

# Turning University Professors into Competent Learners

or

## How to Interweave a new Educational Methodology with a Tool for Lifelong Learning

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**Abstract**—This paper presents the results of a pre-pilot experiment offered in Bulgaria for teachers' trainers who have to update their skills using ICT in teaching. The pre-pilot became a synergy of results of two European projects – the Leonardo Innovative Teacher (I\*Teach) project and the FP6 TENCompetence project. The methodology for building ICT-enhanced skills, developed in the frame of the I\*Teach project, was applied for training teachers how to use ICT, using the provided by TENCompetence project tools and infrastructure.

**Index Terms**—ICT-enhanced skills, Teachers training, Virtual community

### I. INTRODUCTION

Lifelong competence development is a crucial need identified for the contemporary information society. In order to provide adequate conditions for everyone to participate in the lifelong competence development, we need to introduce a lot of changes in society – political, social, technological, etc. In order to stimulate these changes, European Commission launched several research programs, aimed to support the process of change.

The TENCompetence project [1] is one of the major responses of the research community towards finding a solution to the above mentioned society need. It is an Integrated Project in the 6<sup>th</sup> FP of the EC, in the IST – Technology Enhanced Learning priority. The project has three main objectives:

- To research and develop an easy-to-use, integrated, open-source, standards-based, extensible and sustainable European infrastructure for lifelong competence development.
- To ensure the validity and viability of the approach during the project by performing real-life pilot implementations in different organizational and international settings.
- To ensure the sustainability of the infrastructure by creating opportunities and training for new innovative European organizations in the field of lifelong competence development.

This paper presents main achievements related to the second main objective, during the pre-pilots in Bulgaria for teachers' trainers who have to update their skills in applying ICT in teaching. The pre-pilot was organized in

July in Sofia and becomes a synergy of results of two different but related European projects – FP6 TENCompetence project [2] and Leonardo project Innovative Teacher (I\*Teach) [3].

We are presenting the main pre-pilot characteristics, the main challenges for the trainees, and main results from the pre-pilot.

The main research questions addressed during the TENCompetence pre-pilot were the following:

- To discover the optimal way to interweave both mastering the I\*Teach methodology and an application of the new tool Personal Competence Manager (PCM);
- To search for appropriate methods to present the new methodology and the new tool to trainees with a high professional level in the context of both ICT and teaching;
- To find the right balance between the face to face and distance training, enabling training on-the-job learning to be implemented.

By finding the right solutions of above mentioned questions we have been prepared for the real implementation of the TENCompetence pilot training experiments.

### II. THE PRE-PILOT SETTING

#### A. The I\*Teach methodology and the PCM

The training methodology, applied during the pre-pilot, was developed in the frame of the I\*Teach (Innovative Teacher) project. The research done in this project identified four groups of important for the Information Society skills– working-in-a-team, working-on-a-project, information presentation and information acquiring skills. The research showed that these *soft skills, enhanced by means of ICT, and named* ICT-enhanced skills [4], are very important for the people in order to perform better and more efficiently in the Information Society.

The I\*Teach methodology is laid on the Project and Problem based learning methods. The main idea of the methodology is to build ICT-enhanced skills through *continuous, repeatable and gradually accumulated experiences and expanded activities* leading to concrete *goals* by performing specific *tasks* in different *context*.

This methodology tries to find the balance between the full freedom of the learners to choose their learning path,

and the necessity to follow strictly the fixed learning path offered from the teacher.

The I\*Teach educational scenario is the main concept from the methodology. Each scenario presents an educational goal to the learner. Usually the goal is a *challenge*, gathered by brainstorming from the “real life” situations and taking into account the interests of the learners. To solve the challenge, learners need to achieve a set of *milestones*, each one linked with attaining specific results. Learners decide by themselves how to move from one milestone to another, thus choosing their own individual learning path. The trainer should stay as invisible as possible, monitoring the workflow and helping/intervening only when there is a real need [4].

