



**Canolfan Ecsbloetio
Ddigidol Genedlaethol.**

**National Digital
Exploitation Centre.**

Education & Outreach Strategy

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THALES



Background

Welsh Policy

The Welsh Government is currently pursuing a large programme of initiatives to support economic growth within Wales. One major component of this is the development of its digital capabilities, underpinned by the Well-being of Future Generations (Wales) Act (Welsh Government, 2015). The act, which works to ensure that Welsh policy is focused on positive long-term goals, contributed to the objectives outlined in the Welsh Government's national strategy: Prosperity for All (Welsh Government, 2017). This strategy has set the agenda for digital development across the country, to create sustainable growth, whilst equipping the population for industry 4.0.

Part of this agenda has been the securement of the Cardiff Capital Region and Swansea Bay City Deals, which aim to create thousands of jobs for Welsh people, through digital and infrastructure developments in areas of strategic importance. However, the strategy also acknowledges the need to address regional inequalities, and so investment is being focused around the Welsh valleys too, as part of the Tech Valley's Strategic Plan (Tech Valleys Strategic Plan, 2018).

The Cardiff Capital Region Skills Partnership has identified existing and anticipated skills shortages across South East Wales, in relation to these developments: 'projected labour demands exceed the expected numbers of entrants within some occupations ... whilst skills gaps increase as the demand for skills evolves in response to changing working methods, utilising new technology and introducing automation' (p. 3). By 2024, the digital sector in South East Wales, 'is estimated to employ 24,057 people', compared to 21,010 as of 2017 (Cardiff Capital Region Skills Partnership, 2018, p. 12).

The Welsh Government has also recognised the potential skills gaps associated with digitalisation, in relation to their education strategy. A cross-curricular "Digital Competency Framework" was implemented in Wales in 2008, to ensure all Welsh students have fundamental digital skills. However, following the recommendations of Professor Graham Donaldson in the Successful Futures Report, further precedence has been placed on this, with revisions in the new draft curriculum, so that digital competence has 'similar status within the curriculum to that of literacy and numeracy' (Donaldson, 2015, p. 40). The curriculum, which will be implemented across Wales by 2022 (Education Wales, 2019), has drawn on the knowledge that something must be done at school-level to address the skills requirements of these developments.

The National Cyber Security Strategy

There is also strategy in place to address the cyber security risks that are likely to arise alongside this sort of digital growth. In its National Cyber Security Strategy, the UK Government, set out its vision for 2021, that ‘the UK is secure and resilient to cyber threats, prosperous and confident in the digital world’. In order for this to be realised, in partnership with the devolved nations of Scotland, Wales and Ireland, they are investing £1.9 billion over a 5-year period on a programme to “Defend”, “Deter” and “Develop”, whilst pursuing international action to help ‘shape the global evolution of cyberspace’ (p. 9) .

The strategy recognises that whilst digital expansion is necessary, it opens up cyber vulnerabilities at all levels, from state, to organisational and personal. Therefore, whilst pursuing a programme of active cyber defence and working to deter cybercrime, it will also look to develop public and business behaviours. Part of this activity will relate to strengthening cyber security skills, stimulating growth within the cyber security sector, and promoting cyber security science and technology. However, it is recognised that to achieve this, more people must undertake work and/or study within the industry, and this requires also addressing ‘the systemic issues at the heart of the cyber skills shortage’. These have been identified as:

- the lack of young people entering the profession;
- the shortage of current cyber security specialists;
- insufficient exposure to cyber and information security concepts in computing courses;
- a shortage of suitably qualified teachers;
- and the absence of established career and training pathways into the profession (HM Government, 2016, p. 55).

The National Digital Exploitation Centre

The National Digital Exploitation Centre (NDEC), located within the Ebbw Vale valley of Blaenau Gwent, exists to contribute to addressing all of the above issues within Wales, from lessening regional inequalities and supporting digitisation across the country, to aiding skills development and protecting the Welsh cyberspace. Run by multinational company Thales, with support from the University of South Wales and the Welsh Government, it will provide opportunities for organisations to develop their cyber security capabilities and conduct research and development activities. It will also help to produce the workforce needed to sustain the growth of the cyber security and digital sectors within the region. These activities can be summarised through four discrete components:

1. **Applied Digital Trust Environment** - capability to design, develop and integrate products, systems and services.

