

# EU CODE WEEK 2015

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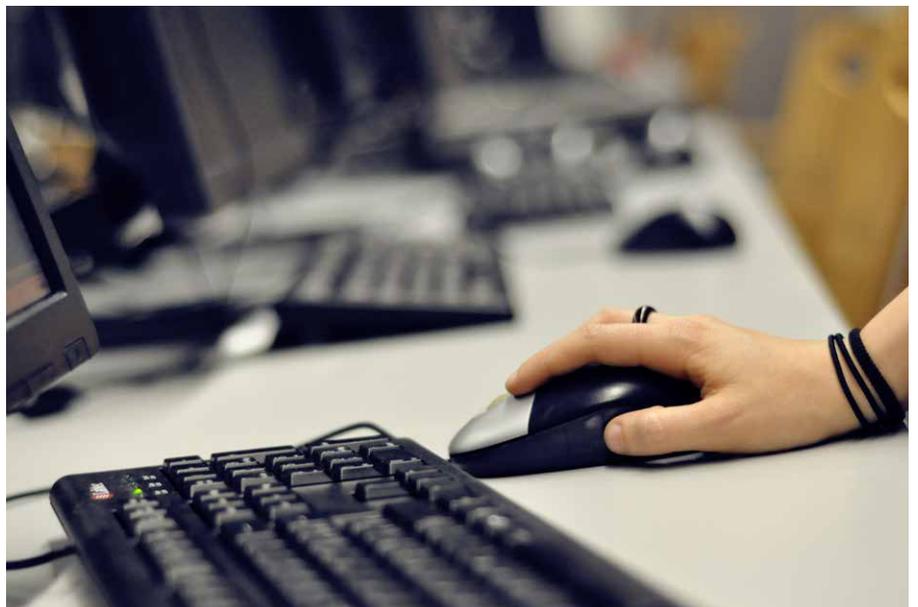
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With the support of



Coding is now part of the curriculum in many EU schools. [Computer\_stock/Flickr]

## Coding classes trending across EU schools

A majority of member states have introduced coding classes to their educational curriculums, as education ministries across Europe increasingly view computer skills as essential to developing key “21<sup>st</sup> century competences”.

“Today, 90% of all jobs are expected to require at least a basic level of ICT skills,” said Marianne Thyssen, the EU Commissioner in charge of Employment, Social Affairs, Skills and Labour Mobility.

“Stepping up Europe’s digital skills will be part of the EU-wide Skills Agenda I will present next year,” Thyssen announced on Twitter, using the #CodeEU hashtag.

EU countries seem to have heard the message. Most education ministries have now added coding classes and computer science to their school curricula, according to a report published today (12 October) by European Schoolnet, a non-profit organisation bringing together 31 European Ministries of Education.

### Growing trend

Computer programming and coding - Priorities, school curricula and initiatives across Europe, provides an overview of coding initiatives across Europe.

Since the first report was published in 2014, new countries have joined the trend, with Spain and France formally introducing coding in their school curricula. Meanwhile, the Czech Republic, Poland, Lithuania and Malta have made existing coding classes a more integral part of their teaching programmes or are planning to do so.

In total, 15 EU countries have integrated coding in their curricula, whether at national, regional or local level - Austria, Bulgaria, the Czech Republic, Denmark, Estonia, France, Hungary, Ireland, Lithuania, Malta, Spain, Poland, Portugal, Slovakia and the UK.

And the trend is expected to continue. Coding will become part of the core curriculum in Finland by 2016, while the Flanders region in Belgium is currently debating the issue. At primary level, coding is already being taught in Estonia, France, Israel, Spain, Slovakia and England. And Flanders, Finland, Poland and Portugal are expected to follow by next year.

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Coding is even a compulsory part of the programme for specific levels of education, mainly as part of computer courses in Bulgaria, the Czech Republic, Denmark, Portugal, Slovakia, Spain, and the UK. In Denmark, basic programming knowledge is a compulsory part of physics, chemistry and maths curricula. Slovakia takes it a step further, integrating coding at all levels of school education as a compulsory element.

### Looming shortage in IT-skilled labour

Katja Engelhardt, one of the authors of the report together with Anja Balanskat, told EurActiv that the European Schoolnet expects coding to remain high on the education agenda beyond the short term. She says education authorities now need to tackle pedagogical questions such as how to effectively design the learning process and assess coding skills.