An I\*Teach scenario represents a composition of tasks, needed to be implemented in the context of an active learning environment. The metaphor behind such a scenario is a *path* (the process) traced by *landmarks* (the milestones) leading to the *peak* (the goal). Following through the *milestones* of the I\*Teach learning scenario, aiming to achieving the final goal, learners gradually develop technical skills as well as *soft skills*.

The comprehensive description of the I\*Teach methodology can be found in the I\*Teach methodology handbook [4]. It contains explanation of the all active learning methods applied, detailed description of the *ICT-enhanced skills* to be taught, and presentation of specific approaches for the development of these skills. And most importantly, this handbook contains a rich set of sample educational scenarios, that have been designed and developed to support the I\*Teach methodology.

Why is it useful to apply the Personal Competence Manager (PCM), developed in the frame of the TENCompetence project, for the I\*Teach trainings?

Our observation from the first I\*Teach training workshops shows that the knowledge and competencies gained do not finish with the end of the training [5]. Most of the teachers face new challenges during their work in the class. They feel the need of continuing the exchange of good practices in the professional community formed during the course. Thus we identified a strong need of the trainees to continue their further competence development preserving all the information channels built during the initial training. The I\*Teach trainers found the PCM as the most appropriate tool to provide teachers with a relevant support and ensure their lifelong learning. They considered PCM to be a tool for converting an established professional community into a virtual one, rather than just a tool for communication. In addition, we found it very easy to put all available I\*Teach learning resources and information into the PCM system. But most of all, our expectation was to use successfully the PCM for teachers' competence development and to give them a chance to continue work on eLearning materials in collaboration with other colleagues and students.

What characteristics of the PCM are identified as the most important for the I\*Teach trainings? PCM is a system designed especially to support peoples' personal and Life Long Competence Development. In contrast with existing learning systems, designed around concepts like lecture, course, training program, the main concepts in the PCM are learning network, competence profile, and competence development program [6]. PCM gathers competence related information drawn from sources at multiple

levels, and is presenting this information in a context, structure and format, which are determined by the user.

The PCM functionalities include forming/joining virtual *communities* (learning networks) with common professional and/or personal interests. Each community can develop different *competence profiles*. For each competence profile different *competence development plans* can be designed, leading to improving or achieving a set of specific *competences*. Each plan may contain various learning paths, comprised by different learning activities and supported by specific knowledge resources (Figure 1).

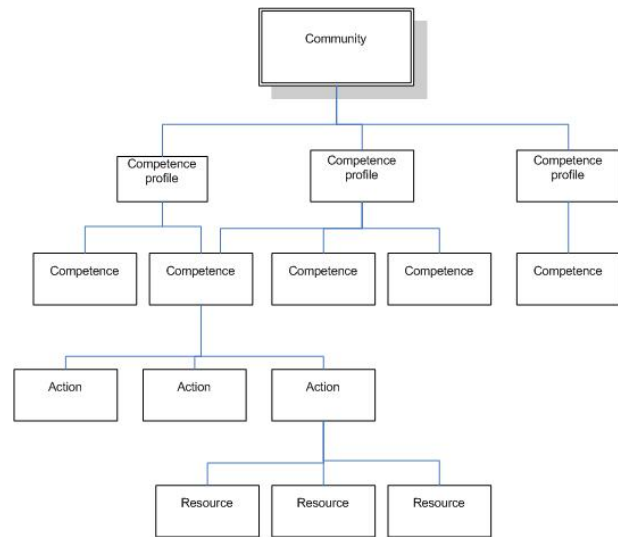


Figure 1. Structure of the PCM community

Working with the Personal Competence Manager users can choose their own competence development plans, follow them and in such a way to build the desired competences. They can rate any existing object (plan, activity, resource) in relation to achieving specific competence profile. They can easily share their plans, ratings, resources and ideas using the embedded communication tools. The self assessment instrument and *best way* map help learners to find the most efficient for them learning path through any competence development plan.