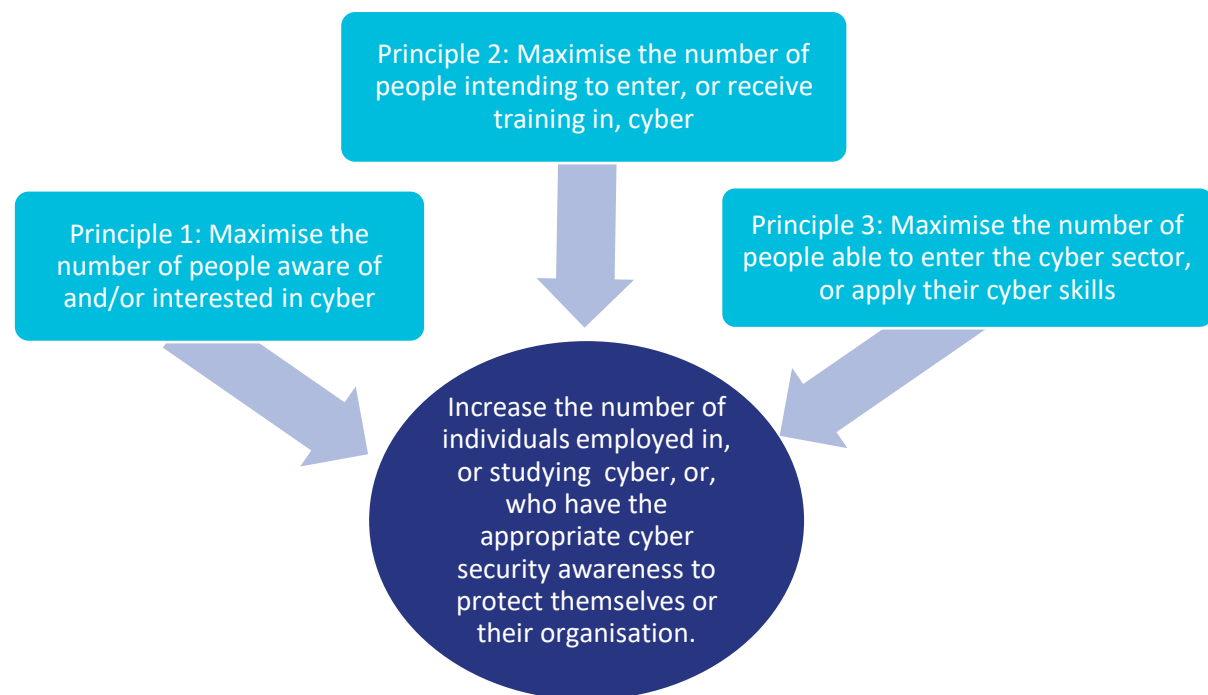
2. **Project Zone** - a well-equipped and secure environment to deliver technology programmes.
3. **Advanced Cyber Institute** - an environment that stimulates new ideas, generates IP and facilitates the transfer of concepts from academia to deliverable products and services in the industry.
4. **Digital Education Centre (led by University of South Wales)** - training and education for individuals, schools, further education establishments and SMEs.

The Digital Education Centre

Ultimately, the NDEC exists to support digitalisation within the region, and in line with the National Cyber Security Strategy, part of this will be ensuring that effective cyber security measures are implemented to protect that digitalisation. The digital education centre is the component of this, which addresses the associated skills requirements. Consequently, the overarching objectives of the NDEC's education and outreach work stream are to carry out activities across South East Wales, which increase the number of individuals, who either:

- undertake employment and/or study in the cyber sector, or;
- have the cyber awareness and skills to protect themselves and/or their organisation.

Three main principles have been identified below to support the realisation of these objectives, and will form the basis of the strategy:



The University of South Wales is leading on this aspect of the project, due to its cyber security expertise and the education pathways it provides through its National Cyber Security Academy.

