

EXPERIMENT IN RENEWING THE ECONOMY-ORIENTED TECHNICAL TEACHER EDUCATION

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Received: July 20, 2000

Abstract

The key issue of the usefulness of technical education and training is whether the school knowledge meets the requirements of the economy. That is why one of the aims of the development of vocational training is the continuous correlation between the content of the training and the requirements of the user (applier). Announced within the frames of the Phare-programme, the project called 'Strengthening the Links between Education and Economy' gave the possibility for the Department of Technical Education of the Budapest University of Technology and Economics to realise an advantaged development for renewing technical teacher education in content. Below, we are to give a short review about this expansion work, in the frame of which we developed and initiated a system of curriculum and learning resources for the different levels of technical teacher training – teachers, engineer teachers (Md), engineer teachers (Bd), and also teacher trainees, and for in-practice pedagogues and the management of schools.

Keywords: vocational training, technical teacher education, economy, human resources training, special courses.

1. Introduction

The Department of Technical Education of the Budapest University of Technology and Economics has the profession to organise and develop the technical teacher training that is an inter-disciplinary area of higher technical education. It is well-known that this work is differentiated and multi-levelled according to either the aim of the training (certificated engineer teacher [Md], engineer teacher [Bd], technical teacher), or its content (university and college levels), and also special engineering fields of interest. The Department of Technical Education considers it a basic task to develop the well-established system of technical teacher training – besides preserving traditions – adapting it to the changing needs and conditions of the society and the economy.

The need of developing *vocational training* has been strengthened especially by the national and international changes in the last ten years. In the former decade,

great challenges appeared – like never before – in Hungary towards human resources: on one hand, because of the globalisation of world economy, the expansion of informatics, and also the acceleration of the scientific-technical development; and, on the other hand, parallel in time with that, the realisation of the political, economic and social tasks of the change of the system. Understanding the new phenomena, especially the radical changes of the demands in *economy and human resources management*, and – derived from this – filling the increasing requirements, means responsibility and task of high priority for the teachers, because if they cannot keep up with the development, the knowledge of the growing generations will remain behind the possibilities. Consequently, the management of the Department of Technical Education considers it as a strategic goal to improve and develop the content – and partly the structure – of *technical teacher training* according to the economic and social needs, and therefore, periodically, they essentially reform the curricula and the learning resources.

2. Aims, Tasks, Activities, Results

Preparations for reforming technical teacher training, according to the needs explained above, began in 1995 but producing the conditions – both financial and personal – could happen only in 1996. Then, Phare invited applications for a programme, called ‘Strengthening the Links between Education and the Economy’, when the Consortium of the Department of Technical Education (DTE) of the Budapest University of Technology and Economics (BUTE), the National Institute of Vocational Training (NIVT), the Hungarian Society for Vocational Training (HSVT) and Flemish Employment and Vocational Training Service (VDAB), won a tender for reforming technical teacher training and further training.

The main aim of the programme, in the first place, was to incorporate pieces of knowledge into the training system, with the help of which the teachers could better understand the determinative connections of the policy of vocational training, the tasks of vocational training in macro-, institutional and local level planning, the demands of the up-to-date training, and also the knowledge and methods of filling the requirements as an employee in the world of work.

Within the frames of the Phare project between 1996 and 1998, special course programmes and learning resources were developed and initiated for technical teacher training and further training. In the course of this process, with the help of curriculum analysis and selection methods, first we analysed the content of the existing curricula and learning resources, and defined the lacking areas. Then – taking the new demands into consideration – we defined the level of requirements, and also the main characteristics of the contents of training and learning resources to be elaborated. We performed this expansion work for each training course separately.

The last two years proved the new training programme to be capable of living, the main features and results of which we would like to make the readers acquainted with.

2.1 *The project was for the enlargement in content and modernisation of technical teacher training;* for those topics that arose from the interaction of the economy and vocational training, and as being very special, they cannot be adapted to the basic subjects. These topics are the following:

- the influence of the economy (employment) on the change in the structure of professions, and how it influences the development of vocational training;
- recent social-political efforts and real changes, which have an effect on the area of public education and vocational training, and that is why they need to be adapted to teacher training;
- the expectable tasks in the area of vocational training arising from the union with Europe, the activity of international institutions in this area, and how Hungary takes part in them;
- adult education and labour market training – or: the so-called life-long learning and training –, and their functions, systems and up-to-date methods;
- the most important areas of the work of vocational teachers, especially
 - ⇒ the computer-aided design (CAD) and manufacturing (CAM),
 - ⇒ the quality assurance of the production systems,
 - ⇒ the computer-assisted instruction,
 - ⇒ the usage of the up-to-date education technology (multimedia), the knowledge and methods of its teaching;
- the tasks of developing the modern employee characteristics, especially
 - ⇒ job-seeking techniques
 - ⇒ careers guidance, and also job guidance, the knowledge and methods of its teaching according to the focal points of the National Basic Curriculum (NAT).

