Like a (School of) Fish in Water (or *ICT-Enhanced Skills* in Action)

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Swimming: from the outside looking in, you can't understand it; from the inside looking out, you can't explain it.
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Abstract. The paper presents pilot experiences related to an educational methodology developed within the European *Innovative Teacher (I*Teach)* project for building ICT-enhanced skills [1]. The methodology is presented in the context of a workshop for teachers in mathematics and informatics with a special focus on enhancing presentation skills. The authors share their experience in treating the very workshop as a project with specific stages - analyzing the audience's interests, developing a presentation scenario around a leading metaphor in harmony with the setting, distributing different roles among the presenters, involving the audience in an active reasoning and sharing. Thus the workshop has demonstrated at a meta-level how the collective intelligence of teachers could be harnessed in action. The main message is: such an approach makes teachers feel like co-creators of the *I*Teach* project´s ideas and teachers need only a bit of praise or encouragement to recognize themselves as *innovative teachers*.

Keywords: Teacher education, ICT-enhanced skills, active learning methods.

1 Introduction

A broad range of new skills needed for teachers in the knowledge-based and life-long learning society have been identified in studies within the EC program *Education & Training 2010* [2]. An important part of these skills refers to the competences and abilities of teachers and trainers to design, develop, conduct, facilitate and assess teaching and learning processes aimed at acquisition of productive *soft skills* enhanced by Information and Communication Technologies (ICT). These skills include:

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knowledge presentation, working on projects, problem solving, and communication skills [3]. In response to the demand of enhancing the ICT skills with such soft skills the Leonardo da Vinci *Innovative Teacher* (*I*Teach*) project has been launched with the participation of Bulgarian mathematics and informatics educators [4]. The focus of this project is on developing a practical methodology and supporting tools for building *ICT-enhanced skills* – a concept coined to denote the synergy between soft skills and ICT skills. The preliminary study within the project is oriented to the elaboration of this concept. Through the collaborative effort of partners from seven European countries (Bulgaria, Germany, Italy, Lithuania, the Netherlands, Poland, and Romania) the skills for

- searching and selecting information
- presenting information
- working on a project
- working in a team

are identified as the *ICT-enhanced skills* for which there was a biggest need in the countries involved [5]. In what follows we try to give an idea of how to implement the *I*Teach* methodology in the context of building presentation skills. The particular event discussed herein is a workshop organized as a satellite event of the *Annual Spring Conference of the Union of the Bulgarian Mathematicians*, Varna, 2007. This workshop is a meeting of math researchers and teachers of highly achieving students in mathematics and informatics.

2 *How to Make a Good Presentation* – Easier Said than Done

As discussed by Syslo and Kwiatkowska in [6], changes in mathematics education may be expected according to the model for ICT development when the first stage (*Discovering ICT tools*) and the second stage (*Learning How to Use ICT Tools)* are passed, and the third stage (*Understanding How and When to Use ICT Tools*) is reached. Thanks to numerous training courses in ICT for mathematics teachers in Bulgaria the first two stages have been passed successfully. Now has come the most difficult and important one – understanding *How* and *When* to use ICT tools so as to achieve particular educational goals. A series of sample educational scenarios have been designed and offered in [7] in support of this third stage. An *I*Teach* scenario according to the project framework represents a composition of tasks (implemented by active learning methods) leading to an educational goal by covering intermediate objectives (*milestones*). The metaphor behind such a scenario is a *journey* (the process) traced by *milestones* leading to the final goal [4]. It was important for the *I*Teach* research team to convince the ICT teachers with whom we worked that their (the teachers') own presentation skills and the presentation skills they were expected to develop in their students should be far beyond the technical skills of using PowerPoint. Thus the teachers should realize the very preparation of a series of slides is just one part of a very complex project in which the objective of communication is not the transmission of information but the reception of it. Of course, guidelines on how to make a good presentation and how to avoid bad ones could be found on numerous sites of Internet and in many textbooks

on ICT today. The real problems now are how to implement this advice and, even more difficult, how to teach what *good presentation skills* mean. This was the gauntlet the authors of this paper took up when deciding to organize a workshop on *I*Teach* methodology for building ICT-enhanced skills.

