

Project E² for the VET: teachers' training for the exploitation of ICT in the Vocational Education

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Abstract: - In the first part of the thesis it is briefly presented the action itself of the project E² for the VET, that is materialized by the Union of Scientific Institutions ASPAITE and the University of Piraeus, in the frame of Act "Educational Software for the VET: Training and Application", of the Ministry of Education. Final object of this project is the in-service training of about 10.000 VET teachers on specific software. It is followed by the presentation of the basic pedagogic frame, which reflects the strategy of planning and realization of the individual actions of the project. Then there is a reference on the educational material, which supported the basic education of teachers, on the training material, which will be used in the imminent seminars for the training of teachers of VET, and in the education of teachers itself. It follows the presentation of the supporting actions of the training project: training teachers' assistants, supporting the teachers and a reference is made on the digital material of support and on the feedback. There are also presented the first conclusions from the internal evaluation of the project.

Key-Words: - educational material, training material, teachers' training, teachers' assistants' training, Information and Communication Technologies (ICT)

1 Brief Description of the Project E² for the VET

Project E² for the VET (Education of Teachers of VET) is the brief title of the project: "Development of the postgraduate educational material for teachers of Information and Communication Technologies (ICT) in Technical and Vocational Education and Training (VET), development of training material for seminars ICT in the VET, postgraduate education of ICT teachers in the VET, and the training of the Persons in charge of Support at Training Meetings".

This project is materialized in the frame of Act "Educational Software for the VET: Training and Application" of the Ministry of Education, which followed an international competition (proclamation 7/2005[1]), with contractor the institution of the union of scientific institutions that is composed by the ASPAITE and the University of Piraeus.

The individual actions of the project are:

- The development of postgraduate educational material that was used in the main education of teachers (unit "E² - Pedagogic") in 8 publications, proportional with the sectors of VET.
- The development of training material for seminars (the training programs that will be held in schools), which will be used during the training of teachers of Professional Education

(already 7 parcels of material for the 1st phase of training have been developed).

The training of 189 instructors, who will then train the teachers of Vocational Education in 2 stages: a) in unit "E² - Pedagogic", duration of 125 hours (already completed), b) in unit "E² - Software", duration of 25 hours.

The development of educational material that will be used for the education of teachers in definite titles of software, but also in tools and services of internet (unit "E² - Software").

The training of teachers' assistants (YYES) duration of 30 hours, on subjects that concern the school laboratories and the special software of Vocational Education.

The development and maintenance of a web page[2], on which it has already been posted the whole educational and training material that will be used for the 1st phase of the training of teachers of Vocational Education.

The pedagogic and scientific support of the teachers.

The Persons in charge of the project of the contractor's institution are: Scientific Person in charge of the project: Konstantinos Makropoulos, Professor of the University of Athens, Chairman of the Managing Committee of ASPAITE; Assistant Scientific Person in charge of the project: Dr Theodoros Kartsiotis, Computer specialist, Coordinator of the production of educational and

training material and Coordinator of the training program; Person in charge of Management: Ioannis K. Psychogios, Person in charge of the Office of Support European and Research Programs of ASPAITE; Person in charge of the project for the University of Piraeus: Simeon Retalis, Assistant Professor at the University of Piraeus; Person in charge for the Educational Material: Fotini Paraskeva, Lecturer at the University of Piraeus.

2 Basic Pedagogic Frame

The effort of passing from the teacher-centered models of teaching, where the frontal teaching is dominating, to the student-centered and to models of collaborative learning[3], is a permanent teaching quest. Efforts that were presented in the past with so called “schools of work” have particular interest for the Vocational Education.

The limited success (or, according to others, failure) of these schools can be attributed to more general educational and sociopolitical factors, depending on the era and the country, where these initiatives were expressed. However in all cases, it is presented as decisive factor the adaptation not only of the educational process, but also of the teacher to the new requirements. This adaptation is structured mainly around the following axes:

- Reformation of the educational material, use of innovative methods and technologies
- Acceptance by the teacher of new methods of teaching, proper education / training for their application

It is a fact that the available educational technology up to the dues of the previous century was limited. The production of educational material suitable and equivalent with the units of the analytic program was a time-consuming and expensive process which actually covered limited material and thematic objects. The first instructive machines (Skinner) and then the special training systems (CAI, CAL) which used PC did not solve the problem. They created however the ground on which the educational exploitation was based, initially of the PC’s technology, then of multimedia and finally of ICT. The result was the constant production of varied forms of educational software (practice, simulation, modeling etc.), which progressively covers wider areas of the analytic program and becomes a tool with which the students may construct knowledge[4].

