



Llywodraeth Cymru
Welsh Government

Cracking the code:

A plan to expand code clubs in every part of Wales



Cracking the code: A plan to expand code clubs in every part of Wales

Audience

Primary schools; middle schools; secondary schools; further education institutions; governing bodies of maintained schools; local authorities; diocesan authorities; regional consortia; national partners; Estyn; teaching unions; national bodies with an interest in education; and members of the public.

Overview

This publication sets out the Welsh Government's plans for supporting coding skills and coding clubs in Wales.

Action required

None – for information only.

Further information

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Additional copies

This document can be accessed from the Welsh Government's website at www.gov.wales/educationandskills

Related documents

Successful Futures: Independent Review of Curriculum and Assessment Arrangements in Wales (Welsh Government, 2015)

A Curriculum for Wales – a curriculum for life (Welsh Government, 2015)

Taking Wales Forward 2016–2021 (Welsh Government, 2016)

Qualified for Life: An education improvement plan for 3 to 19-year-olds in Wales (Welsh Government, 2014)

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Ministerial foreword

Being digitally competent is one of the fundamental pillars of our young people's education, and it is an absolutely necessary skill to support teaching and learning at all stages. This is why I fast-tracked publication of the Digital Competence Framework (DCF) which is available for all schools as a cross-curricular tool.

The world that we live in is constantly changing and becoming increasingly digitally dependent. To succeed as a nation and as individuals we need to go further than being digitally competent; we need to contribute towards the digital economy and enable our learners to open doors to a kaleidoscope of digital career opportunities.

The learners' ability to write code is a key aspect of that ambition and is far more than simply being sat around the computer; it is about problem solving, being creative and doing things in a different and in a fun way. Being able to code cuts across so many subject areas and so many exciting careers and has the ability to open up new opportunities for young people and for teachers. There are already many opportunities to introduce coding skills in the curriculum and some fantastic case studies to learn from, and I want to encourage more of the same.

Code clubs are a proven means to support the introduction and development of coding skills and provide enriching experiences for both teachers and learners within which they can try something new. They can take place at any point in

and around the curriculum and the school day, and can be delivered by the teacher and/or with volunteers from within the community.

I want to encourage more schools to introduce coding skills and to run code clubs which is why I am launching 'Cracking the Code'. It sets out how Welsh Government will work with the regional education consortia, universities, colleges, business, industry and the third sector to expand the existing network.

Through this approach, we will support teachers to increase their confidence in delivering coding skills and support progression for learners from primary to secondary and from basic programmes to the more advanced.

Computer science will form part of the new Area of Learning and Experience for Science and Technology but we are not standing still in our curriculum reform and our drive for excellence. With the publication of the DCF I laid down a marker that digital skills are important. 'Cracking the code' is my statement of intent that not only will our learners be competent and effective users of technology, but they will also become creative authors of technology as well.

Kirsty Williams AM
Cabinet Secretary for
Education

Introduction

In *Taking Wales Forward*¹ the Welsh Government set out that it will ensure young people in Wales have the relevant skills for the future by “*supporting the roll-out of digital competence in our schools and developing coding skills in our young people*”.

This reflects the importance placed on digital skills as a key component of the economy of the present and the future². There are currently around 1.5 million jobs in the digital sector in the UK, 400,000 of which involve coding. It is estimated that there will be 100,000 new coding jobs by 2020.

In *Successful Futures*³, Professor Graham Donaldson illustrated the importance of digital skills, stating that “*Children and young people need to learn how to be more than consumers of technology and to develop the knowledge and skills required to use that technology creatively as learners and future members of a technologically competent workforce.*” The implementation of a new Digital Competence Framework for all learners from 3-16 will start to address this challenge.

Professor Donaldson expands on this further in setting out the new Area of Learning and Experience (AoLE) for Science and Technology – “*Children and young people will also have opportunities to learn how technology is used to design products that improve the quality of human life and to apply their scientific and other knowledge to practical purposes and challenges. For schools, this means providing children and young people with rich opportunities to develop technological skills, knowledge, understanding and attributes through designing and developing products and systems.*”

In order to design and develop digital products and move us away from being users of technology to authors, a learner must first be able to code.

