Informed Scotland

TECHNOLOGIES
AT WORK
SPECIAL

▶ technological developments in society ▶ digital & ICT ▶ business education

▶ computing science ▶ craft, design, engineering & graphics ▶ food & textiles

inspiring • enabling • supporting • equipping

Commissioned by

Education Scotland
Foghlam Alba

TECHNOLOGIES AT WORK
A FOREWORD

Every aspect of the curriculum has a part to play in helping children and young people understand the world of work, the parts which they might play, and the contributions they might make to business, employment and the economy in their careers beyond school. Within that overall framework it is possible to see a unique role for the technologies, and the particular logic and clarity of a special relationship which the technologies can share with creative, productive working life in the 21st century.

Over a number of years, and through many different programmes and initiatives, national and local governments have recognised the importance of the technologies in supporting young people's expanding awareness of careers and working life. For example, the Technical and Vocational Education Initiative (TVEI) invested £1bn in schools across the UK over a span of 10 years or so; and more recently the Scottish Government's Determined to Succeed programme focused a further £100m on developing young people's readiness for work, much of it supporting technological skills and knowledge.

Building Society: Young people's experiences and outcomes in the technologies was launched on 9 March 2015. Its vision for learning in, through and about the technologies, makes clear the importance of cultivating strong links and associations with the progress being achieved in Developing Scotland's Young Workforce, in the wake of the Wood Commission report and the Scottish Government's response.
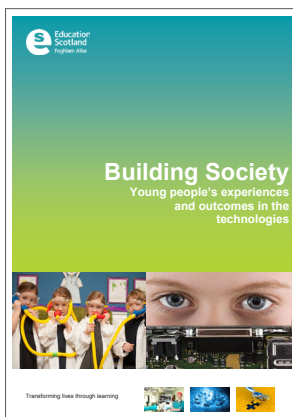
Technologies at Work highlights ideas, issues, projects and resources from across the learning and skills landscape. It aims to help business and schools identify and make the most of the common objectives and synergies of the technologies and young workforce initiatives. It makes connections between subject areas, between education and business sectors, and between the economy and learning.

Education Scotland, who commissioned this *Informed Scotland Special*, encourages partners in business and across education establishments to use the resource, recognising the important bridge the technologies provide between the communities of school and work.

Key themes from the *Building Society* report:

- Technologies should promote creativity and problem solving, real-time, real-world.
- Digital technologies should be placed at the heart of learning.
- A clearer technologies 'brand' should be developed within the broad general education. (29)

We want our young people to be fully equipped for a world which is changing, educationally, economically and socially, at an unprecedented rate.

BILL MAXWELL, CHIEF EXECUTIVE, EDUCATION SCOTLAND

EDUCATION SCOTLAND LINKS

- Creativity
- Curriculum, Learning, Teaching, Assessment & Support Forums
- Developing the Young Workforce
- Expressive Arts
- Food & Health
- Glow
- ICT in Education
- My Experiences & Outcomes
- National Digital Learning Community
- National Qualifications
- Partnerships for Learning
- STEM Central
- Technologies curriculum area
- Technologies Learning Blog

Look out for links to new Journey to Excellence technologies videos throughout the Special

▶ **Carolside Primary School 1**

A Storify captures issues discussed at the launch, including the creation of a new National Technologies Network. Major articles appeared in TESS and The Herald. A blog was posted by Lee Dunn, University of Glasgow and TESS published a letter by Nancy Clunie, Dalmarnock Primary.

Schools

ICT, DIGITAL & COMPUTING

■ **Computing at School Scotland** published a *Briefing Paper* on computing science education, listing five key issues 'endangering' the subject – teacher numbers, teacher training and workforce replenishment, overcrowded classes, time allocation at S1–3, and the development of computing science in primary and early years. (29)
▶ *Perth Academy 1*

■ **SQA** is developing a new suite of qualifications in cyber security at SCQF Levels 4, 5 and 6, believed to be the first of its kind for school pupils in Europe. (28)

■ **Education Scotland** published staff training materials for the new web development topics in Higher and Advanced Higher Computing Science. (27)