More specifically as far as it concerns our education, according to the recent programs of equipping our laboratories of information technology for

Vocational Education, the proportion of students per PC is henceforth under 10. Also the quality of the equipment of ICT, as well as the coverage and speed of the Pan-Hellenic school network¹, elevate the relative indicator of our Vocational Education to a satisfactory place among the countries of the European Union[5]. The professional software, that has been adopted to Greek or has been originally produced in our country, and is distributed to schools, without covering unfortunately, all the units of courses and the sectors of Vocational Education – and this is a problem that is met internationally –, is appreciated that it is on high level. It is progressively supplemented with the production of more software, with the important initiatives by the teachers, who can jointly shape “instructive proposals” by using educational gates, as for e.g. the educational gate of the Ministry of Education www.e-yliko.gr. Simultaneously the educational exploitation of the internet and its services provide the informed and suitably trained teacher with the possibilities to find suitable material, which covers units for which special educational software or digital resources do not exist.

It is particularly important that many of our Vocational Education’s courses (more than 120) use in exclusive or importantly high degree the ICT. However, in the rest of the courses the educational exploitation of ICT is also much more greatly available than in other types of schools. Nevertheless, Vocational Education by its nature encourages the instructive exploitation of ICT.

Consequently, today, it appears that firstly the factors that facilitate the new forms of teaching and learning exist, particularly in the Professional Education, and that the material and technical infrastructure does not constitute any more the main inhibitory factor for the exploitation of technologies as educational tool.

On the contrary, the second factor, the teacher, continues to exist, who either has not been convinced for the necessity of the radical change of his methods of teaching, or - in the cases where he/she has been convinced - does not know in which way this can be achieved. Consequently it is profound the necessity for the training of teachers in the exploitation of the computing and network infrastructures.

¹ The Pan-Hellenic School Network interlinks and provides [telematic services](#) to 13.757 schools, to 2.613 administrative units of the Ministry of Education and to 63.127 teachers and 12.161 students of High school (source www.sch.gr).

The modern pedagogic perception for the educational and training process can be condensed in the phrase “practicing – discovering learning in a group collaborative environment”.

- The “practicing” and “discovering” learning can today be achieved more easily from what in the past, (even in an environment of simulation) with the appropriate educational software or with tools of the internet.
- The “group collaborative” approach for the process of learning can be consisted from non-homogeneous (as for the level of computer’s knowledge) groups of teachers, who will process with the help of ICT a certain subject, will come to a result, will present it, and finally, will evaluate it.

Particularly for the students of Vocational Education the acquisition of declarative knowledge through the process of learning by heart, is, not only an anti-pedagogical, but also a useless one. The learning of the process of searching for knowledge is much more important than its acquisition. Our students will face a particularly competitive labor environment, where knowledge becomes extinct very fast; while it is fundamental to know how to “locate” information.

Our objective consequently should not be only the acquisition of procedural knowledge and the modeling, but also the acquisition of follow-up learning qualities. In an unsophisticated transference the main objective, the Vocational Education, can be particularly summarized in the phrase: “*we are supposed to teach the student how to learn*”.

It is obvious that the current pedagogic definitions and methodologies, which have been imported henceforth also in the Greek education (even on the level DEPS and APS), as it is the “multi-subject” approach, multi-scientific, the self-assessment and the self-adjustment, the work plans of the type of project and “group collaborative” teaching, can be applied on such a learning and training environment. Without claiming that the educational exploitation of ICT is the only way for the upgrading of the educational process, we consider that the knowledge coming from the teacher who has the possibilities to use modern technology and has the relative pedagogic background, which supports this knowledge, facilitates remarkably, the radical change of instructive methodology.

It has been observed that a basic danger of scorning the educational value of ICT - and more generally of the proposed new methods of teaching and learning - is their general reference, their presentation to the teacher without concrete examples and without being immediately visible the appropriateness of

their use for the particular specialty and for the particular teacher. In every action of the project “E² for the VET”, authorial or training, the “particular example” is the starting point and possesses the dominant place.

With base the above pedagogic approach, we drew and produced the teaching and training material, we materialized the basic stage of training of instructors and we are now materializing the remainder actions of the project by being concentrated in the below mentioned (strategic - pedagogic) axes:

1) The main point of the project is to bring in contact the teacher of Vocational Education with the modern methodologies of teaching, which exploit ICT in the educational process.

2) All objects of training are approached through concrete examples that concern concrete specialties and sectors of the Vocational Education and concrete object of the analytic program. It follows - where it is necessary - the pedagogic foundation. Those being trained work on their own PC under a “group collaborative” training process as members of a group.

3) The objective isn’t the projection of catholic model of learning and teaching. The teachers of vocational education will have to choose by themselves the form that suits their particular educational objectives of a teaching unit.

4) The education of the instructors and the training of the teachers of VET must have certain aims which must be distinguishable and measurable. It must also be completed with the production of teaching deliverable, in which it will be reflected the degree of achievement of the objectives.