What is code?

Computer code is a set of rules or instructions. It is made up of words and numbers and when you put them in the right order it will tell your computer what you want it to do.

Code is what makes it possible for us to create computer software, apps and websites. Your browser, your Operating System, the apps on your phone, Facebook - they are all made with code.

¹ <http://gov.wales/docs/strategies/160920-taking-wales-forward-en.pdf>

² <https://www.tes.com/news/school-news/breaking-news/computer-coding-classes-disadvantaged-children-could-boost-social>

³ <http://gov.wales/docs/dcells/publications/150225-successful-futures-en.pdf>

On 25 April 2016, the First Minister set out how we intend to support children and young people in Wales to have the critical digital skills needed to succeed in the economy of the future. The proposals set out how Welsh Government would:

1. Develop a new curriculum for Wales which includes a new Area of Learning and Experience for Science and Technology and the roll out of a Digital Competence Framework (DCF)
2. Support projects like Technoteach to provide effective Continuing Professional Development support to teachers.
3. Expand successful projects such as Technocamps and partner with innovators such as Raspberry Pi Foundation to give every child in Wales access to a coding workshop and encourage more girls to take up STEM subjects.
4. Develop new pathways for Initial Teacher Education and Training in Computing to encourage the best talent into the profession. All entrants to the teaching profession should have the skills to deliver the Digital Competence Framework (DCF).
5. Work with industry, local businesses and the third sector to encourage code clubs in every part of Wales.

We have:

- **Published the Digital Competence Framework (DCF) in September 2016.** The development of the AoLE for Science and Technology is being taken forward by the Pioneer network as part of the curriculum reform process.
- **Supported Technocamps** to deliver professional learning and workshops to support coding skills.
- **Partnered with Technocamps and Raspberry Pi Foundation** to support programmes of professional learning and communities of practice.
- **Published “*Criteria for the accreditation of initial teacher education programmes in Wales: Teaching Tomorrows’ Teachers*”** which sets out the accreditation criteria which requires future accredited providers of ITE to design and deliver courses of ITE that support the four purposes of a new curriculum for Wales and address the six areas of learning and experience. All teachers need to develop the right teaching and assessment skills to enable them to use the new curriculum to support learning and teaching successfully.
- **Developed this plan – ‘*Cracking the Code*’** which sets out how Welsh Government and partners will work together to encourage code clubs in every part of Wales.

Code clubs

What is a code club?

Where learners come together either during curriculum time, break or after school and, with the aid of a teacher or a volunteer, learn how to code through exciting, fun and inclusive methods and experiences.

Code clubs are of significant benefit to the learner, the teacher, the school and any potential external partners working with the school as a result of participation in a club. They can be fun and engaging for both the learner and the teacher and allow the space to be creative and innovative, forging new relationships with the community.

There are already over 300 code clubs in existence in Wales either created independently or through third party programmes that provide support structures and networks. To support code clubs and teachers, Welsh Government has already made available a wealth of resources on Hwb, the digital learning platform, and is actively working with organisations and programmes to bring additional bilingual coding teaching resources to schools in Wales.

This plan sets out how the Welsh Government and partners will work together to expand the number code clubs in every area of Wales for learners from age 3 so that they can develop their skills in time around the curriculum.

In order to achieve this we will work with the regional education consortia, and partners in Wales, the UK and at an international level. This will include but is not limited to, schools, further education, higher education, business, industry, and the third sector to build on the existing network of code clubs and expand the number through the following **strategic actions**:

- 1. Raise awareness and highlight the benefits of code clubs to headteachers, teachers, learners and parents.**
- 2. Break down the barriers to participation in code clubs.**
- 3. Broker and facilitate coding experiences.**

Strategic action 1

Raise awareness and highlight the benefits of code clubs to headteachers, teachers, learners and parents.