2.1 Preparing – Some Necessary Conditions

We had made PowerPoint presentations on the *I*Teach* methodology at longer previous workshops [4] but we were not sure how to make best use of them. Following the custom of some presenters we might have just as well reduced the number of slides… Really? We knew that our whole preparation and presentation at the workshop should be geared not to us, the lecturers, but to the audience. Our main objective was to make our message understood and remembered. (Easier said than done.) As the ancient Greek aphorism goes *You could not step twice into the same river.* This time the "waters" (the concrete conditions) were really very different: the workshop was held at the biggest sea resort in Bulgaria and we decided that it would be a good idea to center it around the Chinese proverb: *Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime*. We had quoted this proverb on many occasions but this time we decided to check it in practice and discuss the matter with an expert in fishing. We talked with him about his skills and asked his permission to take pictures of him in action letting him know that they would be used in our workshop. He was very cooperative and sympathetic with the teacher's labor. The scenario was becoming clearer in our heads: the next thing we did was to buy two toy fishing rods.

2.2 Refining the Idea of How to Start

We kept looking for the most appropriate opening (as a very essential part of the scenario) – probably one in the style of showing that we were not scared to be an object of laughter; we hoped to prevent the teachers from following the man who had decided *not to go into the water until he learned to swim*. It would have been nice to be original and many of our trainees expected us to be so (at a previous *I*Teach* training session immediately after the New Year we, the lecturers, appeared with funny hats in harmony with the season [4]). But to invite the audience in the swimming pool in bathing suits and funny hats would have been too crazy even for us. Still we needed something that would give a special flavor to our workshop and we found it – *to catch our audience with fish bites*. The chef from our hotel was gained for the cause – he prepared small fish sandwiches. Thus the opening was ideally tuned to the circumstances – noon time, the audience had sacrificed their lunch to attend the seminar and deserved to be awarded in a cocktail style. The educational role of the fish bites was still to be seen…

2.3 Analyzing the Audience

We knew in advance that most of our audience would be mathematics and informatics teachers. In addition, as a satellite event of the conference there was a section of high

school students at which they were expected to present their projects in mathematics and informatics at a very high performance level [8]. Thus the workshop title *The innovative teacher* had to attract both young and very experienced colleagues who were eager to keep up with the most modern tendencies of applying ICT in mathematics education. What would be most interesting for them, something we could help them with? The original plan was to orient the workshop towards written presentations of teachers' good practices, e.g. *How to write an article for a math journal?* But after some preliminary discussions we realized that teachers were lacking a real motivation for submitting articles to journals. At the same time there was a serious interest in the oral presentations of projects – most of the teachers were working with their students on research projects and teachers' success depended to a certain extent on the presentation skills of their students Furthermore, the teachers themselves were in the role of presenters in their everyday activities. Depending on their presentation skills the attention and the interest of their students would be held or lost. But how could we be sure that we know better than our audience? And even if we did, should we follow the traditional style of preaching the rules (taught by many of the teachers themselves) by means of professionally made slides? It was clear that we should not deliver a lecture but rather rediscover the ideas together and present at a meta-level the *I*Teach* methodology for building ICT-enhanced skills (with a focus on the oral presentations skills). Our message would be: *If you want to learn to swim jump into the water with us,* quite in harmony with the active learning methods [7].

2.4 Balancing the Realization – Some Sufficient Conditions

Our rich teaching experience and the fact that we would present as a team made us confident in tuning dynamically our presentation to the audience during the workshop. Thus, with the idea of balancing between the *careful planning* and *divine inspiration* we felt ready for the start.

The mini-sandwiches were accepted with pleasant surprise but it was obvious that their quantity would not replace a proper lunch. The first slide appeared as a background of this somewhat unexpected opening (Fig. 1)

What? – No title and authors? Every guide for a good presentation says that it is important to start properly – with introducing ourselves and the theme of the talk. Not necessarily! In fact, many of the participants knew us for various reasons and we decided to leave this part for the end. The first idea to be conveyed by the slide was that the presenters and the audience should be like a *school of fish* – enjoying the water together! Another message would be revealed later on.