2.2 *The content of the development in the project was defined differentiated focusing on all three areas of teacher training at the Technical University, as follows:*

Vocational-training-development-oriented engineering teacher training

The main objective of the compilation of engineering teacher training was to develop and introduce a curriculum, which enabled the teacher to understand the relationship between economic and employment needs and the changes in the structure of the profession, taking the needs of both the labour market and the economy into consideration. It enabled the teacher to perform human policy related responsibilities in a company.

Labour-market-oriented engineer teacher (Md) training

One of the main objectives aimed at the development of engineer teacher training was to design and introduce a curriculum, which enabled teachers involved in

vocational training at schools to plan and compile a local curriculum and relevant education material to be flexibly adaptable to the needs of the economy.

Another objective was to design and introduce a curriculum, which enabled teachers to adapt learning resources – on the basis of the professional and examination related requirements of secondary qualifications recognised by the state – to labour market training, taking into consideration the effectiveness of the requirements and also the adoption of methods. This adoption enabled the teacher to perform human policy related responsibilities (e.g. further training of personnel, training consultancy, etc.) in a company.

Job-oriented teacher trainee training

The main objective of the development of teacher trainee training was to train teacher trainees capable of adapting to the new demands of the economy and able to implement changes in the local curriculum and training programmes. Thus they got to know and acquired the practice-oriented teaching methods that were based on the analysis of the profession and that assisted a better fulfilment of the future job.

2.3 Within the project, the *learning resources of the following four main modules* were worked out for the different levels of the technical teacher training under the direction of the Department of Technical Education of the BUTE:

- ⇒ ‘Public education and vocational training policy’,
- ⇒ ‘Adult education and human resources management’,
- ⇒ ‘Innovation methodology’, and
- ⇒ ‘World of work’ modules.

The learning resources of these main modules – *integrated lecture notes, and also schedules and lesson plans differentiated according to the training aims of the courses* – were developed with the content summarised below.

Public education and vocational training policy main module includes those social-political aims, in the interest of the realization of which, there were changes of reform value initiated, and also occurred, in the fields of public education and vocational training, and changes still to be expected. The conditions of vocational training planning – the management, financing and the system of legal rules – make the centre of interest. The students study the state-accepted system of qualification (OKJ, List of National Qualification) in detail, and also the composition and structure of vocational and examination requirements.

In the frames of *adult education and human resources management main module*, the students become familiar with the functions, systems and up-to-date methods of traditional post-schooling, i.e. life-long learning and education. The learning resources put a stress on the main characteristics of school-based and beyond-school-system adult education and human resources training, its expectable

development tendencies, and also the quality assurance of human resources training and up-to-date methods of learning resources development.

Within *innovation methodology main module*, the students become familiar with the crucially important fields of teachers' development activity. This also covers the current issues of local curriculum elaboration and development. The application of up-to-date education technology is emphasized, such as the methodology of computer-assisted education, application of multimedia, etc. During the training, there is a separate part dedicated to computer-aided design (CAD) and computer-aided manufacturing (CAM) issues.

In the frames of *the world of work main module*, the teachers become familiar with the objectives of developing employee features, the most essential knowledge of careers and job guidance, and also the main objectives of teaching job-seeking techniques.

We emphasize that the expansion work aimed equally at the different levels of technical teacher training – like certificated engineer teacher (Md), engineer teacher (Bd), and also teacher trainee training on correspondence courses, and full-time parallel training for certificated engineer teachers –, but in a differentiated way, of course. The lecture notes were made with uniform contents, the difference among courses was given in the time-schedules, the differentiated application was realized through training by these time-schedules.

It is to be remarked that the learning resources made as a result of the development – according to the original project aims –, were adopted in teacher and management trainings in the NIVT, and special learning resources were developed in the Institute, too.

2.4. *The Quality Assurance of the Project*

During the planning and realisation of the programme, we took a *stressed care* of *quality assurance*. In this process of developing learning resources, there was the principle of quality assurance in a more powerful way than in an active training programme already working in a routine way. Think of the continuous control practised by the director in the development tasks following one after the other, the vetting of the learning resources and correcting at the same time, etc.

According to *the quality assurance of the programme, and in favour of its* further development later, we targeted the following sub-aims in the process of planning the development of learning resources:

- to guarantee the possibility of the active expression of the students during the self-supporting elaboration of the learning resources and the training, about the system, the content, and also the usefulness of the new training;
- to provide the teacher teaching the subject (module) with real feedback about their work and the content of the topic taught, according to the organised expression of the students, that can help their self-supporting work-development;

- to help the organised gathering and elaboration of the expressions of both the students and the teachers, defining further development tasks of learning resources and training
- the system of the expression of the students should strengthen the requirements of the interactive training, and the elaboration of the subjects (topics) effectively and alone, though by the direction of the teacher.

