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Building and Developing a Teachers' Community Based on the PROFILES Science Education Network

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Abstract

At present, Science teachers' networks offer proper environments for exchanging ideas and good practices, but also for promoting knowledge. In Europe, such networks have been established in the past, but in Romania, Science teachers' networks are relative new, just few attempts at local level being recorded. Recently, a successful network has been set up in the frame of the FP7 European Research Project "PROFILES - Professional Reflection-Oriented Focus on Inquiry-based Learning and Education through Science". The PROFILES network has been set up during the implementation of the accredited "PROFILES - Education through Science" CPD programme, started in spring 2011 with 32 members.

The paper presents the steps followed by the PROFILES team to create the nucleus of a Science Teachers network, to develop the number of network members and to maintain the connection between them after the PROFILES project end.

Keywords

Science education, Science teachers' network, PROFILES Project.

Introduction

Starting with the beginning of 21st century, huge steps have been done in the development of Science and Technology. The knowledge is increasing continuously and radical changes are going in our lives. Topics like new materials or innovative technologies are more and more used not only in industry or environment but also in medicine, pharmaceuticals, sports or education.

Since Science and Environment problems like pollution, climate change or decreasing the risk disasters are only few of the problems that

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affect our lives, we need to produce in the next few years a big number of Science researchers to be involved on finding solutions to the problems we face. For this purpose, a bigger number of students must be attracted to study Science, even from the secondary school. Since in the last period, a lot of countries reported a high decreasing of teenagers' interest for Science, a series of European projects have been focused on identifying the reasons of this fact, trying to find new teaching strategies in order to attract and to keep their interest in learning topics related to science and technology. One of the best strategies to support education through Science, and develop the skills mentioned above is represented by the *Inquiry-Based Science Education* strategy, which has proved its efficiency at all the educational levels. In this context, Valahia University Targoviste has been involved in a series of international projects focused on how to promote new teaching methods, in order to increase the students' interest for Science.

One of those projects is a FP7 European Research Project one, called: “*PROFILES - Professional Reflection - Oriented Focus on Inquiry-based Learning and Education through Science*”. The partnership involved in the project was formed by 22 institutions from 20 countries, having the aim on promoting *Inquiry-Based Science Education (IBSE)* strategy through “raising the self-efficacy of science teachers to take ownership of more effective ways of teaching students, supported by stakeholders” (PROFILES Consortium, 2010).

In Romania, the PROFILES project gave to the interested Science teachers the opportunity to enhance their professionalism, by participating in the teachers' continuous professional development programme: “*PROFILES - Education through Science*”. The overall aim of the CPD Programme is represented by the development of Science teachers' skills and competences to conduct a teaching process based on scientific research and curriculum integrated approach. At the end of the CPD programme, the teachers had to produce PROFILES modules based on teaching Science through the IBSE strategy.

Method

In Romania, during 2009-2013 it was a very low percentage of continuous training programs which have been accredited and developed especially for Science teachers. In this context, out of the total of 623 accredited programs, only 10 targeted especially to the training of Science teachers (approx. 1.6%). Among those ones, the CPD programme

“*PROFILES - Education through Sciences*” contributed to an increase of the quality of the continuous training system, implicitly determining an increase of the didactic proficiency, correlated with the necessities of the actual society and with the EU Strategy regarding sustainable development.

Teacher networks represent a feasible solution for exchanging ideas and good practices. In certain conditions, networks can promote knowledge, including also the use of new technologies. In this context, Science teachers' networks offer proper environments for exchanging ideas and good practices, but also for promoting the suitable knowledge.

In Europe, such networks have been established in the past, but in Romania, Science teachers' networks are relative new, just few attempts at local level being recorded. Two essential elements link the CPD process with networking (Harwell, 2003):

- (a) providing to Science teachers the possibility to practice and experience what they achieved, and
- (b) defining an ideal environment for establishing the interaction among participants.

In this respect, a Science teachers' network has been started to be built and developed during the PROFILES Project. The PROFILES network has been set up during the implementation of the “*PROFILES - Education through Science*” CPD programme, started in spring 2011, with 32 members, and having the following specific objectives:

- (a) the development of vocational training skills based on scientific research;
- (b) the capitalization of potentials and experiences of individual students;
- (c) the promotion of a curriculum integrated approach, related to the requested Science topics;
- (d) the achievement of an educational approach in-line with the principles of the constructivist paradigm (Drăghicescu et al., 2013).

