieved, it is necessary for the Institute to increasingly participate in education development programmes and application projects in co-operation with the above mentioned network of institutions, in the framework of which we have concluded a great many agreements for co-operation (National Institute for Vocational Training, National Institute for Adult Training, Hungarian Centre of Distance Learning, etc.). Mutual relationships have been maintained, therefore those colleagues support the Institute by acting as visiting lecturers, consultants and opponents, members of state examination boards. Thus the Institute acts as a medium linking together the three major spheres of training, that is to say vocational training, adult education and higher education, furthermore it functions as workshop for modern research of methodology acknowledged on an

international and domestic scale. Renaming the Institute in 1999 (its present name dates back to that year) resulted in an expansion of profile realised in the fields of higher education vocational training, adult education and distance learning, as well.

In the 3rd millennium the development of human resources means opportunities never occurring before and, at the same time, challenges. Development today necessitates life long learning for people and employees. Thus the Institute pays a great deal of attention to updating the content and structure of the ongoing training by introducing programmes which can serve as a model. As a scientific workshop and a community of researchers the Institute as considers as an aim to involve students in developments, an excellent ground for which is facilitated by ***teams of students completing their papers*** for National Scientific Students' Association Conferences supported by the Institute.

A commitment to quality is verified by the fact that in the process of accreditation all majors for vocational teachers' training and engineering teachers' training were assessed as 'excellent' by the Hungarian Accreditation Committee.

2 The Training Profile of the Institute, the Material Background of Training

As a result of a recent change in legal regulations, traditional college-level training in Electrical Engineering, IT Engineer Teacher, Technical Vocational Trainer majors is to be terminated. The Institute therefore places special emphasis on elaborating programmes for new basic and further training majors, which will remain competitive on the long run on education market.

Joining the cyclical training system of the European Higher Education Zone, the Institute has taken up incentive and contributed to adjusting and conceptualising teachers' training including vocational teachers' training in harmony with the Bologna process and has also prepared related documentations. The permission to launch a new technical professional teachers' training (BSc) in the Electrotechnics and Electronics specialization was granted in 2005.

The chance to launch an Engineering Teacher (MSc) major at the College in co-operation with the professional elite represented by lecturers of Budapest University of Technology and Economics has appeared as an extreme challenge for both ongoing engineering training and the Institute. The procedure of authorization concerning our application for launching the major, which is devised to follow BSc Electrical Engineering training is nearing its end. The Institute hopes to start this new type of university-level engineering teachers' training, for which a great demand has emerged on the labour market.

In the framework of programmes offered by PHARE, the Institute has determined the contents of Accredited School-based Integrated System of Higher Education Vocational Training courses and integrating it into the system of domestic training, relying on harmonisation accomplished together with several domestic institutions of higher education. In the same fashion, the Institute also played a key role in creating an Electrical Engineer Assistant major. As a result of the development activities of the Institute, the qualifications ***Media Technology Assistant, Education Assistant*** and ***Technical Assistant*** were established and entered into the National Register of Qualifications. Our distance learning programme in the major Media Technology Assistant was the only one in Hungary to be granted authorisation.

The Institute of Human Resource Development and Methodology has hitherto founded and launched ***15 accredited pedagogy further training programmes*** specialised in Education Quality Assurance, Skills in Adult Training, Multimedia, CISCO CCNA, A Survey of the EU and Project Management, etc. The Institute has also got involved in further training provided for ethnic Hungarians dwelling across the borders. Postgraduate specialised further training programmes are continuously being elaborated, according to demands for training.

Material background for high quality training is provided by a modern set of devices to serve the purposes of Technological Pedagogy and Media Technology training. (However, no suitable infrastructure is disposed of by the Institute due to the lack of capacities.) The financial means to purchase modern education technology, teaching tools and software were raised by the Institute relying upon support from actors in the sphere of economy. The Education Technology Laboratory (digital photography, photo processing, making digital educational films, virtual reality devices and their applications) Web-based multimedia development (preparing e-learning packages). Special Methodology laboratory (multimedia work stations in intranets, applying electronic tables, applying virtual university scheme.) Operating CISCO *Regional Academy* at the professional site of Neumann János Faculty of Information Technology, Budapest Tech (CCNA programmes for the students of the majors, on-line examinations). *Electronic Distance Learning* (studying competency modules in multimedia environment, online and offline learning, virtual classroom module for collaborative learning). Within the co-operation between education and economy, large companies having their employees trained in the Technical Professional Trainer major have made a valuable contribution by offering their up-to-date training centres, education technology and company libraries.