Measurables

Scope

Current targets for the NDEC's education and outreach activities pertain to engagement with schools and further education establishments across South East Wales¹. There is also an initial and separate focus on Blaenau Gwent, due to the NDEC's placement within this particular locality. However, as the centre is "national", there is remit to expand this scope across the whole nation of Wales, as the project progresses.

Targets

It is the target of the NDEC to engage with at least the quantity of schools and further education establishments by the end of each of the relevant periods to support the deliverables as detailed below:

	2019		2020		2021		2022		2023		2024
	31/03	30/09	31/03	30/09	31/03	30/09	31/03	30/09	31/03	30/09	31/03
Blaenau Gwent	5	10	20	25	25	25	25	25	25	25	25
South East Wales	0	15	30	45	60	75	90	105	120	135	150

Additionally, in line with the National Cyber Security Strategy and the need to develop personal and business behaviours relating to cyber security, the NDEC also aims to engage with, and train, individuals and local SMEs in cyber skills and awareness. The NDEC recognises that this will be a substantial part of its activities and will develop its own metrics associated with this.

Added Value Activities

Additional added-value activities will be undertaken to complement the key project deliverables. These will include:

- Promotion of the NDEC and its full-set of offerings, to develop its business and education contacts, and establish its role and importance within Wales.

¹ South East Wales is to include the local authorities of the Vale of Glamorgan; Rhondda Cynon Taff; Merthyr Tydfil; Caerphilly; Cardiff; Newport; Blaenau Gwent; Torfaen; Monmouthshire and Bridgend. This area has an estimated population of 1.5million, which is 48.7% of the Wales population (Cardiff Capital Region Skills Partnership, 2018, p. 3).

- An annual summer community event in Blaenau Gwent to assist the integration of the NDEC and Thales into the community.
- Collaboration with the South Wales Cyber Cluster, and other regional clusters identified as relevant, to integrate the NDEC and Thales into the digital/cyber business landscape within Wales, and provide opportunities for knowledge sharing.
- Collaboration with other education providers in the digital /cyber sectors, to integrate the NDEC and Thales into the existing outreach landscape and provide opportunities for knowledge sharing.
- Evaluation and review of all educational interventions to develop best practice.

Measurements against Targets

Engagement with schools and further education establishments for education and outreach activities will be measured quantitatively, and is to be proven by:

- an initial dialogue (verbal/email) and,
- a follow-up minuted meeting and/or attendance at a dissemination/discovery event where the NDEC benefits are explained.

All engagements must be recorded and monitored formally, and any action plans arising should be provided to the Business Manager within 14 working days of each engagement in the agreed format.

Engagement will also be measured informally through a combination of:

- formal and informal feedback from schools, further education establishments, individuals and SMEs who have received training and/or outreach activities;
- case studies of interactions with schools, further education establishments, individuals and SMEs;
- where students are old enough to consent to data tracking, conversions into study or employment within cyber fields;
- social media interactions and engagement;
- referrals to additional NDEC offerings that have come through the education and outreach work stream.

Education & Outreach in Wales

The Existing Landscape

There are already multiple existing education and outreach providers, which are based in, or operate within, Wales. These providers have been identified as part of a scoping exercise of the current digital education landscape within the region². The scoping included all STE(A)M³ outreach providers that operate within Wales, however, it should be noted that not all of these are currently active within the region. Some are also private companies, providing services for a fee. To draw a distinction, below is a summarised version of the providers which do have a substantial and active presence within Wales at present, and that offer fully-funded outreach activities in Wales, similarly to the NDEC:

Provider	Main Activities
Technocamps	Events and workshops to encourage interest in STE(A)M & training for teachers in the Computer Science curriculum (funded by Welsh Government & the European Social Fund).
First Campus	Projects to encourage individuals into higher education, with some STE(A)M activities (funded by HEFCW).
CyberFirst	Competitions and residential courses in cyber run by the National Cyber Security Centre (NCSC).
EESW Stem Cymru	Projects and workshops to increase interest in STEM subjects, with a focus on Engineering (supported by Welsh Government, the European Social Fund and other private sponsors).
Welsh Valleys Engineering Project	STEM subject support for students and teachers, with a focus on Engineering (supported by the Royal Academy of Engineering).
Cardiff Met University	Robotics and other STE(A)M outreach workshops.
University of South Wales	Cyber workshops and open days, with an established cyber security outreach programme.
Cardiff University	STE(A)M workshops and lectures.
Digital Communities Wales	A Welsh Government project to increase digital skills with train the trainer sessions & a 'Digital Heroes' programme to upskill children and the elderly.
Swansea University	Science and Maths outreach workshops.
Careers Wales	Information, advice and guidance for people in Wales regarding careers and progression pathways relevant to the region, some of which relates to skills shortages and STE(A)M industries.