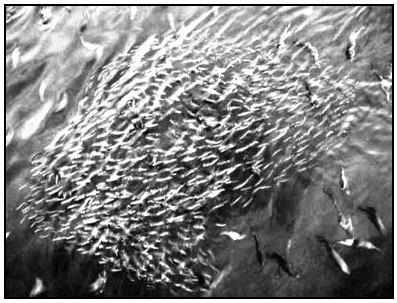

Fig. 1. A school of fish

Since there were several parallel sessions at the conference a very important problem for the participants seemed to be the factors influencing the choice of what to attend. This was the topic of brainstorming we organized with our audience (Fig. 2). We gave them some time for reflections and the teachers began offering their suggestions which we started filling in the blank slide in real time (Fig. 3).

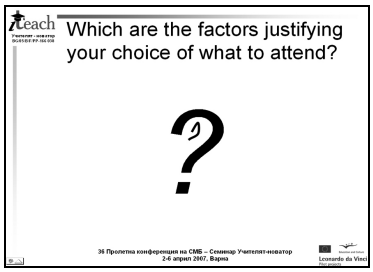

Fig. 2. Factors according to the audience

At the beginning the teachers were slightly hesitant, just like students in a classroom, but gradually they became very active and it was clear that another slide would be needed to reflect all their ideas.

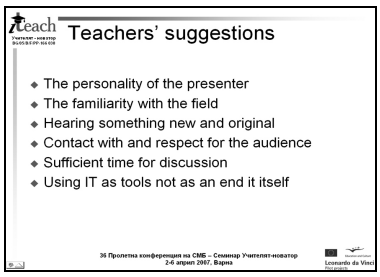

Fig. 3. What the teachers suggested

We chose the factors that were the most representative ones and showed our audience with pride and joy the next slide (Fig. 4).

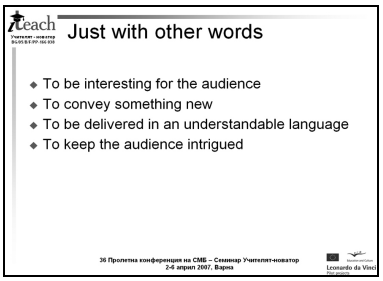

Fig. 4. Authors' suggestions

These were in fact the same ideas which the teachers themselves had suggested (but with slightly different phrasing).

It became clear that the audience and the presenters were interweaving their roles and everybody was expecting with genuine interest the contribution of the others.

Although our team felt fairly self-confident in improvising thanks to our long practice in working jointly on projects and presenting together as lecturers in teacher training courses we had carefully distributed our roles in the workshop. The captain of the presenting team had the role of challenging the well-established rules for a *good presentation* and would provoke her co-presenters in the hope of encouraging the audience to express their own view and opinion rather than to receive passively information. The youngest member of our team in turn stayed among the audience (thus making the argument with the rest of us more natural since the audience didn't know at the time that she was one of the presenters). With such an approach we hoped to demonstrate skills for working in a team in addition to the other ICT-enhanced skills (such as skills for planning, looking for information from different sources, and working on a project). Our audience gradually realized the message that a good presentation is like a good performance – *the viewer expects to be surprised*. But to feel free to improvise it is crucial to know your partners and to tune the distribution of the roles according to the potential and interests of all the team

members. Our youngest colleague shared her experience as a teacher in the *National High School of Mathematics and Sciences* whose students can bring many surprises for which there is no recipe. Thus the next question to the teachers came naturally: *How do you build ICT-enhanced skills in your school practice?*

There were several enthusiasts ready to share their good practices – Boryana Kuyumdzieva who was the first one in Bulgaria to introduce graphic calculators in mathematics classes, Katya Stoyanova who had organized a mathematical theater, Steliana Kokinova who had participated in a team competition for teachers developing a set a problems on a given mathematical theme. Our role was to give comments where appropriate, to extract the most essential things from all the examples, to help these teachers realize what was innovative in their experience and how it could be implemented by others. The important message we would like to convey was that the teachers were co-creators of the *I*Teach* project ideas (metaphorically they were swimming *against tides of trouble the world knows very little about* and they needed only a bit of praise or encouragement to recognize themselves as *innovative teachers*).