Apart from scheduled seminars fixed in timetables, students have permanent free access to the infrastructure at the Institute, namely an ***open laboratory*** having been operated for more than a decade, where they can prepare for teaching practice, carry on with research for their theses or presentations for National Scientific Students' Association conferences or elaborate ***project tasks*** related to didactics, methodology and multimedia. ***Consultation services*** for students have

been introduced (Learning and Research Methodology, Survey of the Labour Market, Job-Finding Techniques). The ***Mediacentre*** with an access via the web supplies on-line content-based services (Knowledge Management, a Library of Theses, multimedia modules). The Institute pays close attention to supporting graduates in finding employment and examining the success rate in their future careers,

Special schools conducting practices with student teachers and partner schools, where over 20 senior teachers are in charge of leading specialisations, which also provide infrastructural an personnel background, act as the workshops of competency-based training.

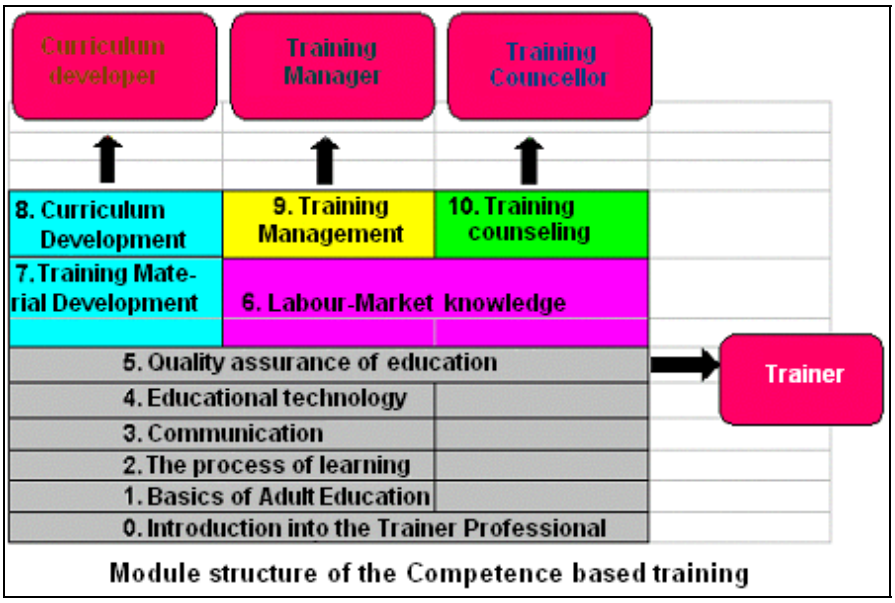
3 Research and Scientific Activities

- **Developing Multimedia Teaching Material, Research in Methodology**

The scope of ongoing research at the Institute is devised to serve innovation concerning both the contents and methodology of training in the areas of higher education as well as professional training. The following projects have been launched relying on domestic and international co-operation.

'Modular Training for Adult Trainers I-II' — Leonardo da Vinci projects. In phase 1 of the project, curricula, the structure of teaching material and curriculum modules of a 3-cycle Adult Trainer Education were elaborated, relying on the outcome of empirical surveys covering employers, trend analyses, and international comparative investigations. Via involving international team work to create a competency-based system of modules enabling students to learn individually, teaching material for 3 specialisations based on basic modules have been compiled. 11 multimedia-supported modules were developed in phase 2. The experience gained through development led to the establishment of a platform, on which teaching material involving multimedia CD-ROMs and the Internet could be accomplished. Media development innovations formed an organic part of starting the subsequent stage of development ('Dreaming'), in which a team of 3 visualises teaching material (in several planes). Owing to methodology development research 44 graded and specialised multimedia modules were completed in English and adapted in the native languages of individual member countries of the EU. In the uniform structure of modules teaching material was created in harmony with end user demands of those involved in distance learning. (The project results are summarized: Szlovák, É.: Training of Trainers for Manpower-Market Leonardo Project, In: *TRAINING 2000 Europe's Vocational Training Encounter*, Brussels, 2000., *2th International Conference on Information*, Monsoura, Egypt, 2003, Szlovák, É.: *Training of Trainers for Market Manpower Training II*. Final Report Leonardo da Vinci Programme. Bussels,

2001, Szlovák, É.: *Multimedia Possibility of the Educational Materials* Fontys PTH, Eindhoven, 2001.)



Module structure of the Competence based training

'***Web-based learning management training for Headmasters***'- Comenius 3.1.project. changing traditional training forms, to developed into WBT-based strategy. The basis of skills and skills development for the participants was standardised competence catalogue, like self-control tool. The personal skills development - *The effective Headmaster work* is due to the important activity-, the task system follow-up the project work method. Organized by LMS, the realization of PLE type of e Learning is a new initiative promising fair prospects in the research of electronic learning. The developing of the courses (intercultural communication, knowledge management, IKT in education, etc.) the realization based on HMI web server, which guaranteed fruitful distance cooperation to develop the educational materials, also the testing and using in partner countries. (The project results and educational materials can be find in http://human.kando.hu web site: in English and Hungarian languages. Developments and results are found in: Szlovák É.: *Final Report: Virtual Further Education Course for Headmaster Project*, SOCRATES LEONARO and YOUTH Technical Assistance Office (TAO), Bruxelles, 2004, & *a Management Training of School Directors with Self-organised Web-based Learning* BMF HMI, 2004, ISBN: 963-7154-25, summary entitled by the institute.)

