

An Italian university network for the professional development of teachers in physics

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Abstract. Teacher professional development (TPD) is a research topic that offers differentiated theoretical frameworks in the literature, giving rise to several evidence-based findings from specific research. Less common is the study of how networks of differentiated competence can produce improvements for actions on TPD. This contribution offers the experience and problems identified by an Italian network of universities cooperating for TPD within the PLS project. This contribution is offered in the context of the workshop #245.

Introduction and aims

The PLS Italian Plan was born in 2004 as a project of scientific faculties to promote STEM degrees [1]. It has changed objectives and contexts over the years to make a wider contribution to the teaching of physics, mainly in secondary schools and universities. Its nature as a national project, based on local projects coordinated at national level by a scientific committee, has been able to create continuity over the years, promoting actions based on school-university collaboration for the improvement of the teaching and learning of physics in secondary school and beyond.



Fig. 1 The universities of the net

In 2000 a network of 14 colleagues was formed who participate in the project and work on the professional development of teachers (PDT) having different competence in the locations of Fig.1 [2]. A previous collaboration for a Master's degree [3] has facilitated the creation of the network. The first common work of the net was a survey of 136 educational activities from 33 universities and the results was published [4]. Other investigations concerned the physics education of primary school teachers [4, 5] and how the teaching of quantum mechanics in high school is promoted. Two special issues of the Journal of Physics collected the experiences [5, 6].

The results of this work are proposed as a contribution to the Workshop "School-University Collaboration and Teachers' Professional Development" submitted by Chiofalo M.

Framework and research

At the end of 2023, a new Three-Year Project PLS-Physics was financed and a national network of colleagues with different research competence in physics and in physics education interested in continuing the collaboration for teacher professional development (TPD) was reconstituted. The meetings have already begun. The goal is the building of a scientifically cooperating community for TPD. The topics under discussion are:

1. How can the cooperation be organized for the exchange of expertise (by methods, themes, problems) and produce results for the advancement of studies between practice and research?
2. How to share PER results for teachers' professional development?

3. How can we compare with other methods of research and practice at the international level?

Findings and perspectives

A preliminary survey on the needs and expectations of the community of the new 24 members identified the following plans for discussion and work:

1. Thematic to develop innovative research-based paths to be offered as work resources to teachers on the topics of: mechanics, thermodynamics, physics of matter, environment, artificial intelligence.
2. Methodological aspects of physics education, such as active learning, laboratory, etc.
3. How to implement initiatives for teachers on the light of theoretical research frameworks available in literature.
4. Meetings for the exchange of competence in physics education and how to bridge research and practice.
5. Development of tools that give evidence of the impact of the different actions for TPD.
6. Studies for the identification of the perceived needs of teachers and the working methods required.
7. Methods of initial teacher education and connection with professional development, i.e. formative methods, induction.
8. Need for international cooperation and planning of a Workshop at the 4th WCPE on school university collaboration and teachers' professional development.

These elements are proposed as a contribution of the Italian PLS-Physics network on TPD in the Workshop presented by Chiofalo (#245) for a discussion aimed at understanding what allows to identify shared principles on the basis of which to implement differentiated actions in different contexts.

References

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