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**SCIENCE TEACHERS' FEEDBACK EXPRESSED AFTER
PARTICIPATING IN TWO CONTINUOUS PROFESSIONAL
DEVELOPMENT PROGRAMS**

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Abstract

The paper presents an analysis on the science teachers' feedback related to the efficiency of two training programs: *PROFILES* and *ForEdu*. The research methodology is based on dedicated feedback questionnaires filled in by 156 science teachers, enrolled in both programs. The questionnaire included items with predetermined answers offering multiple choice. To some items, the teachers wrote a descriptive phrase that corresponds to the situation in which they are, following the graduation moment of the related training program. There are several aspects taken into account: the usefulness of the training program, the novelty of the training materials, their applicability in the didactic process, the reason for participating in such programs etc. Other items are direct related to the skills that have been acquired after participating in the training programs. The whole analysis led to the idea that teachers are aware of the necessity of being permanent involved in continuous training programs, which targeted to both direction: scientific preparation, but also psycho-pedagogical / methodical training. Even there are a lot of similarities in terms of teachers' answers, collected from the mentioned training programs, it can be noticed that in the "*Profiles - Education through Science*" program, where the activities were clearly focused on developing teaching strategies (*IBSE - inquiry based science education*), positive effects at the level of formative and informative acquisitions were more evident.

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1. Introduction

The fundamental goal of the current Romanian educational system is to provide a qualitative education. A crucial variable on reaching this goal is represented by the teachers. Having in view the societal changes, the transformations that took place at all the societal levels, with great impact on the educational systems, the teachers have to be able to be fast connected and easily adapted to all those

changes. In this context, in many cases, their initial training is not sufficient to perform a qualitative educational process, this one being needed to be supplemented with lifelong training, which must be centered around the real needs and expectations of the teachers.

“Teacher professionalism is a crucial element on seeing the ‘*education through science*’ philosophy being meaningfully implemented by teachers, having as results the acquisition of the key competences by students. An important approach to promote teacher professionalism is through the development and enactment of *professional development programs*.” (Holbrook, Rannikmäe, & Valdmann, 2014, p. 139).

Science education became a very important goal in school, so we can talk about “a strong expectation for science to be an essential, or core subject in the school curriculum, for the benefit of all students” (Holbrook, 2010, p. 82).

Coming to the particular aspects of science education, at the European level, in recent decades, there has been recorded a significant decline in students’ interest and motivation for learning in general and sciences (Physics, Biology and Chemistry) in particular (Rocard, 2007). Taking into account this fact, Valahia University Targoviste, through its specialized unit - Teacher Training Department - designed and conducted two dedicated training programs for science teachers: “*Profiles - Education through Sciences*” and “*ForEdu - Professionalization of the Teaching Career*”, the last one comprising on four training modules: “*ICT - E-education*”, “*Designing and Implementing the Curriculum Oriented on Competences*”, “*Classroom Management*” and “*Interactive Pedagogy*”.

We briefly describe below, each of the two training programs.

1. The “*Profiles - Education through Sciences*” Continuous Professional Training Program was developed in the frame of the European FP7 project entitled: “*PROFILES - Professional Reflection Oriented Focus on Inquiry-based Learning and Education through Science*” - funded by the European Commission -, which aims to promote education based on scientific investigation (*IBSE - Inquiry Based Science Education*). The main objective of the training program is the professional development of Sciences teachers (Chemistry, Physics and Biology), enriching their teaching competences, through achieving teaching demarches oriented on scientific investigation and integrated related approaches (based on the *IBSE* strategy) in their classrooms.

The originality of the PROFILES approach consists on paying special attention to the increasing of science teachers *self-efficacy*. The self-efficacy consists - in this case - on raising the competences and confidence in teaching, in a meaningful way - from the educational point of view -, and which can motivate students. In the “*PROFILES - Education through Sciences*” training program, there have been developed and implemented, during Sciences lessons, training modules centered on teaching through scientific investigation, by promoting a *student-centered* learning model (Gorghiu, & Drăghicescu, 2014). PROFILES aims to make science learning and specific science subjects more interesting, more relevant and significant for secondary education students. This is not an easy objective to be reached – in this respect, being known that teaching Science (and consequently teaching specific topics of Sciences) is not so interesting for most of the students. Science classes are often described as too boring and irrelevant, especially at ages 11-16 (Byrne, & Brodie, 2013, p. 28). Even active methods of teaching and learning, in which students work in groups, fail to promote sciences for most of the students. Taking into account those facts, the PROFILES project tried to solve at least a part of those problems.

2. The main objective of the “*ForEdu - Professionalization of the Teaching Career*” training program - developed within a dedicated POSDRU project -, was the formation and development of primary and secondary teachers’ competences, in order to improve the management and quality of the educational process.

