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# Spanish schools play catch-up on high-tech teaching

Provision is patchy but Madrid and Barcelona are showing the way in Stem subjects



Stephen Burgen YESTERDAY



Social attitudes in Spain have changed almost beyond recognition in the past 30 years, but institutional change has been much slower. This is especially true in education, which has struggled to break out of an old-fashioned “chalk and talk” approach to teaching.

Science and technology teaching in particular has lagged behind many other countries and there is growing pressure from, among others, the Spanish business federation, to modernise and extend Stem (science, technology and engineering and maths) teaching.

There are signs of progress, however, particularly in Madrid, where in 2016 the regional government was among the first in Europe to introduce a compulsory course on technology, programming and robotics. As it is compulsory, Madrid must provide funding, for example ensuring every secondary school has a 3D printer.

Teaching of advanced technology is uneven across Spain as the topics are not obligatory in the national curriculum, an education ministry report noted this year. Some regions are too poor to follow Madrid and this is likely to remain the case unless central government makes the content compulsory.

“Part of the problem is schools don’t know what topic to drop in order to make way for programming and robotics,” says Alberto Valero, responsible for the BQ education project, which supplies technological material and training to schools. “Madrid added it to the existing technology syllabus and teachers complained about the extra work.”

However, Yolanda González Sánchez, head of studies at the Federico García Lorca de las Rozas secondary school in Madrid, says: “Ninety per cent of the faculty have done a course in [robotics](#) and it is applied to all disciplines.

“A large percentage of our students will be doing jobs that don’t yet exist and will very likely involve technology.”

First-year pupils are taught how to program and make a motherboard for a robot. “Later, pupils design programs to solve a real-life problem, such as traffic flows or recycling energy,” she says.

BQ education has developed units to teach programming and robotics, often using Scratch and Arduino. Scratch is a programming language and community for eight to 16-year-olds that allows them to program and share games. Arduino is an electronics platform for programming and activating hardware.

Madrid and Catalonia are the only regions where programming and robotics are studied at primary and secondary level. The Catalan government has introduced a programming and robotics course using Scratch and Arduino.

Microsoft Spain this year said it was joining forces with Lego Education Robotix to improve programming and robotics education and to provide free training to teachers. They will introduce the Maker programme, a project-based approach that allows pupils to develop, program and 3D print prototypes.

Juan Manuel Delgado, head of studies at Madrid’s Camilo José Cela secondary school, says the technology teaching has been absorbed into an approach where pupils solve their own problems.

“We want to teach kids to be not just consumers of technology but technology creators,” he says. “In robotics we set simple problems for the youngest kids involving movement and obstacles . . . and then in the third year they make robots with 3D printers and enter the robot championships.” The Madrid event attracts entries from 2,000 pupils aged 12 to 18.

“This course really helped me understand how technology works and how to use computers in a different way,” says Alana Emeny Castrejón, 16, a former pupil at Camilo José Cela.

While high-tech learning is patchy, Mr Valero believes Spain is ahead of the game in robotics. “The UK and US are very focused on coding and making video games, and less on the tangible, like building robots, while in this respect Spain is among the pioneers in Europe.”

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