

# The Training Needs of Physics Teachers: a Challenge from the Association for Physics Teaching

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**Abstract.** A comparison is presented between the training needs expressed by a significant number of physics teachers (about a thousand) and the perception of the effectiveness of the various Association for Physics Teaching (Associazione per l'Insegnamento della Fisica, AIF) in-service training initiatives on AIF's members. The analysis presents ideas on which initiatives are most effective and how to propose training activities that satisfy the real training needs of in-service teachers. The AIF's commitment to promoting innovative and effective teaching methods in the most diverse contexts favoured discussion in the conference between different stakeholders interested in a widespread improvement in physics teaching.

## Introduction

Recognition that teachers are at the heart of education reform has led policymakers and national standards to call for high-quality professional development opportunities, but teachers often perceive these as fragmented, disjointed, or irrelevant to the real issues of classroom practice [1]. Therefore, further research is needed to understand the improvement needs of physics teachers to provide effective professional development.

The Association for Physics Teaching (Associazione per l'Insegnamento della Fisica, AIF) has as its primary objective the improvement of physics teaching in high schools also through in-service training of teachers. A working group on training policies<sup>1</sup> has been operational at the AIF since 2021. The group launched a broad survey into the training needs of physics teachers in Italy which concluded at the end of 2021 [2]. Furthermore, the challenge of effective in-service training was the focus of a conference organized by the association in 2022 [3].



Fig. 1. The poster of the "Ettore Orlandini" conference entitled *Professional development of teachers in physics education*, organized by AIF in Udine in 2022.

The aim of the conference was to compare the teacher training demands that emerged in the survey with the training proposals of AIF and others such as universities and other teacher

<sup>1</sup> Members: Giovanni Magliarditi (coordinator), Vera Montalbano, A. Carlo Russo.

associations. On the sidelines of the conference, a questionnaire was proposed to members, section secretaries, and working group leaders, regarding their experiences in teacher training and the educational value of such experiences for professional development [4]. The analysis emphasizes the importance of fostering collaborations with universities, particularly in the National Plan for Scientific Degree (Piano Lauree Scientifiche, PLS) initiatives, and with educational research. At the same time, the challenges of such collaborations were highlighted, due to the absence of educational research groups in many universities and the often-considerable gap between such research and everyday teaching practice [4].

### **The training needs of Italian physics teachers and effectiveness of professional development efforts**

A comparison is presented between the training needs expressed by a significant number of physics teachers (974), mostly in service [2], the perception of the effectiveness of the various AIF in-service training initiatives [4] on members (18 secretaries of local section or working groups' coordinators, 76 AIF members) and the final questionnaire proposed after each AIF training activity on the ministerial in-service training portal (850 participants) [5].

The training activities proposed by AIF were grouped into the following categories: competitions (e. g. Physics Olympiad), residential courses, local training activities, peer comparison in the sections, training activities on innovative methods (active teaching, orientation, laboratory, exercises and problems, multimedia tools, curriculum updating and modern physics), training in primary and secondary schools.

Despite the different audiences involved in the various questionnaires and the different objectives, the analysis presents interesting food for thought on which initiatives are most effective and the directions in which to move to propose training activities that satisfy the real training needs of in-service teachers. For example, residential courses are perceived as complementary to local proposed training activities, and thus more coordination between national and local proposals would be needed.

The AIF's commitment to promoting innovative and effective teaching methods in the most diverse contexts favoured discussion between different stakeholders (school offices, teaching researchers, university professors, teacher trainers, other professional associations of teachers and physics) interested in a real and widespread improvement in physics teaching. The comparison of teachers' needs, and the perceived effectiveness of the professional development proposals offered so far in multiple forms is an essential step in the improvement of AIF's educational efforts.

### **References**

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