

Report on the outcomes of the Greek National Workshops



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The scope of the workshops

The national workshop aimed at presenting innovative science education approaches and practices to school actors, engaging them in a discussion process on how best the results and experiences from previous projects could be disseminated and exploited by relevant STEM stakeholders (educators, school counsellors, policy makers). The target audience was secondary school STEM teachers, school counsellors and headmasters from the Region of Crete. Due to the size of the Region it was decided that it would be more appropriate to organize two workshops –one for Western Crete and another for the Heraklion area, in collaboration with School Counsellors.

Workshops' processes

Both workshops were entitled “Innovative Projects in Science Education: Reflections and Proposals for Exploiting them in the Teaching Practice” and their duration was from 8:30 to 15:00. To facilitate the discussion and get teachers feedback on INSTEM related issues, a questionnaire was prepared (based on the questions provided in “WP3: Paper on national implementation to enrich discussion in national workshops”) which foresaw the following three rounds of discussion:

- “Teacher and Science and Technology Teaching” (with a focus on inquiry learning)
- “European Projects and Teachers Professional Development” (to collect teachers’ feedback on inquiry based learning, science and technology teaching, the impact of European projects in the school environment, their difficulties in exploiting project outputs), and
- “Implementing European Project in Education -at the educational policy level” (to collect teachers’ proposals on how the project outputs could be more useful, relevant and attractive to them).

Teacher participants were invited by school counsellors on the criterion those that these teach STEM related courses. The invitation to participate was made through e-mails (in the case of Western Crete) or through a “Call for Participants” that was uploaded in the portal of the Prefecture of Secondary Education (Heraklion region). FORTH researchers informed also science and mathematics teachers that have participated in other EU project activities and/or have shown interest for EU project results. More than 130 teachers were personally contacted.

The Western Crete (1st) workshop took place in the Vamos High school on December 4, 2013 with the participation of 35 school actors and 3 FORTH researchers. The 2nd (Heraklion region) took place in FORTH premises on January 11, 2014 with the participation of 26 school actors and 3 FORTH researchers.

After a very short introduction to the scope of the meeting, an ice-breaking session took place (teachers formed small groups to get acquainted and initiate a dialogue). Then FORTH researchers made concise presentations of INSTEM and other STEM related projects –NTSE, STENCIL, weSPOT and MASCIL, and distributed project leaflets and materials. The major part of the workshop was allocated to the 3 Discussion Rounds. In each Round teachers worked in small groups and chose a representative who presented the group's views to all participants. The majority of teachers participated actively in the group work and expressed high interest in engaging in discussions on the views presented by each group. However time restraints did not allow further discussions at this stage of the process. The vivid discussions of the teachers and their request for continuation of this process indicate their high interest and active engagement to the workshop processes.

The above approach was followed in both events. Based on the experience gained from the 1st workshop it was decided to reduce the number of participants for the 2nd and make some minor modifications to the questions used to facilitate small group discussion.

The main points discussed and the conclusions emerged are provided below in a form of a detailed presentation of teachers' views and recommendations.

Workshops' outcomes

The following is a selected list of key concerns / issues that derived from the notes teachers participants provided from the small group discussion. It has to be mentioned that while working in small groups teachers were asked to keep notes of the main points discussed and these were forwarded to FORTH. The key issues refer to: a) teachers' feedback on inquiry based learning, science and technology teaching, the impact of European projects in the school environment, their difficulties in exploiting project outputs; b) teachers' proposals on how the project outputs could be more useful, relevant and attractive to them.

Teachers' feedback regarding Inquiry based learning: the conditions of the Greek system (centralized, strict curriculum, exam-driven) leave little space for innovative practices and explorative learning. This type of learning is more appropriate for project work or other cross-disciplinary activities.

Other *restraining factors* are:

- Students' assessment (except that our system is exam-center there is a contradiction between stated and "real" objectives: students should have an "inquiry spirit" but they are assessed on the "actual content")

- Students are not familiar with this type of learning and are not very keen in acquiring such skills
- Number of students per class
- Teaching conditions (teaching hours and duration)
- Teachers are not familiar with explorative learning and ICT use in educational practices
- Teachers mentality (reluctant to change their teaching habits and afraid of evaluation outcomes)
- Lack of teacher training, stimulus and incentives
- Infrastructure: there are not enough appropriate labs *Enabling factors*
- Teachers' will to explore new ways of learning
- Informed and adequately trained teachers
- Reform of curriculum, teaching practices and students' assessment Technological support

Teachers concerns

- Do we know what inquiry-based learning is?
- Do we achieve better our goal/objectives using inquiry?
- How do we assess inquiry?
- Through what kind of applications we can implement it in sciences teaching?

Teachers' feedback regarding sciences and technology teaching

- *Activities to enrich curriculum requirements:* try to incorporate in their lessons simple experiments that relate science to everyday life, use simulations and perform lab exercises. Many are involved in different types of project i.e. environmental, cross-disciplinary and very few in European projects.
- *Channels used for information seeking:* through the internet, books, colleagues, universities and research centers, seminars, school counsellors, other structures that have implemented similar activities/projects.
- *Expressed needs:* would like to receive more information and training in new teaching methods and innovative applications in science education, be able to participate and/or observe experimental teaching sessions, have wider access to educational software, virtual labs and ICT training, are interested in connecting science teaching with the "real world" and relate entrepreneurship with sciences.

Teachers' views regarding the impact of projects in the school environment

Teachers acknowledge that different programmes –especially European, could provide valuable information and material for their teaching and professional development but they seem sceptical on using these outcomes.