The next step in our presentation scenario was to summarize what was the most valuable in teachers' good practices in the form of a challenge – we offered them to participate in a competition for interpreting in educational context three slides with pictures (Fig. 5).

(1) (2) (3)

Fig. 5. The challenge

A few-minute silence of surprise followed, but then a lot of ideas were thrown in the air as follows:

About Fig 5 (1)

Is this the golden fish? Students have more than three wishes. Raising funds for education.

Is this the bait (for the student) or the catch (of the teacher)?

About Fig 5 (2)

Are we (the teachers) expected to learn this as well?

Consultations with the expert…

A lesson on catching whales.

ICT teacher training for 5-8 grade

About Fig 5 (3)

The hypotenuse is not always the shortest path.

Imagine that this is plus infinity…

The finger shows which way the "educational wind" blows.

A colleague of ours, Prof. Neli Maneva, gave the following interpretation of the whole challenge: *The road to the useful knowledge requires sharing, attention and illustrative examples. After the training, the trainer is free and satisfied but someone has to do the real work.*

Of course, our original interpretation was inspired by the Chinese proverb about the fishing quoted above and the Zen koan*: I'm pointing at the moon, and you're looking at my finger* (the *moon* been replaced by the *sun* this time) and we were trying to express the current situation with the teacher education – we, the teachers' educators are talking about *what we expect to* see *one day,* and the teachers are interested in *what they are going to do on Monday*. But we were open to the interpretations given by the participants with such a sense of humor and wisdom.

Thus we reached the moment of demonstrating the *collective intelligence* in action. This intelligence was illustrated by Cornu [9] interestingly enough in terms of "fish"– when facing a big challenge a school of small fish would take the form of a much bigger fish as a self-defense (Fig.6).

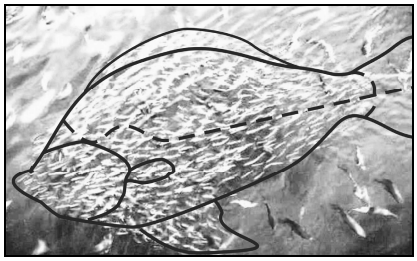

Fig. 6. Collective intelligence

This originally hidden message had to be experienced to be captured!

The final goal of our *journey* (the project development process) was rediscovered with the joint efforts of the audience and the presenters (Fig.7).

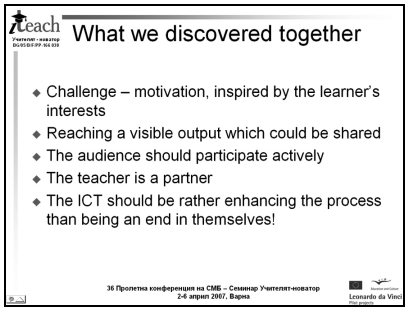

Fig. 7. The joint product

The audience had realized that this presentation could be considered as a product of a whole project with a carefully planned scenario (containing a challenge for the audience), carried out by a team (including the fisherman, the chef, the presenters in different roles, and the audience itself).

The methods, strategies and approaches included various means and technologies. The information search combined with the knowledge of experts in different fields reflected our experience in project work which justified our choice to treat the workshop as a project itself (the team had to generate the theme of the workshop and the way of presenting it in a fixed short time and to find an original and appropriate way to implement it). The participants confirmed our belief that the innovative teaching methods are often forgotten ones (possibly enhanced by the new technologies). And in harmony with the whole presentation idea, the introduction of the presenters was left for the (happy) end. We had special awards for the most active participants – the two toy fishing rods were delivered to the best catchers of ideas (Fig. 8).