Results and Discussion

The major research issue was oriented on assessing the utility of the network for Science teachers. This evaluation is based on a survey that interrogated the teachers regarding the possibilities offered by the PROFILES on-line community on finding useful resources, exchanging ideas, materials and best practices, but also finding open-minded colleagues for collaboration. Following to the first step of the PROFILES Science teacher network (one county in 2012), teachers from two other counties

joined the network in spring 2013, developing a *regional network*. In this format, the PROFILES teachers were able to exchange knowledge and experiences in on-line meetings and face-to-face workshops. Each county coordinator facilitated the maintenance of the network and provided the necessary support and information for the new members.

The network offered a proper environment for disseminating the PROFILES resources (materials, modules, implementation results) in the Romanian Science teachers' community. For a faster development, 6 PROFILES secondary key-teachers - who performed as mentors -, embraced the role of lead teachers, contributed to the professional development of the in-service Science teachers, made PROFILES known not just with the view to extend the network, but also to popularize the projects philosophy and the related good practices in the educational community.

In this way, in spring 2014, the network has been opened also to non-PROFILES teachers (especially Science teachers who were not enrolled in the CPD programme). More, primary teachers joined the network, being interested to apply the PROFILES philosophy in their teaching practice (at the level of 3rd and 4th forms). The result was the extension of the network - in summer 2014, the PROFILES network has reached 28 Romanian counties.

At present, more than 1000 Science teachers and more than 300 primary teachers are part of the network. The network became *national*, having in each county a leader. The coordination (at national level) remains a specific task of the promoters. An image of the development of the PROFILES network is illustrated in figure 1 (Gorghiu, & Gorghiu, 2014).

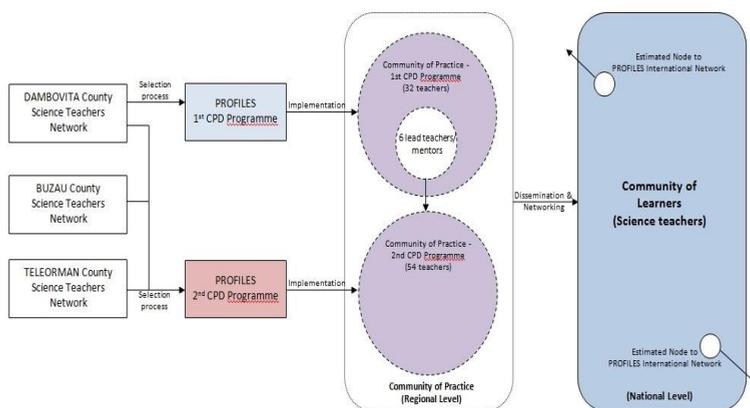


Fig. 1. The Romanian PROFILES network.

At the moment, based on the nucleus of the PROFILES project community, the network has been extended and opened not only to Mathematics and Science teachers, but also to primary school teachers, gathering more than 1000 teachers, from 28 Romanian counties, all of them being involved in a national project dedicated to promoting new ICT methods for Mathematics and Science Education, funded by the Sectoral Operational Programme for Human Resources Development, called: "ProWeb - A Network for Teachers' Continuous Professional Development in order to Use Multimedia, Virtual Instrumentation and Web 2.0 in the Curricular Area of Mathematics and Natural Sciences" (POS DRU/157/1.3/S/141587).

Related to the evaluation of the network, in terms of being useful for Science teachers, their feedback is very positive: 94% of Romanian teachers expressed that being part of this network contributes to their professional development meanwhile 98% of them stipulated that the engagement of the network members (as trainees) in CPD activities answer to their needs. More than that, 70% of the network members appreciated that the network is useful for exchanging good practices and teaching materials.

As example, a part of the PROFILES Modules created by the teachers have been also implemented by "non-PROFILES" teachers. But all of them are enthusiast related to find colleagues interested and oriented on various subjects (linked or not to the Romanian curricula). In this respect, mutual assistance and collaborative projects have been developed, especially in the case of non-PROFILES teachers who implemented the PROFILES modules in their classrooms.

Conclusion

The presented network was developed first hand in the context of a funded European project oriented towards Science education. Its construction took some time, but it succeeded to mobilize teachers and originated resources, with the main aim to exchange concrete teaching activities and PROFILES best practices.

However, the networking process is a voluntary one and depends on the motivation of the participants. In the case of the Romanian PROFILES network, the teachers' motivation comes from their interest to learn about new teaching methods (especially inquiry-based science education). Another motivational factor is to be part of a community that allows the exchange of good practices and learning from each other. The

network also disseminates PROFILES concepts, modules and results at different educational levels.

An important issue to maintain alive the network and increase the number of the teachers connected is represented by the meetings where the way how Science education could be improved is discussed. This is not just a national issue, but also an international one. It is necessary to internationalize the network and to enter in dialogues with European Science teachers, to exchange good practices at a higher level and to understand different cultural and educational traditions in the European Union.

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