"We need more concrete insights into the actual integration and real uptake of coding in schools, as well as educational practices related to it," Engelhardt said.

The rationale for introducing coding classes at school is motivated in part by a looming shortage in IT-skilled labour force across Europe.

"In five years' time, 825,000 jobs may be unfilled, simply because employers cannot find people with the right digital skills," said Günther Oettinger, the EU Commissioner in charge of the Digital Economy & Society. "The answer is glaringly simple, Europe needs to get serious about digital skills, for each and every person, and each and every business to thrive in our digital economy and society," he wrote on his blog.

But while attracting more students to computer sciences is a rationale for the 11 countries surveyed in the European Schoolnet report, the aim of fostering employability in the sector is key for only eight countries.

### 21<sup>st</sup> century skills

This is because coding has started to leave the realm of computer geeks to enter the mainstream. In fact, basic coding skills is increasingly seen as a fundamental skill for all students, not just computer scientists.

"Computational thinking is typically associated with coding and computer programming, but is more than that, involving solving problems, designing systems, and understanding human behaviour," according to the European Schoolnet report. They now form part

of so-called "21<sup>st</sup> century skills", like problem-solving and logical thinking.

For Engelhardt, Europeans should now try to determine the computational skills every student should acquire in order to be prepared for tomorrow's digital world. One key challenge she emphasises is how to make coding more exciting for students, especially girls.

Gifted students also need to be supported in pursuing a career in computational science with personalised learning, she adds. Successful models could also be emulated for providing teachers with appropriate training, she says. At the moment, many competitions are offered in several European countries as a way of rewarding excellence in the area, but students with a general interest should also be attracted by providing more general courses, according to European Schoolnet.

What the decisive factors are for young people to opt for scientific careers in computer science also needs to be studied.

"The role of formal qualifications or certifications that can be obtained during school, e.g. the offer of specific computer science school-leaving exams, might play a role for students to continue with higher studies," European Schoolnet stated in the report.

## INTERVIEW

# Ansip: Europe 'still has some way to go' on digital skills

40% of the population in Europe has insufficient digital skills, according to Andrus Ansip, who says this "is a real cause for concern" as most jobs today require at least basic knowledge of ICT, including coding.

*Andrus Ansip is a former Prime Minister of Estonia who assumed office for almost ten years - from 2005 to 2014. He is now Vice-President at the European Commission, in charge of the Digital Single Market. Ansip answered to EurActiv's questions in writing.*

**The previous Commissioner in charge of digital affairs, Neelie Kroes, was quite personally involved in promoting coding as part of official school curricula. Do you share her passion?**

Absolutely. Digital skills are essential and programming is part of a broader package aiming to advance digital skills

in Europe as planned in the Digital Single Market Strategy presented in May by the Commission.

**For most youngsters, coding is more like a pastime. So does coding really need to be taught?**

You are right that today, most coding activities take place outside of the school classroom, which means that it is mostly kids who have the coding bug, or whose parents are aware, that take part.

But we need to reach all children. If programming were taught in schools,

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more children would get the opportunity to learn the basics. Having said that I would like to underline each EU country is responsible for its own education and training systems. As change may take time, in the meantime we have to support other initiatives, such as EU Code Week. This promotes coding – in the classrooms and in other places – and tries to bring all kinds of partners together to offer more coding activities the whole year around.

After all, every week is code week! Learning programming is learning how to create with code. Humans have been moulding the world with clay, stones, wood and brick for centuries. Today, you create digital content with code. You build apps, games, steer robots, make animations and much more. I want as many people as possible – not only children – to find out that you can do more than play, like, share or digital content. You can actually make something.

It is also important to learn some coding to understand how our digital society is built. Today we use computers all the time, and more and more devices are connected. You need these skills to understand how our world is working.

Furthermore, learning how to code means you learn computational thinking; logical thinking, step-by-step analysis, breaking up a problem in bits and pieces, abstraction, generalisation, adapting an idea and using it for something else. These skills are important in schools and in work.

But most of all it is fun to code!

