Chapter 4

Teaching Formation to Develop Computational Thinking

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ABSTRACT

In order to develop computational thinking, it is essential to modify the initial training of teachers, that is to say, to restructure the curricula of the faculties or professional schools of education in any field or context it is going to be possible to identify areas of basic or general training and areas of specialized training. As well as reading or writing, computer thinking is currently essential because its application in any professional context is necessary.

INTRODUCTION

Computational thought is considered as a competence of the 21st century, which has several developmental possibilities from the perspective of initial and in-service teacher training. In this chapter, we present the conceptual meanings of computational thought from the perspective of pedagogical optics, establishing the link between the levels of mathematical thought (sensory, concrete and graphic) with the phases of analysis and abstraction, modeling and organization, code, technological system, programming and permanent reflection, then.

Teacher training must contribute to the formation of capable citizens for developing critical and rigorous thought processes, capable of “learning to learn”, an expression that connotes a radical transformation about the way which teachers and students do their daily lives in the classroom, and which requires the search for new forms of access to knowledge (Snalune, 2015).

In all the specialities of teacher training (initial, primary or some specific of the secondary level) we are going to find the differentiation in terms of the areas of general or basic training and the areas about the specialized training, the percentages of the subjects destined to the areas of training or specialized areas vary finding recurrence differences between the area of basic training and the specialized training, finding recurrently greater percentage in the specialized area.

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To promote an awareness and attitude so that future teachers harmonize their relations with nature, within a framework of respect for cultural diversity, social and ethnic diversity, with a responsibility sense for the future generations needs (Román-González, 2015), (Zapata, 2015). This is what the basic training of future teachers pursues, a very important aspect of basic training has to do with pedagogical practice, understanding it as a systematic, inclusive, interactive and flexible process, if this interaction is successful the achievement of the learning purpose is assured (Figure 1).

Contemporary training models use the TPACK (Technological Pedagogical Content Knowledge) model as a reference, in which the teacher seeks to show the disciplinary, technological and pedagogical mastery of the subject in a joint way.

Pedagogical practice is part of what is called the Pedagogical Domain and is developed within the general areas, here it is important to mention the Technological Domain complements the pedagogical domain, since it guarantees the effective incorporation of ICT in the teaching and learning process (Rojas López, García-Peñalvo, 2016).

The Disciplinary Domain consists of the teaching specialization corresponding to initial teacher raining (Román-González, Pérez-González & Jiménez-Fernández, 2017). That is to say, specialties such as pre-school, primary or some specific secondary level.

Adapt the training model to the new skills of the 21st century. Among them, the computational thinking is a fundamental skill for everyone and not just for computer scientists (Romero, Usart & Ott, 2015). (Lye, & Koh, 2014). In addition to reading, writing and arithmetic, we must add computational thinking to the analytical capacity of each child (Llorens-Largo, 2015). It involves problem solving, system design and understanding of human behaviour, based on the fundamental concepts of computer science. Computational thinking includes a range of mental tools that reflect the computing field breadth. It is influencing research in both the sciences and the humanities. From the different meanings we dimensioned the concept of Computational Thought in:

Figure 1. Fields of teaching practice