² Findings of the scoping exercise can be viewed at: https://miro.com/app/board/o9J_kxYW1WI=/.

³ Here, "STE(A)M" outreach pertains to raising interest in STE(A)M subjects (Science, Technology, Engineering, Arts (digital in nature) and Maths).

As its main objectives are to increase the number of people employed within, or studying cyber, or, who have the appropriate cyber security awareness to protect themselves or their organisation, it must also be part of the NDEC's strategy to partner with, and raise the profile of, other organisations that can help towards achieving these goals. It is also not an efficient use of its resources for the NDEC to duplicate existing provisions, especially where those provisions arise from similar funding streams. Therefore, it is hoped that where its aims can be carried out by collaborating with, or referring to, another provider, efforts will be made to do so. Ultimately, it is hoped that the NDEC may act as a central entryway into all the other STE(A)M outreach activities that are run within the area, whilst plugging the gaps in provisions, so that a comprehensive and efficient approach can be used in achieving its objectives.

Gaps within the Existing Landscape

Following the scoping of the existing education and outreach landscape in Wales, the subsequent gaps in provisions have been identified as needing specific attention within the NDEC's education and outreach strategy, in order to meet its main objectives:

1. **Primary school interventions** to raise interest in and awareness of cyber at earlier ages and embed cyber education within schools earlier on.
2. Interventions that aim to **convert interest in STE(A)M subjects into the intention to study or work** in cyber areas. For example, interventions that:
 - a. Focus on education and training pathways in cyber
 - b. Focus on careers within the cyber sectors
 - c. Provide specific interventions dependent on ability and viable employment/study options
3. Outreach that focuses on **cyber within the Welsh context** and the context of **available pathways into the industry**.
4. Interventions that **address barriers to education, training and employment routes in cyber**. For example:
 - a. Parental interventions
 - b. Teacher interventions
 - c. Bringing children into industry
 - d. Specific interventions for underrepresented groups in digital/cyber (women, BAME, SEN, Welsh speakers etc.)
 - e. Scoping and creation of alternative routes into the industry

5. Outreach that **supports people outside of education** to enter the cyber sector, or **cyber training** that can be implemented within their own personal lives and/or their organisation. For example:
 - a. Adult education (including certification options)
 - b. Re-training initiatives
 - c. Specific interventions to increase diversity within the cyber sector through adult education
 - d. General cyber upskilling for individuals and SMEs

6. Activities that **promote cyber security as a separate and specific industry and field of study** within the STE(A)M outreach arena, that is fundamental to the development and sustainability of all other digital sectors. For example:
 - a. Opening eyes to the danger of the lack of cyber security in the digital world
 - b. Outreach that stresses the importance of addressing diversity issues within the cyber security sector

The following strategy has been written using the findings from the scoping exercise and gap analysis, and to align with the NDEC's targets. All activities are aligned with the overarching objectives of the education centre: to increase the number of people employed, or studying in the cyber sector, or, who have the appropriate cyber security awareness to protect themselves or their organisation. They are then structured by the three principles of achieving these objectives:

1. Maximising the number of people aware of and/or interested in cyber

2. Maximising the number of people intending to enter, or receive training in, cyber

3. Maximising the number of people able to enter the cyber sector, or apply their cyber skills

Principle 1: Maximising the number of people aware of and/or interested in cyber

Element 1.1: Increase interest and awareness from an earlier age

Action 1.1.1: Regular workshops to increase awareness of cyber available for KS1&2.