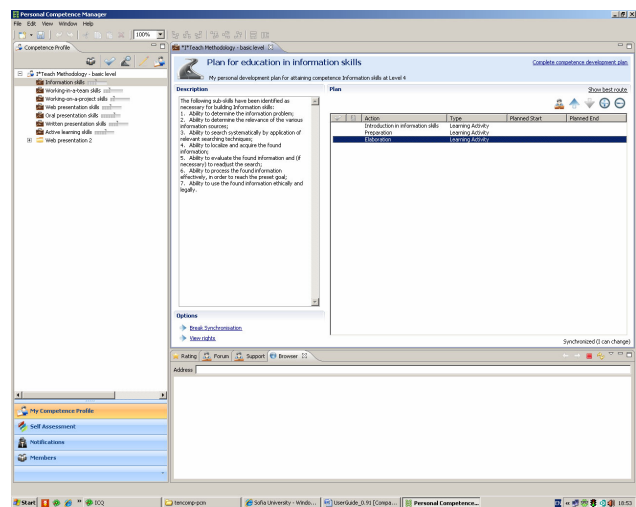


Figure 2. The PCM user interface

The PCM system is available as a service-oriented architecture with a Java Eclipse client (Figure 2), with new

Web-based client interface planned to be available at the next stage of the TENCompetence software infrastructure development.

All these features make PCM the perfect tool for putting in action the idea of *collective intelligence* [8], followed by the standard I\*Teach trainings so far.

### B. The pre-pilot research methodology

The pre-pilot research methodology includes five main steps:

- Choosing the experimental group
- Analysis of the target group
- Pre-pilot experiment: using PCM to teach I\*Teach pedagogical approaches and ICT-enhanced skills
- Analysis of the learners' results
- Gathering feedback from the experimental group and analysis of the information received

All the steps are described in details below. One input questionnaire was used for gathering the information and analysis of the target group. Final feedback from the learners was gathered via informal interviews, final questionnaire, and final discussion covering the level of satisfaction, the level of self-confidence, results from the learning, problems met and suggestions how to improve the training.

### C. The trainers

The main problem with introducing a new toolkit is that often the emphasis is on the tools rather than on the context in which they could be used and on the didactical strategies.

With this in mind training was carried out by two teams of trainers: one in charge of applying the I\*Teach methodology, and the other - of the TENCompetence infrastructure.

Since it was not possible to upload any learning resources at the current version of PCM, we proceeded as follows:

- The I\*Teach team prepared the instance of the course in MOODLE where the Methodology was presented as a group of several word documents, describing the I\*Teach methodology and explaining how best it can be used with 3-4 examples, which are called learning scenarios, consisting of several learning tasks, all described in a well predefined templates.
- The TENCompetence team developed a set of units of learning [7] presenting the main ideas of the I\*Teach methodology, accessible through the SLED server.

### D. Selecting the right participants

There were several important arguments determining the selection of the participants in the pre-pilot experiment:

- it was scheduled for the summer (when most of the secondary school teachers are in vacation)
- the participation was on voluntary basis
- in order to promote the new methodology, we believed that we had to apply it to teacher trainers first ("you teach as you were taught")
- we needed people open to new challenges and prepared to learn every day something new

- the PCM functionalities were not fully developed yet and any qualified and constructive recommendation would be helpful

The easiest solution was to invite university lecturers involved in pre-service teachers' education who already had excellent computer skills.

42 participants were involved in the pre-pilot. The youngest was 21 years old, while the oldest was 67 years old. The ratio between males and females was roughly 1:1 (22:20). Most of them were University lecturers specialized in teacher training (from areas like computer science, language learning, educational technology, etc.) but there were also 12 secondary school teachers.

