# Chapter 5
# Building the Future of Distance and Online Learning:
## The Case of a Portuguese University

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## ABSTRACT

*The switch to distance and online learning is a central issue for the European Education Area in Higher Education. To help prepare the future of digital education, the academic community of the University of Aveiro (UA, Portugal) has been called to debate learning experiences, to prepare forward-looking training systems, and to share practices. With this framework as a background, this chapter has a double objective: to present a teachers' professional development program designed for the empowerment of digital teaching and learning processes and to report two teaching experiences incorporating the key ideas of the program and designed to serve STEM publics (a professional training course and a pre-service teachers' course). An additional objective is to present a future research proposal within an informal context for STEM students. The study will provide relevant insights regarding e-learning in STEM education at the UA and the impact of transformational strategies on the community.*

## INTRODUCTION

Every teacher aims to engage their students inside and outside classes. For more than twenty years, under the Bologna Declaration, Higher Education Institutions (HEI) have been challenged to introduce and promote active methodologies able to transform the process of transferring information into meaningful learning activities. In fact, the Bologna Declaration (originally representing the commitment of twenty-nine European countries to reform the structures of their Higher Education systems with a view to establishing greater transparency and ease of mobility within the European Union) now represents forty-five countries and is also designed to coordinate policies capable of leading to a European Higher Education space) (1999). The openness for dialogue, cooperation, and co-construction that the Bologna Process gave room to, goes far beyond quality assurance or credit systems. In fact, considering this social dimension of learning and teaching, HEI have been preparing themselves to promote a diversity of generic competences (previously known as soft and, more recently, classified as transversal and transferable competences (Terzieva, Luppi & Traina, 2015)) in their students, aligned with the values of better knowledge for better education policies of the European society (Eurydice, 2021). Not being our intention to elaborate about it, we use the terms to indicate generic competences that may support entrance into professional life and ensure flexibility and adaptability in all areas of life. Examples are multilingual, digital, or collaborative and cooperative work skills. The implementation of innovative learning skills for the 21$^{st}$ century involves the use of strategies that aim to involve students in the learning process, as alternatives to more traditional teaching models, centered on the teacher. An example are the so-called active methodologies that seek to put the students in charge of their own learning processes.

One broad area of education is the one of Science, Technology, Engineering, and Mathematics (STEM). To prepare the next STEM generation future, HEI are willing to devote considerable time to prepare their teachers for the challenge, regarding that, among all the teaching contexts, digital plays a very strong role in STEM education. And digital affects how we work together, act, and learn. To prepare the way, the University of Aveiro (UA) has been actively preparing its teachers to the digital transformation, thus offering alternative teaching and learning contexts for the digital STEM students.

One of the pushing training systems that provides teachers and students with spaces for reflection arose with a dedicated and committed teacher professional development program, entitled Docência+. The program, aimed to enhance pedagogical competences, is part of the university's approach to pedagogical innovation, encompassing the presentation of methodological tools and their practical application.

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