Action 1.1.2: KS1&2 teacher CPD sessions to stress the importance of students following cyber pathways within Wales and give tangible examples of how to do so in the primary classroom.

Action 1.1.3: Support schools to engage with existing cyber primary outreach.

Element 1.2: Address barriers to interest and awareness

Action 1.2.1: Provide specific intervention for groups who perceive barriers e.g. girls, BAME, SEN & Welsh speakers.

Action 1.2.2: Provide specific activities for other barriers e.g. parental opinions, apathy to FE in general, not feeling the sector is relevant within Wales.

Action 1.2.3: Provide specific outreach to promote creative/alternative opportunities within the cyber sector.

Element 1.3: Increase awareness and interest in adults and businesses

Action 1.3.1: Deliver outreach to adults/SMEs to retrain or upskill in cyber.

Action 1.3.2: Develop partnership projects with organisations that specialise in adult education and retraining e.g. First Campus, Go Connect etc.

Element 1.4: Ensure best practice

Action 1.4.1: Engage with & disseminate research on best practice for growing awareness of, and interest in, cyber.

Action 1.4.2: Engage with & disseminate research in best practice for growing awareness of, and interest in cyber within under-represented groups.

Element 1.5: Engage with and promote existing provisions

Action 1.5.1: Support existing cyber initiatives to become more popular in Welsh schools e.g. CyberFirst.

Action 1.5.2: Promote other outreach providers to schools.

Principle 2: Maximising the number of people intending to enter, or receive training in cyber

Element 2.1: Increase knowledge of pathways into the sector

Action 2.1.1: Map all relevant careers and businesses in Wales.

Action 2.1.2: Map all available employment and training pathways into these careers and businesses in Wales.

Action 2.1.3: Signpost adults to routes into employment, training and accreditation.

Action 2.1.4: Provide outreach activities to students regarding these identified routes into the sector.

Action 2.1.5: Provide CPD to teachers regarding these identified routes into the sector.

Action 2.1.6: Provide parental outreach to increase knowledge within the community and contribute to normalisation of progression the sector.

Element 2.2: Provide basic digital/cyber skills training

Action 2.2.1: Develop introductory training for adults and SMEs to in basic digital/cyber skills

Element 2.3: Address barriers to considering these pathways

Action 2.3.1: Develop a project in partnership with organisations that address access to HE & FE e.g. First Campus.

Action 2.3.2: Where barriers cannot be overcome through encouraging participation in FE, investigate alternative routes into the sector, as outlined in Element 3.1

Action 2.3.3: Provide intervention to parents negatively impacting pupil intention to enter the sector.

Element 2.4: Ensure best practice

Action 2.4.1: Engage with careers guidance, and educational organisations to identify partnership opportunities and learning exchange.

Action 2.4.2: Engage with industry and skills partnerships to get up to date information on skills needs and industry trends.

Action 2.4.3: Collect data on effectiveness of interventions to guide future activities.

Principle 3: Maximising the number of people able to enter the cyber sector, or apply cyber skills

Element 3.1: Direct individuals towards appropriate pathways

Action 3.1.1: Map skills needs in relation to different industries, types, and levels of skills e.g. high-level cyber skills vs. general security skills & creative skills vs. programming skills.

Action 3.1.2: Devise outreach activities for specific skill types and levels and target them towards individuals interested in and able to access that skillset.

Action 3.1.3: Devise specific interventions for MAaT pupils to ensure appropriate subject choices are made for further relevant studies.

Element 3.2: Look to develop alternative routes into the sectors

Action 3.2.1: Map all relevant employment and training pathways into relevant careers, industries & businesses in Wales.

Action 3.2.2: Identify any gaps in pathways into relevant careers, industries & businesses in Wales.

Action 3.2.3: Where gaps are identified, work with partner organisations to develop appropriate provisions.

Action 3.2.4: Investigate accreditation options for general digital/cyber skills within the workplace.

Element 3.3: Exploit existing alternative pathways into the cyber sector

Action 3.3.1: Map all existing alternative pathways into the sector e.g. apprenticeships, degree apprenticeships, and other work pathways.

Action 3.1.2: Identify where existing Thales and USW alternative pathways exist and embed within outreach provisions.

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