■ **The BBC** launched Make it Digital 'to increase digital skills among young people and help to fill the digital skills gap'. Every UK pupil starting secondary school in 2015/16 will be given a Micro Bit mini-computer developed with **Arm**, **Microsoft** and **Samsung**. **Raspberry Pi Foundation** is helping the BBC to develop learning resources. (29)
BBC also launched a digital skills apprenticeship scheme.
▶ *Craigowl Primary School 1*

■ **Oracle** and **Skills Development Scotland** (**SDS**) are sponsoring **Tech Partnership**'s Computer Clubs for Girls licences and Java Fundamentals training for 50 Scottish schools. (27)
▶ *Carolside Primary School 2*

ENGINEERING

■ **Morphy Richards STEM Centre** was opened at **Dumfries House** with engineering focused learning activities for 5–14 year-olds. Professional learning will also be provided for teachers. (30)
Six education centres include those for Traditional & Craft Skills and Hospitality.

■ **Comhairle nan Eilean Siar** with **Lews Castle College UHI**, **SDS**, **SQA**, Sector Skills Councils and employers, launched progression pathways in engineering and health & social care sectors for S5/S6 pupils. The two-year courses combine work-based skills with school/college study. (28)
▶ *Perth Academy 2*

■ **Enterprise Education Trust** launched a new Engineering Programme, enabling young people to see the importance of the sector and the career opportunities available. The first course for 100+ secondary pupils was held in Dundee. (27)

■ **Women's Engineering Society** is running a new Magnificent Women and Their Flying Machines outreach activity and resource for schools and groups. The first event in Scotland was held at Ayrshire College for S2 girls. (27)

With this report we have a platform to allow students to become world class problem solvers through a lateral, expanded, non-siloed education system.

RICHARD CLIFFORD, EXECUTIVE DIRECTOR, MAKLAB
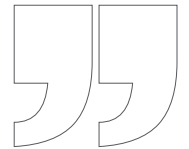
ENTERPRISE & BUSINESS ENGAGEMENT

■ Scottish Government announced £327k for the Enterprising Schools Project as part of Scotland CAN DO.
■ **Young Enterprise Scotland** is leading the project involving **Education Scotland** and other partners.
■ A framework will be developed for schools to achieve an entrepreneurial activity 'star-rating'.
■ Seven schools from six authorities will work with partners to create a 'peer-to-peer support model'. (27)

■ **The Prince's Trust** is to deliver Future Starts pilot projects involving schools, colleges and employers in Edinburgh, Glasgow, Dundee and N Lanarkshire. Senior phase students at risk of disengagement will be given the opportunity to sample career options and develop skills. (27)
▶ *Pentland School*

■ A Skills Centre of Excellence opened at **Irvine Royal Academy** with **Ayrshire College**, **Scottish Funding Council** (**SFC**), **Edge Foundation** and **SDS** funding. It aims to prepare young people for work through more vocational options from S4–6 and better links with local business, while widening participation among under-represented groups. (28)

■ **CBI** published *Delivering Excellence: A New Approach for Schools in Scotland*. Recommendations include greater flexibility so teachers can gain experience of business, SQA to increase its business engagement to improve understanding of new Nationals and mandatory work experience. (29)
▶ *Alford Academy 1*

The key skill I gained from education was the ability to learn – essential in an ever changing career where adaptability & flexibility at pace is very important.

JOE BLAIR, GRADUATE MECHANICAL ENGINEER
AMEC FOSTER WHEELER, & STEM AMBASSADOR
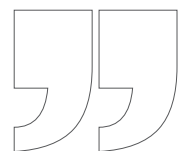
Business

CONSTRUCTION

■ **SDS** published *Construction Sector Skills Investment Plan [SIP]*. Key themes are attracting future talent and creating pathways; more effectively meeting employer demand; modernising training; providing skills for future growth. (29)
There are 10 SIPs – others are highlighted below.