Fig. 8. The opening and the closing ceremony

The chef and the fisherman also received certificates for valuable contributions to the workshop. As for us, the biggest reward was the impression of one of the innovative teachers (Boryana Kuyumdzieva from *Baba Tonka Mathematical High School* in Rousse) who shared after the event that she felt fully satisfied with the setting, the support and the hope for the future conveyed by the workshop. The genuine novelty for her was the quality of communication of ideas since: ***Everything could be said and heard but what really matters is to experience it!***

3 Reflections

After coming back to the hotel we smoothly passed to the next phase of our project – the reflection. Why did the teachers so greatly appreciate this style of interaction? One possible explanation is it gives people the feeling of achieving something that is already within them and only needs a little encouragement to be seen and harnessed into action. In other words, an *innovative teacher* in terms of the project *I*Teach* could be any one of them, provided they *look at where our fingers were pointing, not at out fingers* (the latter being very often the case with the teacher training courses). To be *innovative* the teachers should experience as intellectually rewarding and enjoyable what they are doing and learning by means of ICT; they shouldn't think only of how to remember all the technical details and make those as a teaching objective. Within the whole *I*Teach* project (of which this workshop was only a milestone) we tried to demonstrate to the teachers involved that the ICT are simply a means for accomplishing a concrete goal and that they could enhance important soft skills which are not included in the current curriculum. Of course, the evaluation of the soft skills (such as skills for searching for relevant information, working in a team, working on a project, presenting your results in written and oral form) is very difficult and there are not sufficiently refined tools for it. But the challenge should be faced and the *gauntlet should be taken*. One way to show this was not to be afraid to risk being laughed at. This helped our audience to share freely their own experience, their problems and opinion. The teachers felt proud not only with their own ideas but were able to enjoy and appreciate the ideas of the others – something which is very important for their students as well. They caught our message that information should not be searched on the Internet only – there are plenty of sources and experts around us. Furthermore, the

rules for a "good presentation" could be extracted jointly with the audience rather than being listed on a slide as a set of axioms. Besides, these rules are a good basis to start with but if you want to reach a particular audience, your work starts with them since *divine inspiration* is based on a solid preparation. The initial fish bites (no matter how tasty and well prepared) were seen now as a metaphor for the need of teaching students how to fish as opposed to feeding them with *bites* of knowledge. The participants ended the workshop even hungrier - not only for a proper lunch but for knowledge to be gained thanks to their personal experience and ideas. As for us, we tried to to look at our workshop scenario with new eyes and present it as a roadmap (in a suitable form, of course) (Fig. 9).

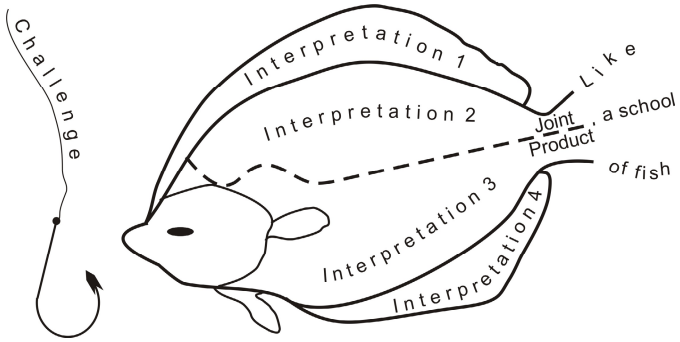

Fig. 9. Scenario roadmap

The tail of the fish illustrates the idea that educational strategies in the spirit of the *I*Teach* project could prepare teachers for their changing role of partners in a creative process [10]. Furthermore, such a partnership could be further supported and maintained in the context of specially designed web-based collaborative environments [11-12] and virtual centers for facilitating teacher's professional development [13-18].

4 Conclusion

The audience became aware of the fact that their observations and experience were the basis of our research and that we treat them as fellow researchers instead of as a *reality check* for researchers.

The *I*Teach* workshop was a demonstration on a meta-level of how the collective intelligence of innovative teachers could be harnessed in action. Pedagogical patterns with similar ideas could be found in [19]. In our approach we tried to demonstrate all the stages of an oral presentation tuned to a given audience – a careful analysis of the audience's interests and problems, making the best possible use of the particular setting, developing a scenario around a leading metaphor, distributing specific roles among the presenters, involving the audience in brainstorming and sharing of good practices, making them aware that the *innovative ideas* were things they had already probably done or were ready to do, and that all this was just the beginning – the real cooperation was to start then.

Our real reward was when already back at work we received a lot of e-mails and letters with questions and requests for further courses and materials. Some teachers invited us to attend their schools and observe project presentations of their students. When visiting these schools we were convinced that as far as their presentation skills were concerned the students felt like *a school of fish in water.*

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