**Do you consider Europe as a leader or as a laggard on coding, and digital skills more widely? What in your view should be done to improve the EU's standing in this regard? Have you quantified the expected benefits in terms of stimulating economic growth or tackling unemployment?**

Europe is making some progress in coding. According to the European



Schoolnet's report, published this week, coding is compulsory for specific levels of education in seven Member States (Bulgaria, Czech Republic, Denmark, Portugal, Slovakia, Spain). In Slovakia, it is compulsory in primary education, and in the UK, coding is compulsory both in primary and secondary.

Overall, however, there's still quite a way to go. While we know that most jobs, in whatever sector, already require some digital skills, in Europe we still have as much as 40% of the population and 32% of the workforce with insufficient digital skills. Only 25% of students are taught by digitally confident and supportive teachers with access to ICT, and 40% of businesses encounter difficulties in recruiting ICT professionals.

This is a real cause for concern, and things could get worse, as we see that education systems are currently slow to react to increased market demand for people with digital skills.

This cannot go on. Today you need digital skills for a career in, for example, engineering, accountancy, architecture, and also nursing, medicine, art, and many more. For a career in any of these fields, basic coding skills will soon be essential.

The ICT sector grows quickly. Some

120,000 new jobs are created each year. Still, if we fail to address the digital skills shortage, Europe could lack more than 800,000 skilled ICT workers by 2020. And this is despite high unemployment, especially among the young.

Technology-based education and digital skills pedagogies should be a 'must have', not just a 'good-to-have', for all ages. This is why the Commission supports and promotes campaigns like Code Week, to make learners fit for 21st century life and work.

Overall, the DSM strategy should contribute around €415 billion per year to the growth of our economy and create hundreds of thousands of new jobs.

**Do you have any measures in the pipeline to promote coding at national level? How could the European Commission cooperate with the private sector (i.e via the European Coding Initiative)?**

If we do not appropriately address this issue, at European and national level, we may miss out on important opportunities to create growth and jobs. This is why the Commission is supporting the EU Code Week (which

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currently involves more than 40 counties in Europe and beyond) and has launched initiatives such as the Grand Coalition for Digital Jobs and Opening up Education.

The Digital Single Market Strategy supports an inclusive digital society where people have the right skills to embrace the opportunities offered by the internet and raise their chances of getting a job.

Early next year, the Commission will present an EU-wide skills agenda prepared by my colleague Commissioner Marianne Thyssen. Stepping up Europe's digital skills will be part of it.

The Commission also supports other independent initiatives such as the European Coding Initiative (involving Microsoft, Liberty Global, SAP, Facebook, and European Schoolnet) under the Grand Coalition for Digital Skills and Jobs. Since its launch in October 2014,

the Initiative's partners:

- Have jointly contacted Ministers for Education raising their awareness about the importance of bringing coding skills to all European kids, including by training teachers on how to teach these skills;
- Set up a new "all you need is {C<3DE}" website with coding resources for kids, teachers and adults;
- Published the EUN report "Computing our future - Computer programming and coding, Priorities, school curricula and initiatives across Europe".

The Grand Coalition for Digital Skills and Jobs, a European multi-stakeholder partnership, aims at making ICT careers more attractive, at facilitating cooperation among business, education providers, public and private actors to address the mismatch in digital skills in European labour.

The Grand Coalition has already inspired the creation of thirteen national coalitions, something we hope to see in all member states. These initiatives aim to boost digital skills, including programming, for different target groups.

The Commission and the member states have also proposed to strengthen cooperation at European level in the field of education and training up to 2020. In the draft joint report, recently published, digital learning and skills – including coding – is a priority

#### What is your vision in this field in ten years' time?

In ten years' time, I would like all Europeans to be digitally competent and to see more people pursuing a career in ICT. We will have a fully functional European digital single market, and the EU will be the world leader in this field.

## Digital economy far from full potential, OECD warns

The potential for information technologies to boost growth across all industrial sectors is still huge, according to the Organisation for Economic Co-operation and Development (OECD) - but it calls on governments to think "strategically" in terms of education and employability.

The OECD Digital Economy Outlook 2015, published in July, forecasts that global trade for ICT (Information and Communication Technology) manufacturing and especially services will continue to grow in the coming years. The OECD is particularly



highlighting the broadband market, which is still expanding, cloud computing services as well as different kinds of software for enterprises.

"The digital economy now permeates countless aspects of the

world economy, impacting sectors as varied as banking, retail, energy, transportation, education, publishing, media or health," the report says.

