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## Science Teachers Training in Spain

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### Abstract

*This workshop revises recent changes in teachers' initial and lifelong training. Initial training, which is now a master, is now longer and includes a more complete evaluation process. Lifelong training is starting to change as regards its approach and methodology and it now focuses on centres' real needs. However, when assessing both training approaches, it seems that the recent implementation of the new system has been performed in a hasty way and it still shows several weaknesses to be solved.*

### 1. Introduction

Teachers' training is essential for the proper functioning of the educational system. Most authors claim that science teachers must have a deeper knowledge of the contents of the subject (those included in the student's book).

However, such knowledge is not enough. Their education has to also include contents on the history of scientific ideas, the processes of knowledge building, or the interactions with other subjects, as well as staying update with scientific and technological recent developments [6]. Moreover, teachers also need some pedagogical training that might enable them to reflect on their practice and get involved in educational innovation and research tasks.

Some authors claim that teachers' future training must include the teaching of the nature of science from an explicit and thoughtful approach [1]. On the other hand, most authors suggest that the inclusion of contents related to sciences' didactics [3] fosters the teaching of the characteristics of scientific work or laboratory practice, as well as students' assessment and their attitude towards science and its learning.

### 2. Teacher training national situation

#### 2.1 Initial teacher training

Since 1970s until 2009, the Secondary Education Teacher Training Programme in Spain consisted of the so-called Educational Aptitude Course (CAP). The CAP lasted several months and presented remarkable structural and organisational failures which justified the need to make changes in the program. Consequently, a series of meetings and conferences were held in order to debate and suggest possible improvements [12] from the perspective of teaching renovation.

From academic course 2009/2010 onwards, a new curriculum is being introduced. The new programme designed for teachers' training is a 60 ECTS (1500 hours) credit Master organised by public and state Spanish Universities [9] [10].

The Master was eventually structured into three modules:

The first or generic module (12 ECTS credits) is devoted to general contents including, according to the Spanish Official Bulletin (BOE), the following:

- Educational processes and contexts: its objective is to acquire a series of competences related to communication processes within the classroom, communication processes at school and problem solving.
- Society, family and education: education and social contexts are related in this section, which also tackles the educational impact of the student's family and community on the acquirement of competences related to respect and equal rights and duties.

The second module (14 ECTS credits) is devoted to specific contents including the following:



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- Complements for disciplines training: future teachers need to learn how to transmit a dynamic view of their subject through history, recent developments and those situations and contexts in which curricular contents are taught. This section is related to the development of strategies aimed at updating scientific knowledge and promoting contact between teachers and experts.
- Learning and teaching of each specific subject: this section is concerned with the acquirement of knowledge about theoretical-practical contents of the subject and how to transform curricula into activity and work programmes. It also comprises a) the design and selection of appropriate educational materials, b) the inclusion of assessment strategies and techniques and c) training in multimedia and audio-visual communication in the learning-teaching process.
- Teaching innovation and introduction to educational research: the future teacher should learn how to put into practice innovative teaching resources regarding his/her subject, basic research and evaluation techniques and the development of research, innovation and evaluation projects.

The third module (16 ECTS credits) corresponds with the practicum, whose main aim is that future teachers gain some experience in planning, teaching and assessing the subjects they specialize in. Teachers have to prove adequate commands of written and spoken expression when teaching as well as the appropriate skills that facilitate learning and living together. This module is divided into two parts:

The first part consists of 100 hours specialised training practice carried out in a high school centre during a time span of four to six weeks. Such practice is supervised by a member of the teaching staff and it concludes with the submission of a final report, including self-evaluation, which is corrected by each supervisor. In the second part, the student has to write a final project reflecting competences acquired throughout the training process which s/he will eventually present in a public session.

## 2.2 Lifelong training

According to the Educational Spanish Law, teacher training is among teachers' rights and duties. Moreover, this law declares that both public administrations and teaching centres are responsible for teaching training. Lifelong training should allow the achievement of goals such as widening teachers' specialized and didactic knowledge, enabling teachers to design curricular projects or developing more critical and co-operative didactic practices.

In Spain, teachers' training on active service is optional and it is organized by the Education Ministry through the Educational Technologies and Teachers Training National Institute (INTEF), the Education Councils of Regional Governments through their Teachers Training Centres (CEPS), Universities through Lifelong Training Centres, trade unions, employers, and teachers associations or private institutions such as CECE, which sign agreements with educational administrations to offer teacher training.

Most authors claim that lifelong training should be aimed at approaching teaching from a constructivist point of view such as programs based on the design and development of the curricula or the research of teaching practice [11]. However, there are many difficulties to get teachers involved in research programs in teaching practice [7]. Such difficulties can be due to several causes: the short time available on the part of teachers, educational shortages, teachers' lack of interest in educational research or a scarce culture of collaborative work. Some research suggest the inclusion of teachers on active service in postgraduate Sciences Didactics programmes [8] but they often have difficulties in/ when defining research topics and complain about their lack of theoretical basis, which complicates the writing of any piece of work.

Despite the above-mentioned difficulties, and with the cooperation of Regional Governments, a new model of long-life learning is arising in Spain. Its basic features are the improvement of school success, acquisition of basic competences, ICTs application in the classroom, multilingualism, inclusion and cohabitation, as well as good-quality management of centres, nursery school and educational leadership. Moreover, there are courses whose objective is to develop capacitation in the real work environment of teachers by means of mixed activities which include attendance and classroom implementation of the contents learnt in the first part of the course. In addition, meetings and conferences are promoted in order to share experiences an innovative practices and there is specific training for teachers as well as nets designed to facilitate collaborative work [4] Moreover, the idea of training teachers in their centres linking their training to their own educational projects is starting to arise in recent conferences. This way, training would be related to the centres' needs [5].



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### 3. Assessment

#### 3.1. Initial training

As far as initial training is concerned, several studies carried out after the first year of implementation [2] of the first part of the master show many weaknesses, the most remarkable ones being the following:

- Hasty implementation of the master.
- Economic criteria as a priority in the design of the curricula of some universities.
- Lack of coordination between institutions and teachers involved in the Master.
- Erroneous assignments when deciding who would teach some subjects.
- Insufficient duration of the master or, at least, not adequate taking into consideration how demanding it is.
- Lack of coherence between teaching models used and the ones prospective teachers are expected to use in the classroom.
- Lack of control over results when assessing teaching.

Among its strengths, it is worthwhile pointing out the following ones:

- A high degree of implication on the part of teachers and students of the master.
- The master can become both a permanent teaching instrument for tutors and a initial training tool for prospective teachers [12].
- It reinforces the relationship between universities and secondary education teachers.
- The use of virtual environments.

#### 3.2. Life-long training

Regarding life-long training, the main strengths of the Master are the following:

- Teachers are offered a wide range of courses organized by many institutions.
- Teachers who followed long-life learning proved to be highly motivated.

On the other hand, the most remarkable weaknesses are the following:

- Teachers' courses are not compulsory.
- Many courses do not include practical application of contents in the classroom.
- Teachers have little time to attend courses.

### 4. Conclusion

There is no doubt that teacher training in Spain needed some changes and things are starting to change. However, there is still a lot to do in this respect. On the one hand, initial training shows many failures due to its hurried implementation and coordination mistakes. On the other hand, long-life training still needs to be adapted to the centres' real needs and it is not easy to motivate teachers who have little time and whose education is not oriented towards research in the classroom.

To conclude with, we hope that in time these problems will be solved provided that both teachers and students get strongly involved in the process and as long as teacher training programs count on institutions' support. Indeed, this is the only way to achieve high-quality teaching and properly qualified teachers.

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