- **Mobility Programmes**

'*TQM in the education*' Dutch – Hungarian exchange program – usage of the Fontys PTH training program allowed the introduction of the TQM model and quality development methods into training. The results of the project a 2-volume

TQM book were adopted and published in Hungarian language, which is used at our education in the College and in our further training programmes. (É. Szlovák: TQM: Total Quality Management Module Textbook I-II, BMF HMI, 2002).

The student who finished at Teacher Training Department of our Institute had a possibility to take part into ***'IMPROFE' project'*** of the Technical University of Eindhoven's master pilot programmes. They were able to obtain a university level diploma fulfilling EU standards among the first. The students latch on to practice oriented company training beside the up to date informatics and management training.

The method for ***applying an active board (electronic board)*** was realized by cooperation between Italy and Hungary through Leonardo mobility project, working with Budapest Technical Schools. Increased application of the active board in Higher Education and Vocational Training in special method training program can be achieved, furthermore supporting educational materials of special subject are developed during two weeks groups preparation. During the residence in Rome we established good relationships with the coordinator institute of Italian EU programmes with the aim to work together in another projects.(Related publication: *Szlovák, É.: The Strategy of Digital Learning Using Electronic Tables. In:* Riadenie skol po transformacnom procese III. Besenova – SK /presentation+conf. brochure/, *Szlovák, É., Makó, F.: The Development of Multimedia Efficiency in Teacher Training*. /forum and conference presentation/, Rom, 2005, Budapest, 2006.)

'*Potential applications of info-communication technology in companies training and courses*'- Leonardo mobility project greatly assists the cooperation between education and economy, which it's mark for the participants: University of West Bohemia (CZ), the Chamber of Commerce Cheb (CZ), a Business Innovation Centre (CZ), Net – University (CZ), Constantine the Philosopher University (SK), MGYOSZ (HU). Study visits gives chance to cognise companies training and the application of modern technologies in different countries. (Related publication: Hutter, O. – Simonics, I. – Wagner, B. – Sárváry, T.: Standard-Based eLearning Solutions in Higher Education *In; Proceedings of 3rd International Conference on Global Research and Education in Intelligent Systems* Budapest, Hungary, 2004.)

Furthermore the international support programmes, through our ***direct partner cooperation we developed multimedia learning material, our partner financed the material development.*** The best example for this cooperation is the development of Analogue and Digital Electronic educational material in multimedia form on CD-ROM, in English for the University of Central Lancashire, Preston, England. This multimedia material scored full marks for the institute due to this professional development.

'Structure and content development of Higher Education – Multimedia modules developing' – in HEFOP tender programme (between 2005-2007) is realised 15 professionals subject of the electronic materials of the Media technician and

Communication-technical engineer education with common development by Saint Stephan University. The finished eLearning materials are usable not only in the university education level, but in the adult education and in the teacher further training as the self study modules (such as Team working and project management; Software development; Basic knowledge of Computer and Internet technology; Multimedia development systems; Pedagogical and Psychological basement of the Multimedia; Multimedia Design; Virtual Reality; Quality Assurance, etc.). The Hungarian Academy of Sciences, Research Institute of Computer Technology and Automation, eLearning Department is involved into the e-learning materials development. (The project's homepage is: http://hefop.komfej.szie.hu, Elsayed, H., Szabó, J., Bártfai, J.: Application of the Interactive Multimedia Technology in the European e-education. 12th International Conference NETTIES, Politechnica University of Timisoara, RO.)

'*eLearning methodology development at Kandó Kálmán Electrical Engineering Faculty*' project supported by the Hungarian Ministry of Education synthesized the existing results and elaborated a new methodology for eLearning training material development. The scientific results of the project are used in our teacher training courses on CD ROM. (References: *eLearning methodology development at Kandó Kálmán Electrical Engineering Faculty* CD ROM BMF-HMI, Bp. 2003; Simonics, I.: *Problems of eLearning Platforms and Disseminations.* In Second International Conference on Information Monsoura Egypt, 2003; Szlovák, É., Cséfalvay, M.,: *Planning and Developing of Multimedia Learning Applications for eLearning* Riadenie skol po transformacnom procese II. Besenova, 2004; Szlovák, É.: *Development of multimedia competency in teacher training*, International conference in Cheb, In eLearning and blended learning, Exchange of experiences eLearning and „anywhere and anytime, University of West Bohemia, Cheb, 2005.)