2.5. *The Realisation of the Objectives*

- Within the project, *besides the four main modules (hereinafter special courses) planned, we also worked out four more special courses* for the NIVT further training of teachers and managers. Within the frames of the eight special courses, we worked out the schedule and lesson plans for 45 modules (topics) altogether, for teacher training at the university and further trainings in NIVT.
- *We worked out 23 lecture notes in the size of about 60 author's sheets.*
- *We multiplied the series of lecture notes in 450 copies each, and provided them for the students participated in university training, the participants of the institutional (NIVT) further training, the experts (authors, lectors) participating in the training, and also the directors of the labour centres and the teacher training co-institutions.*
- Within the frames of teacher training *at the Department of Technical Education of BUTE*, there was a continuous training in the topics of the four special colleges – for certificated engineer teachers (Md), engineer teachers (Bd), and teacher trainees in correspondence course trainings, and also full-time parallel trainings for certificated engineer teachers. Starting from the 2nd term of the school year 1996/97, the training went on for three terms. During this period, 498 students took part in the new special college training altogether.
- We used the new learning resources *in the National Institute of Vocational Training* first in the school year 1996/97 – using some modules – in preparatory teacher further training aiming at the adoption of the new central vocational training programmes. More than 800 teachers participated in these preparatory trainings.

The whole programme (eight special colleges) within teacher and manager further training programmes in the NIVT, was announced first in the school year 1997/98, where there were 203 participants altogether.

The new programme was accredited in the Ministry of Education by the Institute.

We have to emphasize that after the experimental training in the first term, the new training was accredited at the university from the first term of the school year 1997/98. After finishing the project officially – from the school year 1998/99 on –, more modules are announced by the schedule each term, as special courses.

The NIVT also continuously announces its further training programmes in the same topics.

The activity within the frames of the Consortium *remarkably helped the Department in the project work* because the direction of the development of learning resources explained above – the one of university training exclusively – was realised by the Department of Technical Education of BUTE. We have to add that about 15 experts participated in writing the learning resources, and more than 30 in vetting them, so the professional co-ordinating activity of the university must be emphasized.

2.6. *The Efficiency of the Project According to Students Expressions*

We think it very important to take *the adapted students expressions* into consideration for the judgement of the quality of the work – the learning resources, mainly the lecture notes, and, of course, the lectures – done, especially because most students were in-practice teachers, who obviously composed their opinions from the point of view of usefulness. As a preliminary thing, *we have to emphasize the activity*, which appeared in the suggestions of the students about both the complete training and the lecture notes. The most essential reflections were the following:

- It is evident from the home papers and the questionnaires that the students thought the topics they had studied were extremely timely, because those filled a gap not only in teacher training at the university, but also in the system of the in-practice teachers' knowledge.
- The topics of *adult education and human resources management*, and also *the world of work, created the biggest stir*, which is justified by the great number of home papers chosen from these topics. Within this, the topics of *careers adjustment and careers guidance*, and also the *employee characteristics* called forth interest bigger than the average. Though a great number of students chose the topics about the questions of *the quality assurance of the training*, and the *knowledge of enterprise*, as the topics of their papers.
- It is a general reflection – and suggestion at the same time – of the students that *the most current topics should be initiated* in larger number of weekly hours – either as an independent subject – *in teacher training at universities*. (We did that in the school year 1999/2000, as some topics – e.g. 'The legal rules of vocational training', or 'The quality assurance of vocational training' – were announced.)
- Another aspect of the former suggestion is the initiative that the knowledge and also the training, in connection with the world of work, job-seeking and the enterprises, need to be introduced also *in vocational school education*. (This suggestion is going to be realised, too, with the introduction of the new curricula.)
- *The comments on the lecture notes* were summarized according to the questionnaires, though many opinions were given about them also in the home

papers. The great majority of the students considered the lecture notes valuable from the points of view both in content and the way of learning. The numeral average of the ‘marked’ lecture notes was 4.1.

- The papers proved that the students understood those included in the lectures and lecture notes, and also their role in the development of teacher training, and they themselves could join them.
- It is important to emphasize that *the work of the teachers* participated in the training was described valuable by the students, they welcomed both their preparedness, their advice and help. The organized gathering of the expressions of the students about the training means a useful help for the further work of the teachers and authors.

3. Conclusions

Summarizing our Phare-programme realised for the modernization of the technical pedagogue training, we think that the set aims were fulfilled. The primary feature of this is that the learning resources – developed for the basic university education and further training programmes, and integrated into the complete training – provide the possibility for the teachers to bring economy and vocational training into harmony, in the first place, with developing the practice-orientation of vocational schools by applying the new knowledge.

Secondly: we formed the chosen heaps of knowledge into learning resources and organized them into content capable of teaching and learning. As a result of this 23 lecture notes were written.

Thirdly: the development of the learning resources for vocational teacher training – meeting the demands of the economy – was successful, and these learning resources are also applicable in different training fields.

Fourthly: the new structure of curriculum (special colleges, the modular composition of learning resources, the great number of lecture notes) can ‘offer’ variable programmes for the students, in the first place, the teacher, and, in fact, the vocational schools, too.

Finally, the ‘additional’ profit has to be emphasized that the management and the collaborators of the Department further enlarged their professional connections, last but not least their experiences in the implementation of international projects, which could contribute to similar further consortial co-operation.

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