As we needed more detailed information about the target group each participant filled in the initial questionnaire containing the following main sections:

- personal information
- qualification enhancement
- experience on web based education
- resources

The results (Table 1 and Figure 3) show that all of the participants have a high level of education:

TABLE I.  
PERSONAL INFORMATION

Personal information	
Total	42
Teachers	12
Level of education	
Preliminary school	0
Secondary school	0
Vocational school	0
College	2
Bachelor degree	7
Master degree	24
PhD	9

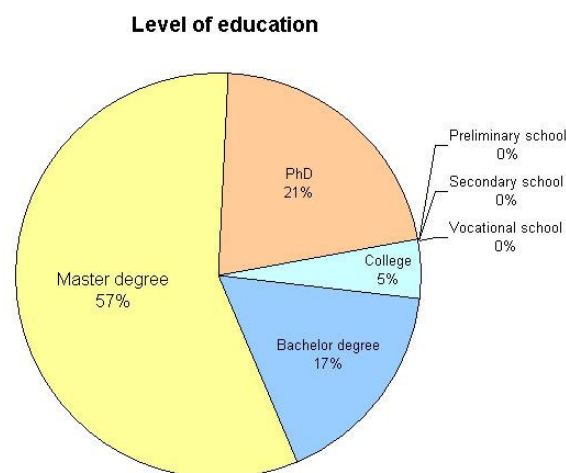


Figure 3. Level of education

Most of the participants (93 %) felt themselves as experts in ICT-enhanced skills. All participants have had experience in web use – in their daily work they exchange

files with colleagues and friends, use chat, search information in the internet, but only few of them (13%) participated frequently in professional discussion forums and online conferences while 46% never have done that.

Although higher proficiency level, people declared their will to improve their functional, social and associative skills, to raise their creativeness and to develop stable professional behaviors.

We, the trainers, faced serious challenges with such a choice, though:

- The setting was reverse – university professors were trainees of high school teachers (3 out of 4 in the I\*Teach team!). These teachers were open-mind, active young people, trained to use I\*Teach methodology and very well performed as trainers in past I\*Teach workshops.
- The high professional level of the participants required a special approach in order to convince them in the applicability of the new methodology
- The trainers were expected find an appropriate context for a motivated introduction of a tool with which they themselves didn't have sufficient experience
- It was not an easy task for the TenCompetence trainers to provide invisible help (an important feature of I\*Teach methodology);
- The goals of both the trainers and the trainees should be put in harmony.

#### E. Defining the most important I\*Teach skills which should be trained

After the target group and related problems were clarified the next task for us was to verify how important for participants I\*Teach skills are and which of them are the most important for professional development of the group.

The questionnaire submitted to the participants covered seven main categories considering to the I\*Teach methodology:

- Teaching information skills using ICT
- Teaching written presentation skills using ICT
- Teaching oral presentation skills using ICT
- Teaching short presentation skills using ICT
- Teaching web presentations skills using ICT
- Teaching working on a project skills using ICT
- Teaching working in a team skills using ICT

Each section was divided to subsections according to the specific sub-skills. Each participant should evaluate his/her competence in each sub-skill using a 1 – 5 scale as follows:

- 1 – Needs assistance
- 2 – Progressing
- 3 – Proficient
- 4 – Exemplary
- NA – Not applicable
- DK – Don't know

The summary of results (Figure 4) show that we should design the training in such a way that the weak skills to be improved.

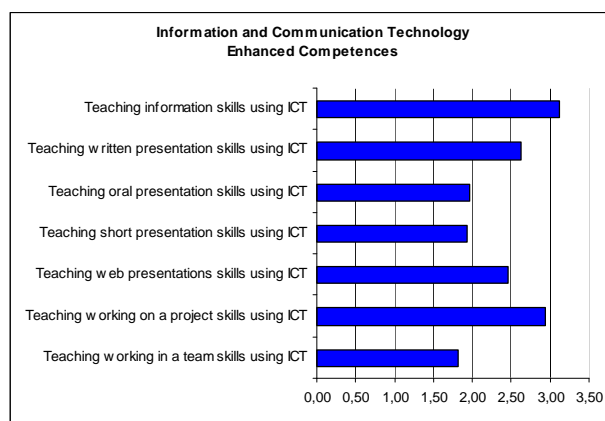


Figure 4. I\*Teach competences need

The detailed information in the questionnaire gave us an idea to group people in small teams. This approach would allow them to see “by the first hand” what the most common problems in working in a team are and to find their own solutions. The tasks given to the groups should require short oral presentation of the intermediate and final results. This decision should reflect to the different kinds of presentation skills, especially to the *ability of public speaking* which is marked as a weak point by the participants.