■ **CITB** published *Construction Skills Network – Scotland 2015–19* setting out the need to attract, train and retain workers. Employment growth will create an average 5,700 jobs every year for the next five years. Jobs in demand include non-construction professionals, technical & IT; painters & decorators; and civil engineers. (28)
An article in The Scotsman described the knock-on impact of a 'chronic' lack of skilled staff. (30)

■ **SDS** published *Modern Apprenticeship statistics: Q1 to 3 2014–15*. 36,937 were in training, the highest proportion in Construction (26%) & Engineering (16%). A new Apprenticeships.scot website was launched. (28)

ENGINEERING & ENERGY

■ **Engineering UK** published its annual *State of engineering* report, finding supply is still growing too slowly to meet demand. 28% of employers report difficulties recruiting technicians and 26% sourcing experienced staff. (27)
Engineering & Advanced Manufacturing SIP (SDS 2014).

■ **SDS** published an updated *Energy Sector SIP*. Key themes include inspiring and preparing young people to engage in energy careers; developing pathways for more people to enter the sector, particularly the young unemployed; ensuring education and training provision meets industry needs; and tackling the gender imbalance. (29)
In 2013 60 companies employed 81% of the sector.

■ A new Energy Jobs Taskforce was set up by the Scottish Government. Taskforce members, **Wood Group**, **Aberdeen City Council** and **SDS** launched the Match People Skills service to help oil & gas workers find employment. (27) (29)

■ **UK Commission for Employment & Skills** (**UKCES**) published *Skills and performance challenges in the energy sector*. Jobs are forecast to grow by 15.5% by 2022. Supply of skilled workers was limited by issues including low interest in the sector as a career. Required skills mix is expected to change to include soft skills, technical skills such as data analytics, and knowledge of new technologies.
An infographic captures the main issues. (29)

■ **Prontoport** is to offer Wind Turbine Technician training to renewable engineering students and the long-term unemployed at their new West of Scotland Training Academy.

DIGITAL & TECH

■ **The House of Lords** Select Committee on Digital Skills published *Make or Break: The UK's Digital Future*. It highlights Scotland's Digital Strategy as contrasting with the 'lack of central vision' at UK level.
■ 35% of UK jobs are at risk of being automated over the next 20 years.
■ The economic potential of more women in digital careers should be realised.
■ The internet should be viewed as important as a utility, accessible to all.
■ Digital literacy should be a core school subject.
■ Computer science should be taught in schools and perceived on a par with other sciences. (28)
SDS published an ICT & Digital SIP in 2014; plans are underway for a Digital Skills Academy.

■ According to a report by **Be-IT Resourcing** 73k digital technology professionals are employed in Scotland. In 2011 17% were female (30% in 2001). More than 51% were over 40; 12% under 28. (28)
The authors commented on the decline in teacher numbers and pupils taking computing courses.
***WISE**, **Equate Scotland**, **WiRES**, **WES** and others aim to improve gender balance in technologies.*
▶ ***Craigowl Primary School 2***

■ **Tech City** published *Tech Nation: Powering the Digital Economy 2015*. Edinburgh has the 4th highest density of digital companies in the UK, with the focus on FinTech (financial), EdTech (educational) and software development. (28)

■ **The Education Foundation** is to launch **Edtech UK** in the summer – a new strategic body 'to help accelerate the growth of the UK's EdTech sector in Britain and globally'. (30)

■ **City of Edinburgh Council** and **City of London** signed an agreement, involving **Innovate Finance** and **Scottish Financial Enterprise**, to share knowledge and expertise and raise the profile of the FinTech sector. (30)

■ **Aberdeen** and **Robert Gordon** (**RGU**) **Universities** are launching two new digital innovation hubs as part of the City Council's Accelerate Aberdeen programme. (30)

Few subjects will open as many doors for students in the 21st century as computer science.

CAROLINE STUART, DIRECTOR, ORACLE SCOTLAND

FOOD, DRINK & TEXTILES

■ **Scotland Food & Drink Skills Academy** launched a new Network of Excellence 'to boost productivity, profitability and innovation'. It includes colleges, universities and training organisations. (29)
SDS published a Food & Drink SIP in 2012. 2015 is Scotland's Year of Food and Drink.

