# Chapter 6
# Introduction to Computational Thinking With MI-GO:
## A Friendly Robot

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## ABSTRACT

*The present study is part of a research about computational thinking and tangible robotics. A robot in development in Portugal, MI-GO robot, is part of the basis of this research. The objective is to determine the attitude of young students concerning tangible robots and to observe in what measure they contribute to the development of their STEM skills. On the other hand, it also aims to know what are the opinions of educators, teachers, and researchers concerning MI-GO's characteristics and what is their value, adequacy and suitability for the educational grades of young learners (from 5 to 10). The study consists on a qualitative approach based in a case study methodology, using the techniques of questionnaire and observation. At first the data reveal a clear adhesion to the robot and tangible programming by learners, and the researchers that analyzed the device consider it was a very adequate one and presented several suggestions to improve it.*

# INTRODUCTION

The presence of digital technologies in contemporary society is an undeniable fact with which the school is challenged daily, with all the advantages and disadvantages that it involves.

In a book about "Open and Social Learning in Impact Communities and Smart Territories" the presence of a chapter about robotics is almost compulsory, not only because of its current importance and the children's interest about playful meaningful learning, but also because it is intimately related to social interaction and smart societies based on (as stated by Johnson, Adams, & Cummins, 2012) the concepts of interconnection between robots' capacities, automatization, artificial intelligence and the Internet of Things.

In fact, the intersection of education with the new tendencies of the scientific and the professional world drives students, from an early age, to have contact with strong new challenges in order to promote vanguard technologies use.

Children live in a strong interaction with their own devices and fortunately, the advent of digital technology is increasingly visible on a national level also in schools. Learning projects with digital technologies (DT) have proliferated in the last decades.

Learning cases that cross different technologies and methodologies with the use of augmented reality, mobile and outdoor learning, digital storytelling, georeferentiation, gamification and game based learning, among others, are an increasing reality in Portuguese schools.

This chapter's content is related with the more recent projects of "programming and robotics" promoted by the Portuguese Ministry of Education. It is organized in seven subchapters.

The first subchapter addresses a conceptual and theoretical framework that mainly refers to constructivism and active learning and the studies developed in this area of knowledge, because it is the basis of the use of Mi-Go tangible robot in learning contexts.

The second one reports some aspects related to the development of the Mi-Go robot, from technical ones to the characteristics that make this robot different from the other similar robots that exist in schools and kindergartens.

The third part presents the methodologies and the designs implemented in the pilot studies of the use of Mi-Go in formal, non-formal and informal learning contexts.

The forth deals with aspects related to the students' proficiency and opinions during the use of the robot: their difficulties, opinions and preferences.

The next one describes the opinion of teachers and educators regarding the advantages, disadvantages and the main aspects in which this robot distances itself from the similar ones as well as its more specific features.

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