Serrano, J.L. (2022). Computational Thinking in Education, by José Luis Serrano. 90 pp. ISBN: 978-8409450435

The book is a perfect synthesis of everything you need to know about computational thinking (hereafter, CT) in education, so that teachers and educators can enter this world without making mistakes. It provides the reader with a good conceptual basis and a set of useful tools to make reasoned, critical and well-founded decisions on how, when and why to encourage computational thinking in students. José Luis Serrano manages to combine the results of the most recent research with his own experience and pedagogical knowledge, resulting in a unique manual that stands out for the clarity of ideas and simplicity of style despite the complexity of the subject matter.

The first chapter summarizes the long and intense road he has traveled before being able to write, as well as the motivations that have driven him to do so. He explains the serious relationships he finds between CP, emotions, problem solving and people's daily behaviors; and introduces as a novelty the 5PC Model.

In the second chapter, José Luis Serrano tries to deepen our understanding of the concept of CP, so much discussed over the years. He reviews the evolution of the concept, explaining that the current definition most commonly used is based on Wing's 2006 extension of the concept promoted by Papert. He comments that the growing tendency to consider the concept as indispensable for any person has gone hand in hand with companies such as Microsoft and Google, but has not been exempt from certain criticisms. He ends the chapter with what he considers to be the most accurate definition: "a set of cognitive processes that enables the formulation and solution of a problem to be expressed in a way that a thinking agent (human or machine) can carry out" (p. 23).

The third chapter is one of the fundamental chapters for a complete understanding of the concept of CP, since it sets out the elements that are part of it. It establishes four categories to classify the concepts associated with CP: cognitive processes, methods, practices and transversal skills. The differentiation and understanding of these allows an adequate approach to the teaching-learning of CP.

The fourth chapter shows the main theoretical references in which the didactic strategies used to develop CP are usually framed. These are: constructionism, active and experiential learning, problem-based learning and game-based learning. Each of them puts the nuance on an aspect

that the author discusses in detail. He also points to feedback as an essential learning tool, for which robots can be very useful.

The general tendency has been to identify robotics and programming with the PC, creating confusion as to what actually develops it. Chapter 5 details these issues, explaining that programming is not essential for developing PC and outlining the two main strategies for developing it: unplugged activities and robot programming.

Chapter six opens the second section of the book and tries to contextualize the 5PC model that will be presented in the following chapter. To do so, it summarizes all that has been said previously, answering fundamental questions.

In the seventh chapter, he presents the 5PC Model as "a proposal to clarify more precisely what PC is, its elements, its relationship with problem solving and the practices most commonly used for its development" (p. 54). It consists of five sequential steps to be followed, in which peripheral skills, PC components, practices used in the implementation of solutions, and problem-solving steps are activated. The chapter develops each of the points in detail, giving the keys to favor CP in teachers in training, although it is applicable to students in lower educational stages.

Finally, in the eighth chapter, the reader is provided with a collection of educational resources and examples of practices that can be very useful for taking action, as well as for resorting to the most up-to-date sources.

In short, this is a very practical manual, which is essential for teachers to be able to face the teaching-learning of PC from a critical and updated perspective.

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