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As always when it comes to technology, Europe tends to look across the pond to the United States. There, ICT industries have become a vital part of the country's economy, employing 4.2 million workers.

In 2012, the industries contributed nearly €880 billion (\$1 trillion) to the United States' GDP and every sector is now relying on hardware and software to some degree.

At the same time, the US Bureau of Labor Statistics estimates that employment in computer systems design will grow annually 3.9% from 2010 to 2020. This figure is compared with 2.6% for professional, scientific and technical services and 1.3% for all industries.

If Europe saw the same kind of employment growth, it could benefit some of the 4.6 million young people in the EU who are currently unemployed, according to Eurostat's data from August 2015. In Greece and Spain, for example, more than 25% of young adults are neither employed, in education or any kind of training.

### Skills for the digital economy's labour market

But the OECD says in another report, OECD Skills Outlook 2015, that governments are increasingly aware of the need for thinking 'strategically' in order to respond to the challenges of unemployment and inequality.

One strategy includes analysing the skills needed for the digital economy and help young people develop those.

Almost all jobs require cognitive skills such as the ability to understand, interpret, analyse and communicate complex information as well as social and emotional skills. Creativity and critical thinking, which are often called "21<sup>st</sup> century" skills, come from the interaction of all these.

Job and occupation-specific skills, which are sometimes called technical

skills, are now also in demand for employers.

"Today's economy increasingly requires youth to have digital skills as students, job-seekers or workers, consumers, or responsible citizens. Youth with no ICT access and experience will be at a disadvantage, especially in the labour market where today's youth are considered 'digital natives'. However, basic ICT skills may not add value unless they are well paired with cognitive skills and other skills, such as creativity, communication skills, team work and perseverance," says the OECD in the skills report.

### Lack of digital skills is "real cause for concern"

Andrus Ansip, the Commission Vice-President in charge of the Digital Single Market, says Europe has made progress in areas like coding, with a majority of countries now introducing programming classes at school.

But overall, he warned there was "still quite a way to go" before Europeans are fully equipped with the digital skills needed for 21<sup>st</sup> century jobs.

"While we know that most jobs, in whatever sector, already require some digital skills, in Europe we still have as much as 40% of the population and 32% of the workforce with insufficient digital skills," Ansip told EurActiv in an interview. "This is a real cause for concern, and things could get worse, as we see that education systems are currently slow to react to increased market demand for people with digital skills."

Ansip cited areas like engineering, accountancy, architecture, but also nursing, medicine, art, and many more which require digital skills.

"This cannot go on. For a career in any of these fields, basic coding skills will soon be essential," he said.

What is important to emphasise, according to the OECD, is that the

development of skills is a dynamic process which means that young people with low cognitive, social and emotional skills will also find it harder to further develop and upgrade their skills over their entire lives. This will make them more vulnerable when technological progress leads to changes in job requirements.

Not all youth possess basic ICT skills despite their universal or at least increasing access to ICT infrastructure.

For example, the OECD report shows that almost 10% of youth on average are not equipped with basic ICT skills.

According to the report, Spain, Italy, Ireland, Slovakia, and Poland fare worse than the OECD average, with the latter having almost 25% of its young people not knowing basic ICT skills. Meanwhile, for the region of Flanders in Belgium, Germany, Sweden, the Netherlands and Finland the figure is less than 5%.

# Digital skills in Europe

Most jobs today require some digital and ICT skills. Jobseekers will have a harder time finding work without them. The European Commission tracks several indicators to measure the level of ICT skills in the population, such as:



- Basic digital skills
- Internet users with advanced digital skills
- Individuals who have obtained ICT skills through formal educational
- People who have created a web page
- People having written a computer programme