It must be stressed particularly that it wouldn’t be possible the above approach, if the institutional frame and the processes of concretization of the project didn’t exist. More specifically, the relative proclamation of 7/2005 by the Ministry of Education contained a current analytic program, which allowed the materialization of the project with the pedagogic specifications which were mentioned above. The identification of the views for the pedagogic approach of the project and the constant irreproachable collaboration with the heads and the executives of KEENET, department B – VET of DSDE, the head of management (Special Services of Application of Information Society Programs) and the technical adviser (EAITY), allowed its materialization, and, finally, the achievement of the above mentioned objectives, at least on the level of the production of educational material and education of instructors. The achievement of these objectives also ensures to a large extent the achievement of the objectives of action as a total.

3 The Educational Material

Having as a base that pedagogic frame, the educational material was produced. This material was used at the education of the instructors and had the pedagogic axis as central. Then appropriate adaptations and examples “gave the parameters” unique to every specialty. Under this methodology proportional author's teams were created; firstly the team that produced the educational material of the so-called “first publication” and then 8 authors’ teams which gave the parameters to every specialty. Authors’ teams included teachers of university education and teachers of Vocational Education as well, who have direct knowledge of the daily school reality and used ICT for the teaching of their courses. The basic handbook supplemented a great variety of reports (mainly of available sources on the internet) and accompanied the educational material. All this material was available to the instructors and teachers before the beginning of the educational programs. It is available and it can be obtained by all the teachers from the website of the project. Thus a new framework for VET education software is built[6].

To be more specific, there were produced 8 packets of material[7] that bring the title “Postgraduate Educational Material for the Education of Instructors of project E² for the VET” and concern the sectors: Manufactures and Applied Arts; Health and Providence; Agronomics, Foods and Environment; Economy and Administration; Electronic; Mechanical, Information technology; Electrical.

4 The Training Material

The training material follows the general pedagogic strategy of the project and was planed, in order to be used in specific training programs which will be held in schools and was also used for the education of instructors. Up to now the following material has been produced:

- “Designing of circuits of internal electric installations with the use of computer with parallel calculation of currents” for the electrical sector.
- “Designing of mechanical parts with computer” for the mechanical sector.
- “Pre - counting and syntax of budget with computer” for the sector of manufactures.
- “Internal Designing with computer” for the sector of applied arts.

- “Simulation of electronic circuits” for the electronic sector.
- “Object oriented designing and planning” for the sector of Information technology.
- “Educational exploitation of the internet” for all the sectors[8].

The training material was planed so that it can be used in training programs of 36 hours, except from the fourth which will be delivered in a program of 42 hours. Each packet of training material includes analytic teaching program, book trainee’s and instructor’s book.

5 The Education of Teachers

5.1 Education in unit E² - Pedagogic

The basic education of the instructors had duration of 125 hours and was carried out in 2 phases (1st phase May-June 2006 and 2nd phase September-October 2006). There were educated 189 teachers who covered all sectors of VET in 18 training departments, which operated in especially equipped laboratories of ICT in the quarters of ASPAITE, in Athens and in Thessalonica. The basic educational material that was used has already been described in chapter 3.

For the instructors to be familiarized with the “group co-operational” teaching, the following techniques were used: The instructor presents during the first teaching hour the object of the education and the teachers are separated into groups; they work alone for 2 hours (for further incentive of the “group collaborative” approach, the instructor isn’t in the class); then in the presence of the instructor the presentation of the assignments, self-assessment and other’s-assessment, the critical approach and the preparation of the final deliverable unit, is made.

A similar process which has a base the model "hours Θ" (hours in the presence of the instructor, 85 out of the total 125h) and "hours E" (hours without the presence of the instructor, 40 out of the total 125h) completed the educational program.

5.2 Education in unit E² - Software

The planned education of the instructors in unit “E² – Software” will constitute the second phase of training of the instructors and will last 25 hours. It will refer to specific titles of software and to tools and services of the internet. Particular emphasis will be given in the units “The place of software in the

VET” and “Technical characteristics” (focusing on the fundamental meaning on which the proper use of software is based). The methodology and the pedagogic approach will be the same with the first phase. One must keep in mind that the instructors are already ready to undertake training action in unit “E² – Software”. This unit concerns mainly the new titles of educational software and it will have the character of feedback, provided that the first period of training in the schools has already being materialized.

5.3 Support Actions of training work

5.3.1 Education of instructors’ assistants

The education of “instructors’ assistants” (YYES: persons in charge of training meetings’ support) will last 30 hours and will concern subjects of support of the conduct of training and more specifically of the contact with probable technical problems during the operation of school laboratories. Based on a predetermined analytic program the instructors’ assistants are expected to ensure the unhindered technical operation of KSE (centers of training support) of the vocational education, which will be equipped with the necessary material.