To get the members more enthusiastic in the training we decided not to limit the topic but to extract it from the participants' interests and abilities.

### III. THE WAY TO COMPETENCE

The duration of half a-day face-to-face training followed by two weeks distant collaborative work and a half a day workshop at the end turned out to be sufficient for the pre-pilot testing.

Unlike all previous I\*Teach training workshops [5], the idea was to put the main load of the training on flexible self-adapted distance work, without close supervision of the trainers.

The biggest challenge for the trainers was to put in action a methodology, new for the trainees, in a technical setting, new for both the trainees and the trainers, for a very short time in a natural way, i.e. to interweave the concepts of competences and communities with the interests of the participants.

The intense training started with a 3 minute introduction of each participant, followed by grouping by interests and hobbies and identifying (via brainstorming) topics for competence development.

The next step for the trainees was to create communities based on the intersection of the expressed interests in developing concrete competencies followed by designing a competence development plan (by means of PCM) and finally - to present their work to all the participants.

All these steps were in fact the so called *milestones* of a typical I\*Teach scenario which they had to go through during the face-to-face stage of the training.

During the whole process we relied on the good proficiency level of our trainees and provided them with *invisible* assistance only when needed. Thus we let them *discover* the I\*Teach methodology by means of PCM functionalities.



### A. The teams

The process of building teams was moderated by trainers. Participants were provoked to answer the initial questions “In which area I feel I’m an expert?” and “In what I’d like to become an expert?” thinking not only about their professional development but also for their personal development, hobbies, social life etc. After receiving the feedback, five groups were formed according to the interests of the participants. Each team was first asked to choose one competence profile (depending of their interests) with very short brainstorming sessions. Later on each team should develop specific competence development plan leading to acquiring of the competence profile chosen. The moderators supported the team building process and looked for that in each team to participate at least one “expert” and at least one “amateur” regarding to the chosen competence profile. Two trainers (one in using PCM and other in I\*Teach didactics) supported each team. The trainers were screened by the roles of regular members of the teams.

The following teams were formed:

- The team with competence in Arts, with special emphasis on dancing.
- Communication in natural language.
- Time management.
- The family life, with special emphasis on how to become better parents.
- The development of e-learning courses.

### B. The first challenges to the participants

After the teams were formed, they started to develop the chosen competence development plan using the PCM system. They first needed to develop new or to join existing communities, according to the competence profile chosen. Then, for each community chosen, they needed to create new or re-use existing competence development plan, leading to the competence profile chosen. For each such plan teachers needed to develop new or choose from existing learning activities. For each learning activity they needed to find and describe the adequate learning resources.

The challenges provided good relationships between the I\*Teach ideas and the PCM tool:

- The team members should distribute their tasks (working on skill *working-in-a-team*)
- For a short period of time (20 minutes) they should develop joint result - *competence development plan* (like *working-on-a-project*) with support of technologies
- The groups had to search and find learning resources (working on *information skills*) for the learning activities
- During the final discussion they should present their own result – the competence plan developed (working on a skill *information presentation*)

Each team had 5 minute to present its results during the final discussion. We were pleased to realize that all teams succeed to develop community in PCM, to prepare draft competence development plan and to find appropriate resources for the planed learning activities. An element of one of the prepared results is given on Figure 5.

