Experiences from Long-Term Teaching Physics to In-Service Greek Teachers – Analysis and Proposals

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Abstract. *Teachers tend to teach as they were taught!*
Do we have the right to insist on that "theory"?
Although the basic teaching style in too many (science) classes today remains essentially what it was two generations ago, the last years there is a growing body of research on how teachers (of science) will develop strategies to ensure that teaching is effective and matched with what is known about effective learning.
We believe that if the teachers are seriously trained and properly provided, they can be very effective.

Keywords Training in- service teachers, Problems, Aspects, Proposals

1. Introduction – Framework – Purpose

In-service training is considered to be an important component in the education of a teacher, helping to assure a high quality of performance in the classroom, from kindergarten to university level. With special regard to science, new developments and research results in different fields, new methods in didactics, new tools, either from the experimental side or with regard to computer utilization, demand a continuous effort to cope with these tasks. Another important aspect of in-service training concerns the exchange of experiences and materials between teachers. Whereas at the University level this part of further education lies in the sole responsibility of the individual, at the school level there exist some established programs for in-service training courses in many countries.
Seven years of ongoing experience, serving education as a school academic super indenter, we had the opportunity and the duty as well, to teach both subjects, Physics and Technology (training of trainers) to a great number of in-service teachers, The sample is about 500, especially teachers of fifth and sixth grade of primary school (10-12 years old).
Each teaching seminar lasts 120 min. and includes: introduction to the subject matter to be taught, the required methodology, some laboratory work and an educational intervention for the application of the microkosmos model.
The purpose is to discern their needs beyond the information provided by the teacher's and the student's book, to discover some good practices and propose some successful approaches.

2. Rationale – Research Questions

In this presentation we are going to analyze in brief:

- teachers' view about the scientific strategies and the common-sense reasoning,
- the appropriate (or not) use of the available means (teacher's instruction and lesson plan book, student's text /work sheet book, interdisciplinary student's book, materials for their experiments)
- the use of the proposed methodology, (by the curriculum)
- their skills in experimentation-as part of the methodology-
- the use of instructional technology (stimulations/visualization) - or otherwise, their ability to involve and explain the taught text/phenomenon using modeling process, supported by computer visualization.

3. Methodology

We follow the next steps:

- A short survey about their teaching preparation
- An exemplary teaching model based on the teacher's and student's books, following the proposed methodology (trigger, hypothesis, experimentation, theory, conclusions)
- Team - laboratory work on the teaching subject

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- Approach of the microkosmos model
- Discussion on:

- Subject knowledge
- Methodological skills needed to translate their science knowledge into lesson plans
- Practical skills need by trainee teachers in order to design and set up experiments and investigations in school using standard equipment or design low-cost demonstrations using everyday materials
- Computer skills
- Curriculum statements translation into teaching routes
- Self evaluation

4. Results

After so many years and hours of training the trainers, we came to conclusions that refer to some main points (except of the necessity for continuing education):

-the need of a better preparation which concerns their involvement (practice) to the experiments

-the need to handle the microkosmos model (to support them), in order to make descriptions or give explanations

-the need of self evaluation

Better teaching is therefore grounded, first of all in improving the quality of teacher preparation and in making continuing professional education available for all teachers.

5. Conclusions – Proposals

We focus on the experimentation procedure, which involves the teachers themselves and propose the reference (occasionally -as part of their didactic approach) to a science education curriculum that is based on the microkosmos model as a unifying element, in order to describe and explain numerous natural phenomena appearing to be irrelevant between each other.

Finally as we all know that the way to interest children in science is through teachers who are not only enthusiastic about their subjects but who are also steeped in their disciplines and who have the professional training to teach the subjects as well.