## Basic digital skills



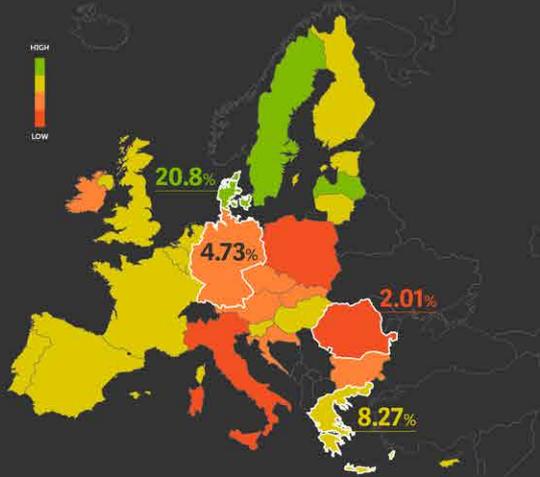
**40%** of the EU population is considered as having **insufficient digital skills**. **22%** have none at all, meaning they did not use the internet. The population **lacking digital skills** goes down to **32%** for those in **employment**. **13%** of the EU labour force had **no digital skills** at all.



## Advanced digital skills



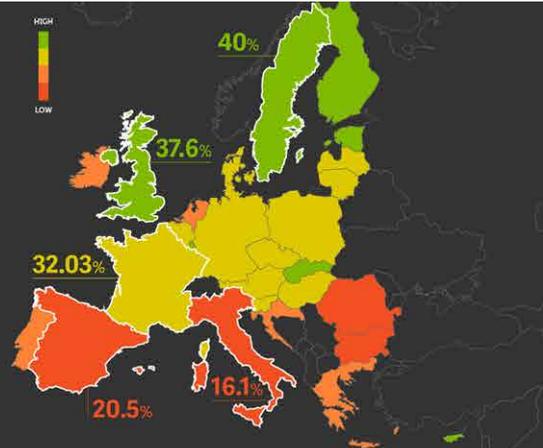
Among regular internet users, **Denmark** is the country with the **highest level** of digital skills (**20.8%** of internet users). **Bottom** is **Romania**, with **2.01%** of internet users.



## Education in ICT



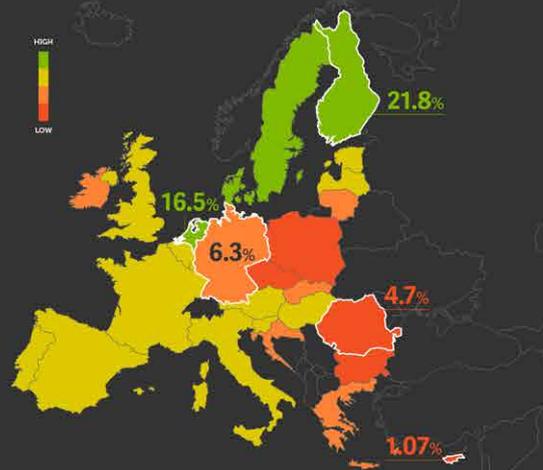
**27.6%** of the EU population report having obtained some **ICT skills through formal educational institutions**, at school, college or university.



## Creating a web page



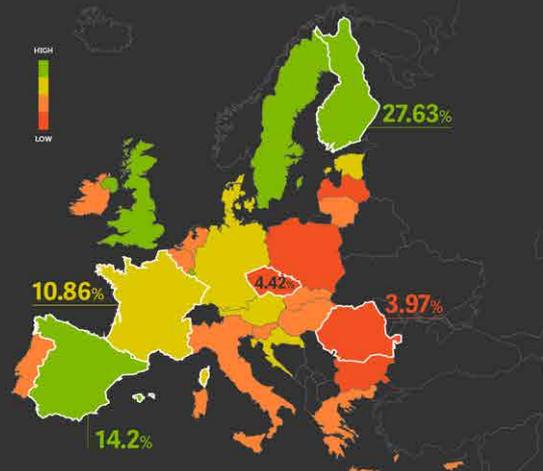
Among internet users, **9.81%** of the EU population report **having created a webpage** at least once in their life.



## Writing a computer programme



Among regular computers users, **10.6%** of the EU population say they have **written a computer programme** using specialised programming language.



## Coding kids share their digital skills with MEPs

Dozens of children from around the continent came to the European Parliament on 30 September to help MEPs brush up their digital skills.

For the third time, Irish MEP Sean Kelly (European People's Party) invited the young coders to the annual event in Parliament.

Rallied together by the organisation Coder Dojo, the children taught MEPs how to code, build a basic website and use other digital programmes. More than 40 children between the ages of 7 and 17 traveled to Brussels from Ireland, Northern Ireland, Italy, Belgium, Romania, the Netherlands, Spain and the UK for the coding session.