Code clubs provide a mechanism to embed computing in and outside of the classroom by nurturing learners' natural interest in technology and how it can be applied to various challenges and real-world scenarios.

The mechanics of writing code include aspects of literacy, numeracy, digital competency and problem solving – all key aspects of the current and future curriculum. Therefore, there is added benefit to participating in a code club that goes beyond its primary purpose as it supports achievement in the wider curriculum.

A significant number of current and future jobs require the ability to code and the acquisition of associated qualifications (such as computer science), which learners and teachers may not be aware of. It is important that we draw this to the attention of those who are making their education and careers choices and those who support the learners, including parents/guardians.

There are already many schools successfully involved in code clubs and more needs to be done to raise awareness of the benefits of these. To help the current network of code clubs and to increase participation in those already in existence, working with key partners **we will**:

- develop a communications campaign highlighting the benefits of code clubs targeted and tailored to the relevant audiences.
- facilitate a programme of career role models and speakers to go into schools to highlight to learners the exciting range of career and life paths that being able to code can bring.
- produce case studies to illustrate the effective approaches that schools have taken as an incentive for others to follow suit.

Strategic action 2

Break down the barriers to participation in code clubs

Raising awareness of code clubs and their benefits will not in itself support the expansion of code clubs in Wales. In many settings, learners and teachers will be aware of code clubs and how to set them up; however, there will be barriers to participation, which include:

- Lack of understanding of the relationship between the benefits of coding and wider skills development;
- Information on existing resources and training and availability of further resources and training to instil confidence in the teaching of coding;
- The availability of activities /experiences which raise interest amongst girls;
- Levels of provision of Welsh language experts, facilitators and/or resources for schools; and,
- Access to volunteer engagement to support schools develop code clubs.

By raising awareness of the benefits of code clubs and addressing the barriers, we expect to significantly increase the number of code clubs in Wales. It is important we support teachers to be confident and competent in their approach to support the development of digital skills, therefore **we will**:

- Work with partners and the National Network for Excellence in Science and Technology (NNEST) to provide ground-breaking professional learning opportunities for teachers;
- Strengthen the use of STEM Ambassadors, and build on the Business Class model to ensure effective business links with schools in support of coding;
- Develop an enhanced role for the Computing at School (CAS) network in Wales;
- Increase in quality and number Welsh language support to schools for coding;
- Capitalise on ESF programmes to ensure increased activity on coding for learners aged 11 to 19.

Strategic action 3

Broker and facilitate coding experiences

Learners and teachers benefit significantly from the ability to work with creative partners who work with code on a daily basis.

Working with these creative partners provides an exciting setting to explore the practical application of code to real world problems which in turn supports the learner's understanding of career opportunities.

Significant investment has already been made in Wales by a number of organisations and we want to build on this to make sure that learners and teachers in Wales have access to a range of exciting experiences. This will include providing teachers and learners with experiences within Wales, the UK and at an international level.

We want to encourage schools and colleges to work with partners across Europe and the World and visit these institutions as part of their programme of learning.

We will:

- Work with the British Council to communicate and support international programmes of learning and experience;
- Explore an enhanced role for technical apprenticeships in supporting coding skills;
- Create a dedicated zone on Hwb, to bring partners together with schools and create a repository of projects, resources;
- Work with business, industry and third sector partners so they can expand their programmes to provide experience and enrichment opportunities for schools and colleges;
- Provide access for schools to an expanded range of robot kits and starter kits.

Glossary of terms

Digital competence

Digital competence is the set of skills, knowledge and attitudes to enable the confident, creative and critical use of technologies and systems. It is the skill set that enables a person to be a confident digital citizen, to interact and collaborate digitally, to produce work digitally and to be confident in handling data and computational thinking (problem solving).

Computer science

The rigorous academic discipline, encompassing programming languages, data structures, algorithms, etc.

Code

Computer code is a set of rules or instructions. It is made up of words and numbers and when you put them in the right order it will tell your computer what you want it to do.

Code is what makes it possible for us to create computer software, apps and websites. Your browser, your Operating System, the apps on your phone, Facebook - they are all made with code.