Their concerns and recommendations can be clustered at three levels

Secondary Education level:

- lack of programme/project coordination
- lack of dissemination of information and/or project outcomes
- usually fragmental and/or incoherent approach is used.
- not clear objectives – especially at the teacher level
- bureaucracy problems

Recommendations:

- central scheduling and coordination of existing programmes/projects
- wide dissemination of practices/outcomes
- targeted information – in small groups, if possible at school level.
- creation of a repository / resource center
 - easily accessible
 - well classified / properly categorized
 - pleasant navigation
 - easy to search (multiple keywords)
 - covering all subject
 - continuous updating
 - translated / localized material
 - interactive
 - where teachers can
 - ✦ upload their own materials
 - ✦ add comments

Programme/project level:

- projects have to ensure that their outcomes are reliable
- results have to be structured in a clear manner (stating the aims and how these can be achieved)
- conditions under which the outcomes are applicable should be clearly described
- details on the sample and methods used have to be provided
- too much information and materials are produced by the different projects and on top of that overlapping of aims and results is a very common phenomenon
 - all the above create confusion
- language barriers (many times poorly translated material)
- bureaucracy barriers

Recommendations:

- clearly stated evaluation results both for processes and outcomes
- results should be clustered by subject, type of outcome, target groups, required conditions, etc.
- aims should be related with educational targets in a clear manner
- provide material that can be used in the classroom
- posters (containing main finding and important information) that can be placed in schools and sciences laboratories

Teacher level:

- are confused with the huge amount of information
- do not feel confident where to search for information and what to look for
- are uncertain on how project outcomes could fit in their teaching.

Recommendations:

- change of attitude
- more open to innovation / change
- collaboration with other colleagues.

Teachers' proposals on how project results could be useful to them

- presentation and analysis of good practices
- case studies with their results highlighted
- concrete examples and how these can be used in teaching
- educational trips
- localized project outputs
- continuous in-service training (seminars that relate theory to practice)
- liaison teacher in each school – a teacher responsible for European programmes that will serve also as multiplier of training

Teachers' proposals on project information and/or outputs that would be attractive to them

- Quality results (and not quantity)
- Case studies and highlights of their results
- Small, flexible, adaptive tools
- Virtual experiments, simulations
- Examples of applications, educational games and exercises
- Material in audiovisual form (more interesting than text)
- Electronic material
- Experimental results in digital format
- Unprocessed information (raw data) that can be used at school for other applications

Teachers' feedback on problems faced while looking for project outputs

- Too much information
- Bulky materials
- Produced by higher education and/or research institutions not adequate for school needs
- Many times websites are inactive (url cease to exist) after the conclusion of the project -thus no access to outputs

Emerging issues from the workshops' outcomes

From the key concerns / issues that derived from the notes teachers and presented above, it appears that teachers have a vague impression of what is meant by “inquiry learning” and are of the opinion that such innovative approaches to STEM teaching do not fit the Greek education system’s structure and conditions. Systemic changes in terms of the curriculum and the type of assessment, support provisions and in-service training are needed to enable the implementation of such activities. They blame basically the “system” but also accept responsibility for not being open enough to innovation and willing to alter the established educational practices.

When teachers refer to “programmes”, they do not make distinctions between programmes and projects, European, national and regional. The majority of teachers is sceptical regarding project outcomes: question their relevancy and applicability to national conditions, want to know the parameters against which validity is measured, believe that projects overlap and that a huge volume of material is produced making impossible for teacher to locate the outputs appropriate for their needs. At the same time teachers that have been in contact with concrete project results, have a more positive disposition towards projects: believe that material produced could be of help to them and their students and point to the need of better dissemination mechanisms.

To address the confusion that is created with the huge amount of available information, materials and overlapping results, the participants believe that specific actions should be taken at the national / regional and programme / project level.

At the project level serious evaluation mechanisms should be established which will provide evidence on the validity of produced outcomes. Teachers need more information to “trust” projects. They want to know what works, under what conditions, what are the expected outcomes for the different target groups, how these can be adapted to the local environment etc. Projects should pay more attention to dissemination issues and to focus more on teachers’ needs –providing for example tools and sample teaching materials. Websites have to be stable, teacher friendly, and informative. Usually url cease to exist after the conclusion of the project and teachers have no access to those outputs. The proposed solution is a repository / resource center.

It was recommended that at the national/ regional level a structure should be established with the aim to serve as a control mechanism (securing that outputs have followed an appropriate evaluation process), responsible also for the coordination of the various programmes/projects and dissemination of their results. Among the needed interventions are grouping and categorization of outputs, monitoring of localization process, adaptation of efficient training provisions (i.e. multipliers for the regional/school level).

To this effect proposed was the building of a Repository /Resource center –an open data base (containing project information and materials), complemented by a discussion forum. This repository has to be easily accessible, well classified and properly categorized, covering all subjects, easy to navigate, interactive, containing translated and localized material. Teachers will be able to upload their own materials, add suggestions/comments and exchange opinions with other colleagues interactive,.

Two additional barriers teachers face regarding using European projects outcomes is the language issue and the type of results produced. Most of the Greek participants' report that they do not feel confident in communicating in English for this translated material (and if possible localized) should be available. This task could be undertaken by projects and/or the national structure they propose. The outcomes of projects usually are long reports and it is hard for teachers to locate what would be appropriate for their classroom teaching needs. Projects could address this need by providing synopses and or summaries appropriate for teachers. A helpful dissemination tool for projects that would also familiarize teachers with this type of activity are posters (containing main finding and important information) that could be placed in schools and sciences laboratories.

Many teachers seem suspicious regarding European projects and reluctant to participate. Projects must convince them for the added value these can offer to teaching and more generally to education.

A necessary condition to move forwards is a change in teachers' mentality. They believe that if the appropriate support is provided along with some space for autonomy, many teachers will be willing to experiment with innovative teaching approaches and appropriate project results.

Pictures from the Workshops



Vamos



Heraklion