Thirteen MEPs stopped by to learn from the visitors, some of whom have already been coding for several years.

Sam, age 14 from Northern Ireland, said he started coding when he was nine.

"Coding is fun because you can make anything. If you can think of it you can make it. Even an actual physical device like a little car or a little robot," he said.

The children who came to Brussels normally attend meetings at local Coder Dojo chapters.

Benedetta, from the chapter in Allumiere, Italy, opened the session in Parliament by playing 'Ode to Joy' on a musical instrument she made using MakeyMakey, a device that uses sensors to turn objects into keys or a control pad.

Coding clubs and extracurricular meetup groups like Coder Dojo can fill a gap left in school systems that don't mandate teaching digital skills at all.

A European Schoolnet report published this week pointed out that 15 EU member states include coding in school curricula at some level, marking



*Irish MEP Sean Kelly (EPP) with children at the Coder Dojo in European Parliament [Courtesy of Sean Kelly]*

an uptick in recent years.

Coder Dojo was founded and is headquartered in Ireland, and now has chapters set up in 60 countries.

European Commission Vice President Andrus Ansip, who is responsible for the digital single market, told EurActiv yesterday (13 October), "Technology-based education and digital skills pedagogies should be a 'must have', not just a 'good-to-have', for all ages."

Sean Kelly said the training sessions would equip children with valuable knowledge, since digital skills "are in huge demand in the labour market."

"The young people attending these clubs on a weekly basis have the chance to learn how to develop computer code, websites, apps, programs, games, digital media and to explore technology," Kelly said.

Scottish MEP Catherine Stihler (Socialists & Democrats) went to the Coder Dojo session in Parliament for the second time.

"During my Coder Dojo session, I was sitting next to two Belgian brothers, aged 14 and 12. We made a website together and then made a game using Scratch. We also learned how to make games using Keno programming," Stihler said.

Stihler told EurActiv she thinks lessons teaching coding and other digital skills should be a mandatory part of school curricula for young students and is considering starting coding classes for children in Scotland.

Mary Moloney, CEO of Coder Dojo, said the regular coding sessions give children confidence in their skills. In Parliament, Moloney said, they had "no problem showing adults how it's done and astounded the MEPs in attendance."

Bulgarian MEP Eva Paunova (EPP) told EurActiv she was taught coding by someone half her age at the Coder Dojo session.

"In today's fast-moving environment, it is not unusual to learn and get coding explained by children. The new generations growing in this new era contain natural digital skills and this is what defines them - generation D," Paunova said.

German MEP Julia Reda (Pirate Party) was paired up with a boy from Ireland who was building a website on the right to internet access.

"In our technology-driven age, it's crucial that everyone has the opportunity to actively shape technology, rather than just being a passive consumer or user of it," Reda said.

## Digital experts say coding leads to empowerment (and jobs)

Computer programming brings “empowerment” to the individual, according to digital experts, who say teaching kids how to code will also prepare them for the jobs of the future.

The European Commission is worried that as many as 825,000 digital jobs may be unfilled in the EU by 2020 as employees are unable to find workers who possess the right skills. To put the issue on the agenda, the EU Code Week, a grassroots initiative, has been launched, with coding events all across Europe.

Alessandro Bogliolo, one of the Code Week’s coordinators, believes that the almost one million vacancies that will soon become available, might just be the tip of the iceberg.

“If the one million vacancies refer to specific digital skills - and to the demand from the industry - then coding is something we should focus on earlier because when we speak about coding, we are mainly talking about computational thinking,” Bogliolo said at a Code Week event organised by Microsoft on Monday (12 October).

“Computational thinking” should be understood as the capability of finding a solution which is constructive and can be applied to solve a problem. Therefore, the Code Week and coding is really about empowering people, he said.

Mary Moloney, CEO at CoderDojo Foundation, agreed that learning to code is about empowerment. CoderDojo provides free of charge coding clubs to kids aged between 7-17. At the moment, CoderDojo is in 60 countries around the world, with 800 volunteers and 30-40 kids who turn up every week. The kids



Speakers at Microsoft's panel event on coding 12 October. [Henriette Jacobsen]

get absorbed into technology by learning how to build apps, games, websites, drones and robots - sometimes using 3D printing.

