518300-LLP-2011-IT-COMENIUS-CNW

Science Secondary Teachers´ Training Perspectives in Spain

Antonio Jesús Torres Gil
Colegio Santo Tomás de Villanueva (CECE), Spain
ajtorresgil@agustinosgranada.es

Abstract

This workshop offers a brief review of those abilities Science Secondary Teachers working in Spain need to acquire as well as a description of the current system of teachers' initial training programmes along with some evaluative comments on this system after its first year of implementation. After analysing our teachers´ initial training, a review on lifelong training by means of educational research is provided which focuses on a) main difficulties found by teachers and b) teachers´ needs for training on ICTs in order to use them in the classroom properly and not only as part of their initial training but also in daily practice.

1. Introduction

Science teachers´ adequate preparation and knowledge are considered to be issues of first importance for educational research and the design of initial training programmes. However, what knowledge should Science teachers have in order to guarantee optimal practice when teaching? Most authors claim that a Science teacher must have a deep knowledge of the content of the subject (those included in the student's book). However, such knowledge is not enough, since their education has to include contents on the History of scientific ideas too [7]. The processes of knowledge building, or the interactions with other subjects as well as staying update with scientific and technological recent developments is also worthy of being mentioned.

Being really aware of contents is not enough. Some pedagogical training that might enable teachers to reflect on their practice and get involved in educational innovation and research tasks is also needed. Some authors claim that the training of future teachers 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 [4] fosters the teaching of the characteristics of scientific work or laboratory practice, as well as the assessment of students and their attitude towards science and its learning.

2. Initial Training Programmes for Teachers

The Secondary Education Teacher Training Programme in Spain has been based on a General Law dating back to 1970s until academic year 2009/2010; the so-called *Educational Aptitude Course* (CAP). This course presented several downsides such as the limited amount of time devoted to specific teaching practice, the fact that theoretical lessons and teaching practice are simultaneous or the lack of suitable supervisor for the practical phase.

From academic course 2009/2010 onwards, a new curriculum is being introduced [10],[11]. The new programme designed for teachers´ training is a 60 ECTS (1500 hours) credit Master. Before the implementation of the Master, a series of meetings and conferences were held in order to identify

those aspects which should be improved when introducing this programme [13], from a new teaching perspective. The most remarkable proposals formulated were a) the need for coherence between the approaches of courses and strategies future teachers should use with their students, b) the assessment of both students´ work and courses they followed during their training period and c) close interconnection between the supervisors for the practical phase and the specific teachings of the master.

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:

- Learning and development of personality: this section is aimed at learning about students´ characteristics, their backgrounds and motivations, as well as understanding the development of their personalities and possible dysfunctions which may affect their learning process.

- 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:

- Complements for disciplines training: future teachers need to learn how to transmit a dynamic view of their subject through history, recent developments, and situations and contexts in which curricular contents are taught.

- Learning and teaching of each specific subject: this section is devoted to 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 audiovisual communication in the learning-teaching process.

- Teaching innovation and introduction to educational research: the future teacher should learn 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 which skills can facilitate learning and living together. It also includes a final dissertation which must demonstrate the competences acquired throughout the whole training process.

Studies carried out after the first year of implementation of the Master [2] identify as the main strengths of the programme the positive attitude and high level of involvement of students and

teachers. Among the weaknesses detected in these studies, lack of coordination between institutions and teaching staff as well as the fact that teachers selection criteria were not discerning are highlighted. Moreover, the new curricula do not account for the need to promote specific training and other aspects such as contents temporal distribution, organization and development of the Master and its assessment should be improved.

Science teachers´ training should not be reduced to such initial training. Indeed, one of the goals of the Master should be to make students aware of the need for lifelong and collective training based on research and innovation when possible.

3. Lifelong Training through research and ICTs

Taking into consideration the amount of competences teachers need to acquire, lifelong training becomes an essential need. Lifelong training enables teachers to widen their knowledge of teaching contents as well as their didactic aspects. It also helps them to learn how to design curricular projects and to develop more critical and co-operative didactic practices. Lifelong training should approach the teaching process from a constructivist perspective as it happens with programmes based on curricular design and development, or those based on research about teaching practice [12]. Indeed, teachers´ involvement in educational research is crucial for the improvement of teaching practice since they help teachers to think about their teaching and encourage a permanent and progressive change.

Although educational research is part of teachers´ training programmes, there are many difficulties to get teachers involved in innovation and research in the field of Science didactics. Such difficulties [8] can be due to several causes: the short time available on the part of teachers, educational shortages, teachers´ lack of interest in educational research, a scarce culture of collaborative work together with the fact that many teachers do not consider research as part of assigned tasks. Some research suggest the inclusion of working teachers in postgraduate Sciences Didactics programmes [9] but even if such inclusion takes place, some doubts arise when selecting research topics, it is not easy to define the object of the study,and the lack of theoretical basis complicates the writing of the work. It is possible that current research lines of research in Sciences Didactics do not respond to the needs, interests and worries of working teachers. Therefore, a less academic approach that may really help teachers with everyday problems they may encounter is required. Some interesting proposals may be found in recent research on the introduction of everyday science, mainly chemistry into teachers´ initial training [14] or throughout teaching practice [5],providing highly satisfactory results as far as teachers and students motivation is concerned and being a clear example for innovation in the classroom.