5.3.2 Support of instructions – feedback

They have already been created groups of support for the instructors and more generally for the training process as for the pedagogic part. These groups are constituted by specialized executives and correspond to the sectors of Vocational Education. Each instructor can pose to the team of support concrete questions that concern either, the teaching methodology and the educational software of the training programs, or more general scientific and pedagogic subjects that are relevant to the training programs and the project E² for the VET. These questions are answered maximum in three days time by the appropriate team of support. Questions that have more general interest are diffused to the whole body of the instructors.

5.3.3 Digital sources and means of support - feedback

The diffusion will be done via the action’s site (<http://iasonas.cti.gr>). Through the discussion teams of the same site dialogue and discussion has already begun which is expected to intensify, when the trainings begin. It has already been mentioned the way of exploitation of the special website that ASPAITE had prepared for the recuperation of the educational and training material. On this site more interesting information are provided.

It is also studied the way of exploitation the important and extensive educational material that was prepared by the instructors in the form deliverables.

Beyond the digital ways of support, it is also available to the instructors, special secretariat for direct telephone or live contact, so that they urgent subjects can be dealt.

With all the above we consider that the process of feedback and support to the instructors was planned in the best possible way. With the materialization of the first training session in schools is expected the testing of the system under conditions of pressure. We are ready to proceed in ameliorative actions, if this is judged necessary.

6 Processes of Internal Evaluation

For the first time in the secondary vocational education, a program of instructor’s training was materialized by following a “group collaborative” model (which combined practical dexterities, theoretical training, and specific thematic objects and software). Consequently it was expected the concern which existed for the success of the project. For this reason the internal evaluation was the initially formative. Of prime importance was how acceptable and applicable was the methodology of education that was reported. In the end of each instructive unit every teacher in collaboration with the others of his team produced a written assignment, which concerned the unit. The assignment was usually a specific teaching proposal for a unit of a course of Vocational Education. The instructor of the unit evaluated the individual assignments. Following this process in total 8 to 11 units were produced deliverable per teacher which corresponded to units of the analytic training program.

During the overall evaluation the teachers presented a sample teaching to their colleagues by using a specific teaching plan, educational and technological resources. This process was characterized as an oral examination and was evaluated by a committee which was constituted by their instructors. Then the written examination followed, where each trainee presented a complete instructive script by applying the knowledge and dexterities that he/she acquired during the program. It is obvious that this continuous process of formative evaluation – that is rendered in a very small part, at the end, accumulative – aimed directly to the improvement and evaluation of training project.

Finally there were produced roughly 2.000 assignments (each trainee delivered 2 CDs which were handed to the head of management) and concern the individual units and the final written examination.

7 First Conclusions

From all this material, from the questionnaires of internal evaluation, but also from qualitative data which were collected with the method the individual and group interviews, and even if we are in the stage of processing, the following first conclusions can be reported :

- The training process of “discovering” – “practicing” learning in a “group collaborative” environment, (despite the fact that it was initially viewed by certain teachers with mistrust) finally became in very great extent accepted by the teachers.
- The evaluation of the training project led to direct corrective interventions where necessary. The continuous handing-in of assignments in the form of projects, resulted to the creation of an active environment of learning and, finally, without any problems, helped the training process and the evaluation of the trainee. It is particularly important that the group collaborative method and the general planning of the training mobilized the total of the trainees (it did not exist even a case of refusal of production of the intermediary and final deliverable).
- To a great extent the objectives of the educational program were achieved: the instructors came in contact with the ICT, got to know through concrete examples of how these can be used instructively in the VET and simultaneously acquired the basic theoretical pedagogic background.
- Many of them declared that they will use the same methodology not only at the training of the teachers, but also in their daily instructive practice in the school classes.

It also appears that the special instructive objectives of the relative proclamation (7/2005) were achieved. In other words the teachers

- are in position to exploit the internet in the educational process: they know of the internet's services, even of those which support the distance learning, can evaluate and develop digital material available on the internet (applets, freely available software, etc.) and can publish material in the internet.

- are also capable to develop software in the educational process: to categorize the software, to evaluate the appropriateness of software for educational use, to determine the elements that contribute in the planning of successful educational activities and to draw and materialize educational activities.

To all above mentioned conclusions, the instructors' great effort to put into practice the basic principles of adults' learning (instructors were educated on the characteristics that concern the education of adults, the particularities that are expected to be met during the conduct of trainings in the schools and for the results, the difficulties and the given solutions of the pilot work named LAERTIS[9]) was extremely reinforcing.

As we have already mentioned we are in the stage of data processing. Though many educational policy makers believe now that ICT can be a catalyst for educational reform in VET, we do underline the in-service training necessity with reference to teach effectively with ICT and, finally, to support active learning in school classes.

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