The *ForEdu* training program, through the design of its specific training strategy, and the concrete ways of fulfillment of all its activities, offers to primary and secondary teachers the following opportunities: access to modern teaching methods - that can become benchmarks for their own professional development; expansion and restructuring of the psycho-pedagogical knowledge; improvement of their skills for implementing new strategies and techniques for intervention in situations of (micro)educational crisis; development of IT competences; development of classroom management competences; continuous self-regulation of the pedagogical practice in relation to a plurality of roles assumed by the teachers: educator, trainer, manager, methodologist, evaluator etc.; training the teachers, considering them as resourceful persons for school and community, facilitating the exchange of ideas and best practices between members of the same professional community.

2. Methodology

The aim of the investigative approach consists in a comparative analyze related to science teachers’ feedback, expressed after their participation in the abovementioned two continuous professional development programs: *ForEdu* and *PROFILES*.

The research methodology is based on a dedicated feedback questionnaire, filled in by 156 science teachers, enrolled in both programs, from three different counties: Dâmbovița, Buzău and Teleorman.

The questionnaire included items with predetermined answers offering multiple choices. To some items, the teachers chose a descriptive phrase that corresponds to the situation in which they are, following the graduation moment of the training program. There are several aspects taken into account: the usefulness of the training program, the novelty of the training materials, the applicability in the didactic process, the reason for participating in such programs etc. Other items are direct related to the skills that have been acquired after participating in the training programs: the ability to create a learning environment suitable for students, the measure in which the teaching approaches are oriented on students, the achievement of particular knowledge concerning the design of the educational activities having in view the increase of the quality, the efficiency on using different teaching methods, the efficiency on using of a variety of teaching materials, the way in which it can be provided a relevant feedback for students, the achievement of a better students’ progress, the providing of an adequate support for the students with special educational needs, the designing of a new curriculum, the collaboration with students’ families and local community, the designing of a more effective teaching career, the designing of successful interschool projects, the use of ICT in a more efficient way.

The data processing was mostly statistical, in correlation with qualitative analysis, based on the information gathered from discussions with the involved teachers.

In the following paragraphs, there are illustrated two relevant items collected from the questionnaire.

3. Results and Discussions

The first item analyzed in this paper refers to the science teachers' feedback related to the usefulness and the novelty of both training programs (*ForEdu* and *PROFILES*) and the motivation to participate to such training programs. The teachers had to choose from six different options: (a) *the training programs seems to be useful for me*; (b) *just a few of the things learned in the program are novelties for me*; (c) *from all the things I've learned in this program, I tried to apply a part in my teaching activity*; (d) *from all the things I've learned in this program, I successfully applied two or three things in my teaching activity*; (e) *I have difficulties to apply in my teaching activity things learned in this program, because I don't know how to do it yet*; (f) *I participate in the training program just to obtain some credits*.

Performing a comparative analysis on the responses of the two groups of science teachers (one from *ForEdu* and one from *PROFILES* training programs), we can observe more similarities, but also some differences (Fig.1). Both of the groups considered that the training program was useful (56% *PROFILES* and 51% *ForEdu*). Related to the novelty, just a small percentage of teachers considered that few of the things learned in the program are novelties for them, which confirm the importance of the transferred knowledge presented in both training programs. Analyzing the figure, we can easily observe that none of the respondents chose the last two answer options, which indicate that the science teachers are aware of the importance of their professional training and acquisition of real skills, not just intending to get credits. From the comparative analyze, we can also observe some small differences between the samples of teachers, meaning that *PROFILES* teachers considered in a great measure the training program was useful for them than the *ForEdu* teachers.

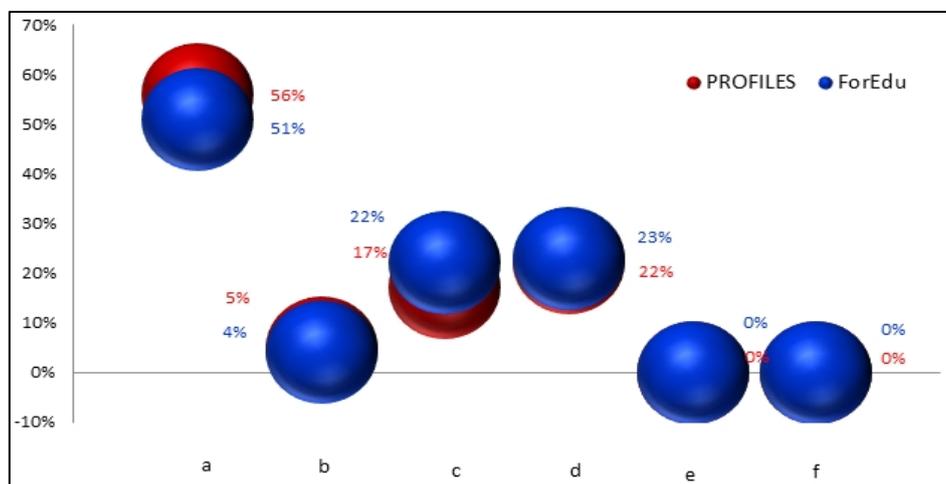


Fig. 1. Science teachers' feedback related to the usefulness, novelty and motivation for participating in the training programs