■ **National Centre for Universities & Business** (**NCUB**) published *Attitudes and Perceptions of Careers in the Agriculture and Food Sector* amongst UK undergraduates and new starts. Awareness is low and only a minority of undergraduates planned a career in the sector. (29)

■ **Scottish Textiles Skills Partnership** launched textileskills.com a resource for employers, employees, students, parents educators and those seeking work. (28)
This is part of the Skills Strategy & Action Plan 2014–17 published by the Partnership. A textiles SIP is in SDS plans.

■ **HIE** launched a five-year Creative Industries Strategy supported by **Creative Scotland**. It will focus on crafts, designer fashion & textiles, design, digital screen & broadcast, music and writing/publishing industries. (27)

Government & Wider Society

DEVELOPING THE YOUNG WORKFORCE

■ Scottish Government published Scotland's Youth Employment Strategy. Closer links between education and employers are 'at the heart' of plans for a 40% reduction in youth unemployment by 2021. Key measures include:
- Increased uptake of work-related learning and qualifications in the senior phase of school.
- Earlier careers guidance available from 2015/16.
- New standard for work experience by 2015/16.
- New 'pre-apprenticeship' pilot by 2015/16.
- All secondary schools to have active partnerships with employers by 2018/19.
- 30K new Modern Apprenticeships each year from 2020. (27)
A Scottish Government blog will share news. (29)

■ The first two regional Invest in Young People Groups were set up in North-East Scotland and Glasgow. They aim to improve links between education and local employers and increase opportunities for young people. (28)

■ **UKCES** published *Catch 16-24: Youth Employment Challenge*. In Scotland 63% of employers say leavers from school are well/very well prepared for work, 81% from college, 88% university. Skills lacking include work/life experience. 20% had someone on work placement from school, 11% from college, 11% university; 5% hosted an intern. (28)

Community & Adult Learning

STEM & CONSTRUCTION

■ **Glasgow City of Science** added **Ayrshire College** and **Engineering Development Trust (EDT)** Scotland to its list of partners. Others will be encouraged to offer placements in EDT's Year in Industry scheme for young people before or during their degree course. (28)

■ **Edinburgh College** is working with **Melville Housing Association** to offer free traditional construction skills training for apprentices, contractors, schools and home owners. The project supports the **Dalkeith Corn Exchange** regeneration. (30)
▶ *Glaitness Primary School*

CREATIVE & DIGITAL LEARNING

■ **Creative Scotland** launched TTS.Digital, a new £450k fund 'to develop young peoples' digital creativity and experimentation' through youth-led projects. (27)
Time to Shine is Scotland's National Youth Arts Strategy.

■ **respectme** and Scottish Government are piloting training for parents and carers on keeping children safe online. (27)

■ **Young Scot** is the lead partner in Scotland for the UK-wide **iRights** coalition, which aims to make the internet a safer, 'more empowering place' for those under 18. One of five principles is the 'right to digital literacy'. (30)

■ **SCVO** awarded the second round of Digital Participation Challenge funding for projects to improve the digital skills of older people, the disabled and disadvantaged. (30)
▶ *Aberdeen School for the Deaf*

■ **Nesta** published Young Digital Makers. 82% of young people say they are interested in digital making; 50% make things digitally less than once a week or never. 89% of parents think it is a worthwhile activity for their children. (29)
Nesta also published a 'dataset' of 97 makerspaces across the UK. There are 11 in Scotland including MAKLab, Edinburgh Hacklab, 57North and T-Exchange. (30)

■ **Carnegie UK Trust** published *Digital Participation in Dumfries and Kirkcaldy*, examining the barriers to digital participation. Over 33% of households in these two towns have no internet access (19% UK average). (28)

> *It's vital we support industry to reach out to the new emerging talent so badly needed for our future prosperity.*
> MEG WRIGHT, DIRECTOR, EDT SCOTLAND

Further & Higher Education

AGRICULTURE, AQUACULTURE & TEXTILES

■ A new National Strategy for Land-based Education is to be developed. The Land-based Providers Group, including **SRUC** and other Scottish colleges, is carrying out a consultation on behalf of **SFC** on the future delivery. ⑳

