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The Partnership Method in Teaching Technical Subjects Specific to the Field of Electronics and Automation

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1.The Partnership Method in Studying School Subject " Electronic Circuits"

The method is applied through the mobility Leonardo da Vinci-IVT project, entitled "Europass and Mobility", having the support of the European Commission in the effort of improving the level of professional training and the personal development of students in initial vocational training, from "Ion Mincu" Technical College, Timisoara, Romania, qualification: Operator technician in IT. The partnership consists of "Ion Mincu" Technical College, Timisoara and Zentrum fur Aus-und Weiterbildung Leipzig - ZAW (Leipzig Chamber of Commerce and Industry's Training Centre). The partnership offer students the opportunity to study various types of electronic circuits, to simulate and analyze their functioning in the ZAW labs, under the direct guidance and support of the German trainers. In the lab, the students read electronic diagrams, identify components, their symbols, produce functional electronic circuits; the activities carried out provides the indispensible link between theory and practice.
Modern training principles used are:
- LEARNING BY DOING – learning thorough practice [Fig.1]
- HANDS ON – touchable introduction of objects [Fig.2]
- INTERACTION – the applications in the training process of specialized software which are the foundation of every activity in the laboratory. [Fig.3]

The lab activity stimulates imagination and creativity, develops abstract thinking, decisional capabilities, responsibility, initiative and team spirit, allowing the students to identify the symbols of the electronic components, to produce circuits, to detect and correct potential errors. In the Zentrum fur Aus-und Weiterbildung Leipzig laboratory, the students physically produce electronic components essential to any computer system and which provide the functions of the central processing and memory units: recovery circuits, stabilizers, integrated circuits and logic circuits and assess the circuits performances. The use of software applications, of the virtual lab, gives the students the opportunity to experiment an infinity of electronic circuit variants since the components do not break down and in the end of the process, to select the optimal professional and why not economic solution.
The activity is carried out individually and enhances learning by touchable presence of electronic components, stimulates decisional capabilities, responsibility, initiative and team spirit, allowing the students to identify the symbols of the electronic components, to produce circuits, to put them into operation, to detect and correct potential errors. Eventually, the students check the functioning of the circuits and draw conclusions as a result of a comparative analysis.

Fig.1 Electronic lab of ZAW

Fig.2 Electric circuits

Fig.3 Realization of electronic circuits

2. The Partnership Method in Studying the school subject "Maintenance of computers and computer networks"

A second partnership has been carried out between "Ion Mincu" Technical College, Timisoara and Centrum Kształcenia Praktycznego Wroclaw, Poland in the frame of the Leonardo da Vinci-IVT mobility project, entitled "Eurogates", whose objectives have been to develop the competences settled by the Professional Training Standards, for the qualification: Computer and computer networks operator technician.

In the laboratory, the students have the opportunity to familiarize with computer systems and the functioning of the data transmission networks, configuration and administration of network operation systems: Microsoft Windows 2000 Server / Small Business Server 2000 and Linux, under the direct supervision of Polish tutors. They are provided with PC-s, connected to the Ethernet network, which makes the Internet connection. Every student works on the server. In order to provide the best work conditions, a professional access system is used (SRA HiS-ANOFM in view of passing to the digital system) which allows the configuration of analogue modems ISDN, HiS SDI. The students configure elements, carry out the partitioning of the resources, with the help of the Partition Magic programme, they produce data networks which comply with the data security strategy for access to and from the Internet network, use Virtual Machine to create virtual servers in a network, setting of the recovery points and make the back-up of existent information in order to recover files, the use of network
protocols, respectively TCP-IP, operations which define the rights of various users to access the network (full rights administrator, users, etc). [Fig.4], [Fig.5]