The next important item of the questionnaire refers to the skills the teachers obtained after the participating in both training programs. Here, the teachers had sixteen options, from (a) to (p): (a) *I create a learning environment suitable for my students*; (b) *I design a good educational process, centered on students*; (c) *I make a better design of my lessons*; (d) *I use more effective various teaching methods*; (e) *I use a variety of teaching materials, more effectively*; (f) *I select the teaching contents better*; (g) *I can provide more relevant feed-back for my students*; (h) *I asses the progress of my students better*; (i) *I better*

support students with special educational needs; (j) I design a new curriculum; (k) I collaborate more effective with the students' families; (l) I collaborate more effective with the school community; (m) I collaborate more effective with other teachers; (n) I design more effective my teaching career; (o) I make successful interschool projects; (p) I use ICT in a more efficient way.

Analyzing the two figures (Fig.2a and Fig.2b), we can find that the most of the teachers' answers correspond to the first answer options. So, the highest percentages were recorded by the first answer options - (a) -, 27% from *PROFILES* teachers and 24% from *ForEdu* teachers considering that the most important skills obtained after their participation in the training program are related to the creation of a learning environment suitable for their students. The next place is occupied by the fourth answer option, 17% from *PROFILES* teachers and 16% from *ForEdu* teachers considering that they use more effective various teaching methods at the end of the training program. On the third place - in the perceptions of both teachers' samples - is the designing of a student-centered educational process.

We can also notice the differences between the answers of the teachers from both samples. The *ForEdu* teachers considered that the most important skills, after their participating in the training program, are: educational design skills, using various teaching methods, using ICT in a more efficient way and designing more effective their own professional career. In the other sample, the *PROFILES* teachers consider that the important skills, after their participating in the training program, are: a better selection of the teaching contents, an effective collaboration with other school teachers and the development of some successful interschool projects.

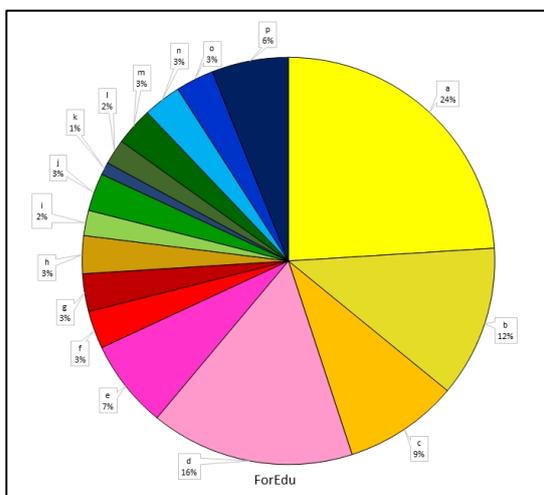


Fig. 2a. Science teachers' feedback related to the skills gathered in the *ForEdu* training program

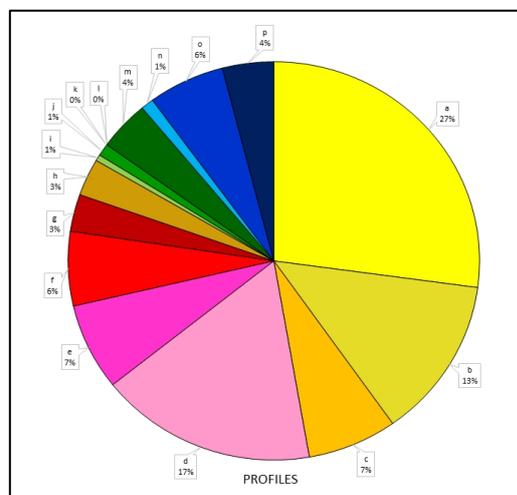


Fig. 2b. Science teachers' feedback related to the skills gathered in the *PROFILES* training program

4. Conclusion

The whole analysis led to the idea that teachers are aware of the necessity of being permanent involved in continuous training programs, which targeted to both direction: scientific preparation, but also psycho-pedagogical / methodical training. Even there are a lot of similarities in terms of teachers' answers collected from the mentioned training programs, it can be noticed that in the "*Profiles - Education through Sciences*" program, where the activities were clearly focused on developing teaching

strategies (mostly on *IBSE - Inquiry Based Science Education*), positive effects - at the level of formative and informative acquisitions - were more evident. In addition, the teachers' portfolios - based on a clear imposed template - were strongly oriented on making connection between the science content - according to the actual curricula - and the everyday life.

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