■ **Scottish Aquaculture Innovation Centre** is providing **SFC** funding for 25 new Masters courses at **Universities of Stirling** and **Dundee**, focused on industry-relevant knowledge and skills plus placements and projects. ㉗

■ **Glasgow Kelvin College** was awarded UK India Education Research Initiative funding to work with **Government Polytechnic for Women**, India in a 12-month fashion and garment design programme. ㉙

■ **Queen Margaret University** (**QMU**) launched a **Scottish Centre for Food Development & Innovation**. ㉗

COMPUTER SCIENCE & DIGITAL

■ **NCUB** published *Growing Experience: A Review of Undergraduate Placements in Computer Science*. Computer science students have the highest rate of unemployment of all disciplines. 26% of third years undertook a work placement; current placements supply outstrips demand. Staff must dispel the belief that there is a conflict between academic achievement and work experience. ㉗
*A blog offers interesting insight into the findings.*

■ *TESS* reported that the number of Scottish first-year computer science students at UK universities was up 21% from 2011/12; engineering and technology by over 10%. ㉘
▶ *Alford Academy 2*

■ **RGU** MSc Digital Marketing students created The Digital Scot to develop and showcase skills learnt during their studies. It gives students opportunities to work with professionals, gain experience and attract employers. ⑳

Creative problem solvers who understand technology are key to Scotland's future economic success. We must grow and develop an interest from early years onwards.
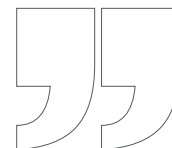
SANDRA CAIRNCROSS, DEAN OF ENGINEERING
COMPUTING & CREATIVE INDUSTRIES, EDINBURGH NAPIER UNIVERSITY

NEW COURSES & QUALIFICATIONS

■ **SQA** has developed new HN units in Big Data at SCQF Level 7 and Data Science at SCQF Level 8. ㉘

■ **Edinburgh Napier University** launched:
▪ a Professional Selling Skills & Sales Process module for third year BA Business Management students. ㉗
▪ a new MSc Game Technologies. It will include graphics, physics-based animation and artificial intelligence. ㉙

■ **QMU** launched a new BSc (Hons) Nutrition and Food Science with an emphasis on health and the prevention of dietary related disease. ㉘

■ **Ayrshire College** is running the Project Bartender training with **Diageo** – part of its Learning for Life programme. ㉗

■ **Heriot-Watt University** launched an MSc Ethics in Fashion to satisfy industry's demand for ethical practice and supply-chain based knowledge. ⑳

■ **University of the Highlands & Islands** (**UHI**) launched a BEng Power Engineering Systems developed with **SSE plc** and delivered at **Inverness College UHI**. ㉘

■ **New College Lanarkshire** developed an HND in IT with **Oracle Academy** and **RBS**. It includes work experience and real-world application of technical coursework. ㉗

■ **RGU** launched a new MSc Data Science. It will prepare graduates for a career in design, implementation and use of computer-analytics and visualisation solutions. ㉘

■ **The Data Lab** innovation centre, **Universities of Dundee**, **Stirling** and **RGU** have created a Data Lab MSc. ⑳

OTHER USEFUL ORGANISATIONS & LINKS

■ ALT Scotland
■ Building Futures Group
■ CALL Scotland
■ CETIS
■ CeeD
■ CoderDojo Scotland
■ Construction Scotland
■ Creative Skillset

■ Digital Learning & Teaching
■ Digital Scotland
■ DigitalSkills.com
■ Employability in Scotland
■ Energy & Utility Skills
■ Energy Skills Scotland
■ Enginterns
■ ILETS Research & Teaching Group

■ Improve Scotland
■ JISC Scotland
■ LANTRA Scotland
■ My World of Work
■ OPITO
■ Our Skillsforce
■ Primary Engineer
■ SEMTA Scotland
■ Skills CFA

■ SSERC
■ STEM Education Committee
■ STEMNET
■ ScotlandIS
■ SQA Blogs
■ SummitSkills
■ Young Engineers & Science Clubs