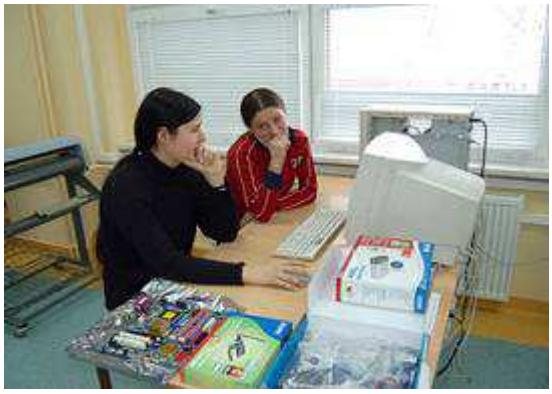

Fig.4 Configuration of a data network

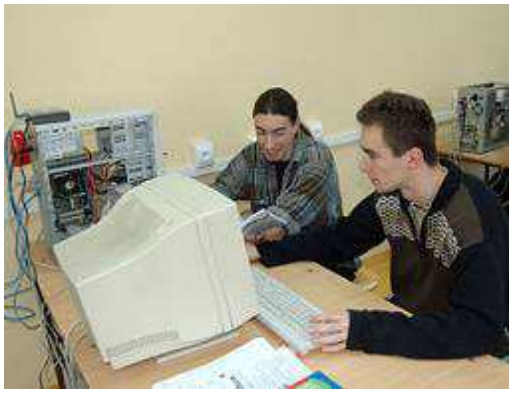

Fig.5 Installation of software application

The examples presented demonstrate that the method of partnership offers the teachers the freedom of choosing the most useful contents, methodologies and means to reach the referential objectives specific to the syllabus area or to the subject, settled by the syllabus. The method allows the replacement of the specific objectives of the subject or the particular syllabus area with intermediate level objectives (referential, target), leading thus to the release of the teacher from obligation to comply with a plan suggested by the planners of the initial syllabus, based on criteria mainly targeting contents and not the concrete abilities of the students. It determines the teacher to become more responsible towards adapting their teaching level and pace to the psycho- behaviourist characteristics of the students, clear definition of the formation objectives (which indicate the long term results settled by the syllabus), of the learning goals (which indicate the students' expected competences at the end of a relatively limited period of time), briefly it leads to curricular decentralization.
The principles which constitute the basis for applying the partnership method in professional training are:
- PRINCIPLE OF COMPLEMENTARITY, "negotiation based on interests"
- ECONOMIC PRINCIPLE, the advantages of cooperation
- PRINCIPLE AT THE LEVEL OF EDUCATIONAL POLICIES, aid and support
- OPERATIONAL PRINCIPLE, networking
Several essential features are to found at the basis of applying the method: definition of a common objectives identified by all the partners, taking a set of measures by each partner in order to achieve the objective, assessment on equal terms among partners, absorption of funds to support the implementation of the method, an optimal structure of the partnership in view of enhancing development through projects.
We illustrated the idea formulated above, on the two examples presented:
- COMMON OBJECTIVE identified by all partners in the situations was: development of practical abilities and professional competences specific to the qualification "computer operator technician" through practical training in another European country, so that we could optimize the graduates' chances to integrate on the labour market.
- TAKING MEASURES by each partner in order to achieve the objective: "Ion Mincu Technical College" designed the Work Programme in ECVET terms, based on the Professional Training Standard, settling activities which correspond and valorise the resources provided by the laboratories of the two partners, and CKP and ZAW provided the training.
- ABSORPTION of funds to support the implementation of the method: "Ion Mincu Technical College" applied for a Leonardo da Vinci grant within the frame of the Lifelong Learning Programme initiated by the European Commission.
- AN OPTIMASL STRUCTURE of the partnership: the relationship between "Ion Mincu Technical College" and ZAW Leipzig has been functional since 2002, we have implemented together several mobility projects and the partnership with CKP is a new one.

3. Instead of closing

Once you have fully realized the power of partnership, all your roads will have a finality.
The present paper aims at representing an illustration of “good practice”, and comes as a support in the initial vocational training, in the fields of electronics and automation, specialization computer operator technician.

References

[1] Educational Tribune, No.996, April 2009
[2] John Dewey and Evelyn Dewey, *Schools of To-Morrow*, University Press of the Pacific, 2003
[3] Danish Technological Institute, *VET Report, Partnerships between Schools and Companies – the Role of Teachers and Trainers*, March 2007
[4] Leonardo da Vinci Mobility project LLP-LdV/IVT/2010/RO/156, « *Eurogates* »
[5] Leonardo da Vinci Mobility project LLP-LdV/IVT/2008/RO/054, *« Europass & Mobilitate »*