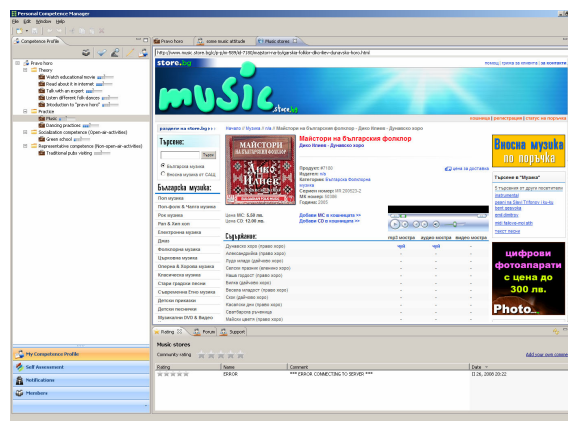


Figure 5. Folk dancing competence plan

Participants and mediators discussed what skills were used during performance of the tasks, what problems arose, what methods for the skills development was applied. The participants shared the opinion that the challenges were the main motivation factor. “Experts” in groups reported that by searching how to help other team members to develop their competences, they learnt a lot about how to structure the competence development plan, discussing with the team members what kind of activities they like/dislike or found useful. By working in a team learners become more confident on the area and that they will be able to develop competence development plans for their learners.

### C. Distance work

During the next two weeks teams were asked to finish their project (I\*Teach scenario developed in the form of competence development plan) working from a distance. Each group should:

- Fully elaborate the competence development plan in chosen area.
- Describe the scenario and all its learning activities and tasks according I\*Teach methodology.
- Collect and develop learning resources

The competence development plan should be described in PCM and should include:

- Learning activities for all intermediate skills and way of action.
- Roles (what are the main roles of participants in learning, which activity to which role is appropriate, which resources are accessible for each role).

The final project (I\*Teach scenario developed as a PCM competence development plan) should be developed and presented to the other teams using the native PCM characteristics and components (competence profile, competence, community, learning plan, learning activity, learning resources).

### D. Final results and feedback

Two weeks later (in the heart of the summer) the participants in TENCompetence PCM pre-pilot put on the table their results.

The date and time for the final face-to-face meeting was initiated by one of the teams – Time management group, which sent an invitation to the other groups (Figure 6).

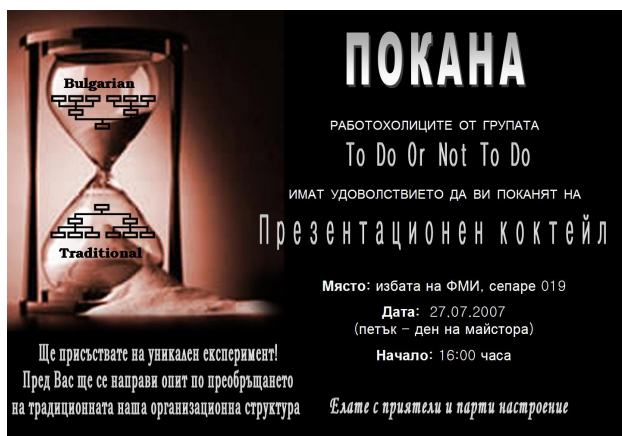


Figure 6. The invitation as an example of short presentation

This invitation carried out two more messages: 1) to encourage the rest of the teams to work more actively; 2) to demonstrate the skill *short presentation* (and to motivate other groups to demonstrate higher skills as well).

The results of the five groups surprised us, the trainers, as well as all the participants, with their quality and originality.

The competence development plans developed by all five teams showed very good understanding of the I\*Teach methodology and good mastering of the teaching skills according to it, as well as appropriate and professional implementation in PCM (Figure 7).