Some will go on to become coders in the future while others will go on to become software engineers, Moloney said. But all of them will go on to become confident, articulate people who can talk about technology and the potential of it and be in a position where they can explore that, said the CoderDojo CEO.

“They can be successful in life and in the world. When they come to us, they are in charge of their own learning, that gives them the power and control back. They find their creativity and their imagination again. They think of coding this way: I have this amazing thing in my head, and now I want to share it with the whole world, if the world would like to see it. That is how powerful it is,” Moloney stressed.

### The public role

But apart from the after-school coding clubs, policymakers are also pushing for coding to take place in the school system by integrating them into the formal curriculum.

“Today, most coding activities take place outside of the school classroom, which means that it is mostly kids who have the coding bug, or whose parents are aware, that take part,” said Andrus Ansip, the European Commission Vice-

President in charge of the Digital Single Market.

“But we need to reach all children. If programming were taught in schools, more children would get the opportunity to learn the basics,” Ansip told EurActiv in an interview.

Don Grantham, Microsoft’s president for Central and Eastern Europe, said schools need to focus on traditional subjects such as reading and writing, especially in the early stages of education. But coding has to be highlighted as a vital 21st century skill as well, he added.

“We need to rethink our approach to computer science. This is our responsibility as an industry, to continue to work with our partners and the public sector to establish a digitally literate generation. All teachers need to feel comfortable in bringing new technologies to class in order to make learning more engaging and versatile,” Grantham said.

Formal school education has a role of offering possibilities to different types of learners who get access to coding and computers, said Anja Balanskat, a senior analyst at European Schoolnet, a network of ministries of education to bring about change an innovation across the schools in Europe.

“What we see is that the whole discussion about coding has gained a new momentum as a concept by the

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ministries and that is really interesting,” Balanskat added.

Education ministries at national level indeed seem have heard the message. In total, 15 EU countries have already integrated coding in their curricula, whether at national, regional or local level.

### Looking for talent

Despite those efforts, the digital industry continues to struggle in recruiting young talented coders, hackers and programmers because businesses don't even know where to look for them.

Thomas Paris, business development manager at the Belgian startup Pictawall, mentioned that his company doesn't care which schools new graduates come from. Pictawall is more interested in seeing which websites an individual has built.

“Right now we are doing a lot of things to find the right people. Sometimes the people we need a not in the most obvious places. So it's actually difficult to know where to start looking for these people. It's very hard to find them, and it's very hard to keep them in a company because they want new challenges every day,” Paris noted.

At SAP Ireland, the software and technology solutions company, new employees ideally need to have a logical mindset next to their business skills, said Liam Ryan, the managing director of the company.

“If you can start coding at an early age, I think it does give you that. If you can programme in one code language that gives you a good start,” he said.

At the Commission, Andrus Ansip reasons along similar lines: “Learning how to code means you learn computational thinking; logical thinking, step-by-step analysis, breaking up a problem in bits and pieces, abstraction, generalisation, adapting an idea and using it for something else.”

“These skills are important in schools and in work.”

## OPINION

*Disclaimer:  
all opinions in this  
column reflect the views  
of the author(s), not of  
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# Computing and digital literacy education needs a unified approach

As EU Code Week comes to a close this weekend, the ECDL Foundation writes that education programmes promoting coding need to be balanced with basic technology skills, which are too often lacking—even among so-called ‘digital natives’.

*The ECDL Foundation is an international organisation promoting ICT skills.*



*Coding skills needs to be paired with digital competency, writes the ECDL Foundation [Courtesy of the ECDL Foundation]*

The question of how to develop coding skills at school has received a lot of attention recently. Initiatives have been started in various countries around Europe, including moves to integrate coding into the school curriculum. But there is a danger that this focus on

coding risks diminishing the quality of other aspects of computing and digital literacy education.

Young people need to be able to develop strong digital literacy skills, and to have the opportunity to learn computing, including coding, yet computing education today is in danger of becoming fixated on coding. This trend might leave young people without the skills they need to progress in school, further studies, and work.

It is natural that e-skills are in the spotlight just now: as digital skills become ever more vital to society and the workforce, efforts to promote digital education are key to maintaining Europe's competitiveness globally.