Regarding lifelong learning, an essential aspect in teachers´ training is the use of ICTs in their professional activity.The fact that we are immersed in the information era, together with the huge amount of resources available through the Internet, and the changes which are taking place in students´ profile make ICTs and information training a real need for both working teachers and those who have recently finished their degree. In fact, they normally show an interest for the use of ICTs in their teaching practice although in some cases, they are not able to use them. Such difficulties are generally due to the limited presence of ICTs in their initial training and the speed at which they are being introduced in our society [3]. In this respect, some people suggest the inclusion of a general and compulsory subject on ICTS in teachers´training programmes as a solution to this problem [6].

The future inclusion of ICTs in teaching will lead to a change in the role of teachers; they will stop being a source of information to become anevaluator and a designer of learning situations as well as a facilitator and someone who provides students with learning resources.

References

[1] Acevedo, J.A. (2010). Formación del profesorado de ciencias y enseñanza de la naturaleza de la ciencia. Revista Eureka sobre Enseñanza y Divulgación de la Ciencias. 7(3) 653-660.

[2] Benarroch, A. (2011). "Diseño y desarrollo del máster en profesorado de educación secundaria durante su primer año de implantación". Revista Eureka sobre Enseñanza y Divulgación de las Ciencias" 8(1), 20-40.

[3] [3] Cabero, J. (2004), "Formación del profesorado en TIC. El gran caballo de batalla."Comunicación y Pedagogía. Tecnologías y Recursos didácticos.(ISSN 1136-7733). 195,2004, 27-31

[4] Carrascosa J., Torregrosa, J., y otros (2008). "¿Qué hacer en la formación inicial del profesorado de ciencias de secundaria?.Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 5(2), 118-133.

[5] Jiménez-Liso, M., De Manuel, E. (2009). "La química cotidiana, una oportunidad para el desarrollo profesional del profesorado". Revista electrónica de Enseñanza de las Ciencias Vol. 8, nº3, 878-900.

[6] . Junta directiva de la Red Universitaria de Tecnología Educativa (2008). "La formación para el desarrollo de las competencias de los futuros profesores en el uso de las TIC". Red Universitaria de Tecnología Educativa. (http://www.juntadeandalucia.es/averroes/mochiladigital/didactica/Declaracion_RUTE2008.pdf)

[7] Mellado, V. y González, T. (2000). "La formación inicial del profesorado de Ciencias". Perales, F., Cañal, P. Didáctica de las Ciencias Experimentales (535-556). Alcoy, España: Ed. Marfil.

[8] Oliva, J.M. (2011). "Dificultades para la implicación del profesorado de educación secundaria en la lectura, innovación e investigación en didáctica de las ciencias (I): el problema de la inmersión". Revista Eureka sobre Enseñanza y Divulgación de las Ciencias. 8(1), 41-53.

[9] Oliva, J.M. (2011). "Dificultades para la implicación del profesorado de educación secundaria en la lectura, innovación e investigación en didáctica de las ciencias (II): el problema del "manos a la obra" ". Revista Eureka sobre Enseñanza y Divulgación de las Ciencias. 9(2), 241-251.

[10] Orden ECI/3858/2007 por la que se establecen los requisitos para la verificación de los títulos universitarios oficiales que habilitan para el ejercicio de las profesiones de Profesor de Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanzas de Idiomas.

[11] Orden EDU/3498/2011 de 16 de diciembre por la que se modifica la Orden ECI/3858/2007, de 27 de diciembre, por la que se establecen los requisitos para la verificación de los de los títulos universitarios oficiales que habiliten para el ejercicio de las profesiones de Profesor de Educación Secundaria Obligatoria y Bachillerato, Formación profesional y Enseñanzas de Idiomas. Boletín Oficial del Estado,141836-141840.

[12] Valcárcel, M y Sánchez, G. (2000). "La formación del profesorado en ejercicio". Perales, F., Cañal, P. Didáctica de las Ciencias Experimentales (535-556). Alcoy, España: Ed. Marfil.

[13] Vilches, A. y Gil-Pérez, D. (2010). "Máster de formación inicial del profesorado de enseñanza Secundaria. Algunos análisis y propuestas. Revista Eureka de Enseñanza y Divulgación de las Ciencias. 7(3), 661-666.

[14] Waldhiersen R., Manrique, F. (2012). "Formación de profesores de química a partir de la explicación de fenómenos cotidianos: una propuesta con resultados". Revista Eureka sobre Enseñanza y Divulgación de las Ciencias 9(1), 124-142.