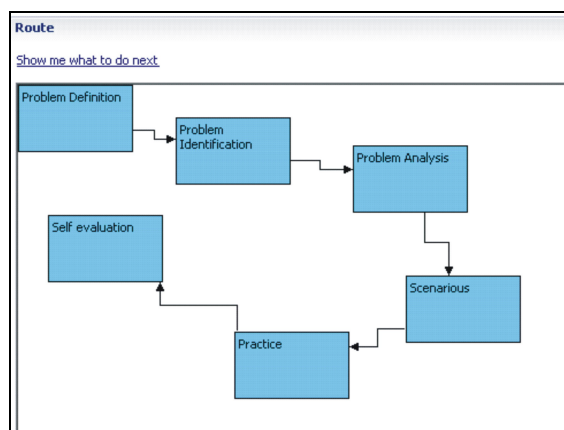


Figure 7. A learning path constructed by the team working on a Time management competence

Some of the teams had ideas which could not be realized with the functionalities of the current version of the PCM. Participants gave their recommendations for the future development of the PCM and expressed their interests in adding some new features. Some of their recommendations were:

- to have a possibility to work with an hierarchy/ ontology of competences;
- to improve the communications in the learning networks adding more functionalities to the forum and chat available in PCM;
- to have the possibility to describe repetitive activities (such as a cycle of actions with conditions) as done in Figure 8.

## Action Plan



Figure 8. A learning path in the form of a 3D spiral

One of the most difficult questions arose from the Arts team - how to measure competence development level in such skills like dancing, singing, etc. The team suggested some possible methods for self-evaluation, but question remained open.

During the final discussion we collected both the informal feedback from learners (interviews, comments, opinions) as well as formal feedback with the final questionnaires prepared in advance. The goal was to evaluate how successful the combination between I\*Teach methodology and TENCompetence instrument was, which of the I\*Teach skill were developed during the training, what was the level of satisfaction from the organization and from the trainers proficiency.

All of the participants marked that the instructors were very well prepared and worked in good coordination. They were satisfied also from the technical equipment available for the training.

Most of the participants declared high level of satisfaction from the pre-pilot experiment, while 83% shared that they received more than they expected in advance.

According to the skills acquired, 76% from all participants expressed significant improvement of their *soft* skills, while 42% from the learners appreciated the high level of acquisition of their technical skills (the total is more than 100% because some people check both categories).

Only 5% of the group (3 participants) did not feel satisfied enough by their participation in the pre-pilot.

## IV. CONCLUSIONS

The first main result of the pre-pilot experiment was the confirmation of our hypothesis, that the learning of the I\*Teach methodology can be successfully supported by the use of the Personal Competence Manager. This was confirmed both by the very successful results from the each one group, as well as from the individual opinion and performance by almost all participants. The chosen balance for learning I\*Teach methodology using the PCM tool as described in the paper, prove to be not only successful and efficient, but also motivating and even exciting (proven by the successful results and positive opinion of the learners). The intensive and very productive work during the distance phase of the pre-pilot shows that we

succeed to find the right balance between the face-to-face and distance phases of the pre-pilot.

The PCM tool can be used also in the lifelong professional support of the innovative teachers. The community created during the pre-pilot can be enlarged with other teachers and it can ensure a sharing of experience, ideas, didactics and pedagogical approaches.

PCM developers received nice ideas for further improvement of the tool.

The most important result of the pre-pilot experiment was that the trainees managed to improve specific competences of their choice — not just to know how to work with one more tool, or how to implement one more methodology, but to improve their self-confidence by proving to themselves that they could be a lifelong learners. Another important finding for the participants was that each one of them learned a new thing not only in a relatively new field but even in a field he/she felt an expert.

The enthusiasm shown by all the teams encouraged us to perform the real pilot training with secondary school teachers two months later by using the same strategy. The fact that the synergy between I\*Teach Methodology and TENCompetence ideas can produce very promising results, raised our confidence during the next pilot experiments.

Our next step is to test the PCM in the real school settings, where the trained teachers have to apply what they learned so far.

#### ACKNOWLEDGMENT

The work has been sponsored by the TENCompetence Integrated Project funded by the EC 6th Framework Programme, Contract No 027087 ([www.tencompetence.org](http://www.tencompetence.org))

Our deep gratitude to Eugenia Sendova, a member of the I\*Teach project, for the fruitful discussions and suggestions.

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This article was modified from a presentation at the 4th Competence Open Workshop in Madrid, Spain, April 2008. Manuscript received 08 June 2008. Published as submitted by the authors.