European campaigns such as e-Skills for Jobs 2015, and initiatives like the Grand Coalition for Digital Jobs recognise that a digitally skilled workforce is a workforce that can meet the challenges of the not-too-distant future. The often-quoted figure reflecting 90% of jobs that will require digital skills this year demonstrates the urgency of the challenge ahead of us, while studies around Europe make it clear that today's employees are not yet ready to meet that challenge.

In one study, conducted by BCS, the chartered institute for IT in the United Kingdom, 48% of employers surveyed did not think that their employees have the right digital skills to meet future challenges. Other studies conducted in various countries, including most recently, Switzerland, highlight a worryingly low level of digital skills.

The problem is compounded by the fallacy that young people are ‘digital natives’, innately skilled in using digital technologies. If we're to avoid creating a new digital divide between those with digital skills and those without, then we need to take a more holistic approach to computing and digital literacy that will give all students a foundation of digital literacy.

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Computing education is important, and coding is one part of that. It can help give students a better understanding of the ways in which computers work, and the possibilities of what can be achieved with technology. Of course it is also a key skill, which some students will want to develop further in their studies, and perhaps use in their careers, in the IT sector and beyond. But coding is just one part of computing.

There is a general assumption that all students need to develop basic

scientific literacy at school, but yet we don't teach them all the intricacies of advanced physics. Likewise, we shouldn't expect that all students will want or need to study computing to an advanced level.

A balanced approach to computing and digital literacy will equip all students with the basics of using computers, and the digital literacy skills that will serve them throughout their working lives and introduce them to computing, and the opportunities that subject offers.

In short, a holistic approach

to computing and digital literacy is essential. Both computing, including coding, and digital literacy need to be taught, ensuring that students receive a high-quality education and develop the competencies they will need throughout their lives. With a unified approach like this, students, employers, and the competitiveness of our economies can only benefit.

*ECDL Foundation*

## INFOGRAPHIC

### Coding at school: How do EU countries compare?



Digital competences and ICT skills are seen as key for young people to integrate in the job market. Today, 90% of all jobs are expected to require at least a basic level of ICT skills.

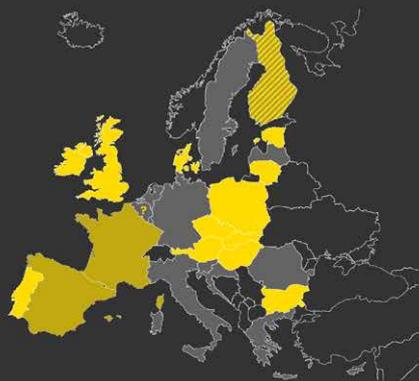
By 2020, Europe is expected to see a shortage of more than 800,000 professionals with computing skills.



More and more countries or regions are now including computer programming as part of school curricula.

#### CODING AT SCHOOL

A recent survey has shown that **15 EU countries** have already integrated coding in their school curriculum.



**Already Integrated:** Austria, Bulgaria, the Czech Republic, Denmark, Estonia, Hungary, Ireland, Lithuania, Malta, Poland, Portugal, Slovakia and the UK (England).

**Finland (will integrate coding in 2016)**

**Belgium (Flanders) is currently debating whether to integrate coding at school.**

**Recently Integrated:** France, Spain, have recently integrated coding in the curriculum recently (2014-2015).

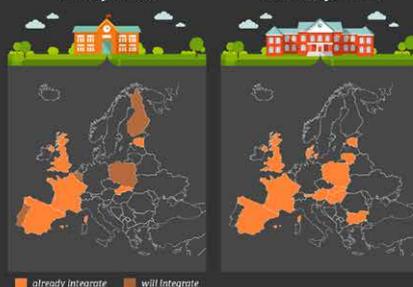
#### AT WHICH LEVELS?

**9 EU countries** already integrate or will integrate coding at **primary school level soon**.

**12 EU countries** already integrate or will integrate coding at **upper secondary school level in general education**.

Primary school

Secondary school



#### COMPUTATIONAL THINKING



But coding is not just for 'computer geeks' or those seeking employment in the ICT sector.



Most countries say their aim is also to develop students' **logical thinking skills and problem-solving skills**, which are beneficial to all students.



Source: Bazarek, A and Engelhardt, K. (2015). 'Consulting our future: Computer programming and coding: Priorities, school curricula and initiatives across Europe'. Brussels: European Schoolnet.



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