In '***Basic elements of Labor Market***' project we have developed multimedia training material for engineer assistant, engineer and teacher training students supported by APERTUS Public Foundation. The training material existing on CD ROM and online prepares the students for the Labor Market with knowledge of Career Guidance, Job hunting, Interviewing etc. (References: http://edu.kando.hu/hmi/)

In **'*eLearning methodology development for company training*'** project supported by the Budapest Public Transport Ltd. (BKV) innovation fund we have developed methodology for eLearning application in company training. We supported the establishment of Learning Management System (LMS) in the company using SCORM standardized interactive learning materials. References: http://media.bmf.hu with login and password.

- **R&D projects on Vocational training and Vocational teacher training**

Survey on '***Starting at workplace and application of professional knowledge by school leavers and employers***' We could analyse answers of questionnaires from 322 schools and 245 employers and chambers. According to the results we evaluated the activities and effectiveness of vocational training schools and edited proposals for decision makers. The survey was done together with National Institute of Vocational Education and Volán Elektronika Ltd, (References: Szlovák, É., Makó, F.: *Starting at workplace and application of professional knowledge by school leavers and employers* Fifth National Education Conference HAS, 2006.)

Survey on '***Access of adult training from infrastructural aspect***' aimed to collect the European best practice on strategies and evaluation of national infrastructural backgrond together with National Institute of Adult Training. We collected data from vocational secondary schools, higher education, adult training institutes and companies and companies – more than 50 employees –, owning practical workshops. The results gave a comprehensive picture about infrastructural backgrond, training capacities and educational technologies of Hungarian adult trainers. (References: *Final study of survey* 180 pp. NFI Budapest, 2006.)

- **Results of R&D**

The fruitful research collaboration with MTA SZTAKI could be a very good example for academic cooperation.

Two professors from our Institute participate regularly in the work of doctoral schools in education of the most important Hungarian universities (Eötvös Loránd University of Sciences, University of Veszprém, and University of Sopron) as supervisors, opponents and members of the qualifying commissions.

As a result of research achievements, fruitful connections and work relations formed during the academic projects, four members of the Institute are participating in doctoral schools, so they carry out explorations in their specific research area. They have already absolved the comprehensive exams, and now they are going to finish their doctoral dissertations.

Beyond thematic publications, research outputs results can also be found in more than 150 articles, conference lectures and papers of the institute members.

Lectures on international conferences (in foreign languages)	51
Books, fragments, papers in foreign language	31
Publications in periodicals abroad	5
Electronic publications in foreign language	9
Conference lectures in Hungary	48
Hungarian books, fragments, papers	72
Paper articles in Hungary	13

Electronic publications	35
Total	**264**

Achievements obtained in electronic training development were presented on the 'Innovation of eLearning-based education' and 'e-Technologies in higher education' national forums. Numerous teaching CD-s, online courses and other auxiliary stuff were introduced to the engineer- and teacher training and vocational training.

- **Scientific Student Work (TDK)**

Both Teacher Training Department and the current Institute accentuated the teacher candidates' systematic preparation for the scientific works as primary task. Students of TDK are given the possibility to familiarise themselves with the basis of technological constitution, cognitive development activity, methodologies and the pleasure of creative work. The team system TDK work, which is supported by lecturers – students cooperation, resulted in an excellent quality evolution (winning the promotion of the Pro Cultura Hungariae application), and is indicated by more than 20 prizes and surcharges in the nationwide conferences. Emphasise only the last years results from its:

XXVI OTDK -2003

- Section of Subject Pedagogy and Educational Technology – 1st prize

- Section of Pedagogic, Psychology, Public Education and Culture and Scholarship for Library Research – 2 surcharges

XXVII OTDK – 2005

- Section of Engineering Sciences– I Prize

- Section of Pedagogic, Psychology, Public Education and Culture and Scholarship for Library Research – 2 surcharges

The most important results, the '***Pro Scientia Award***', which the most valuable study is awarded by the OTDK to the 1st prize winner. Now this prize winner is one of the leading teacher of the Institute, who is working for his diploma in teacher training. His consultant, now the Head of the Institute, - acknowledges the excellent results and progress as a supervisor – was rewarded with the 'Master of Supervisor' title from the President of the Hungarian Academy of Sciences. Our teachers regularly take part to work out the evaluation systems of the OTDK programmes, and take part in the section board works of nationwide competition. The initiative met with warm response in the International relationships, that the Institute gives a professional presentation possibility for excellent performance students of the Hungarian Higher Education across the borders in the Section of Media technology and Pedagogy, which is coordinated by the Institute.