

STEAM

Science
Technology
Engineering
Arts
Maths

Why STEM can only take us so far

Foreword

For the UK to grow and exploit new economic opportunities we need our young people to be prepared for the changing needs of the labour market.

It is now widely accepted that employers value employees with 21st-century skills – a mix of cognitive and personal skills, like creativity and collaboration – as well as content knowledge. Our research on creativity and automation suggests that employers will place an even higher premium on creativity in the workforce in the future.¹ More generally, technological change and other drivers, including globalisation, population ageing, and the green economy will, over the next few decades, sculpt a workforce that looks quite different from that of today.²

Our analysis of online job advertisements shows that many employers today already demand creative and design skills *in combination* with tech, support, and teaching skills,³ pointing to a STEAM skills agenda. Consistent with this, there is evidence that such fused skills show up in better economic performance – businesses that make use of both arts and science skills show higher levels of growth and innovation than companies that don't.⁴

The government has rightly recognised a need to invest in STEM education in schools and universities. However, in order to ensure that the UK is investing in skills that will be valuable for the future of work, we must focus on mechanisms that promote the fusion of arts, sciences and technology right through the talent pipeline.

Hasan Bakhshi MBE, Executive Director, Creative Economy & Data Analytics, Nesta

'Increasingly, companies and educators are becoming aware that encouraging broad-based skills and multi-disciplinary teams is a good thing.'

Professor Katie Normington, Vice Principal & Dean of Arts & Social Science, Royal Holloway University of London (2016)

'The Arts are the catalyst not just for the creative industries, but for all industry, from engineering to automotive to advertising.'

Ian Livingstone CBE & Shahneila Saeed, *Hacking the Curriculum* (2017)

STEM + Arts = STEAM

STEAM is about the vital interplay between – and having a parity of esteem for – science, technology, engineering, arts and mathematics.

STEAM is essential for creating a workforce that can solve the problems of the future.

Innovation

Combining arts and science results in increased levels of innovation. Research by the University of Sussex for Nesta found that firms that combine arts and STEM skills are more likely to bring radical innovations to market (Siepel, et al. 2016).

Recent research in the US has found that engaging in the arts correlates with increased levels of scientific and technological innovation. STEM professionals participate in arts and crafts much more often than the average American, and the most entrepreneurial individuals participate at even higher rates than the others. Graduates majoring in STEM subjects in the United States are more likely to have extensive arts skills than the average American (LaMore, et al. 2013). Nobel Laureates in the sciences are 22 times more likely than scientists in general to be involved in the performing arts (Root-Bernstein, 2008).

‘We’re moving out of the information economy ... we’re moving into an innovation economy, where the demands on our creativity as human beings – that’s where we’re going to see increasing value in the workplace.’

Frazer Bennett, Chief Innovation Officer, PA Consulting Group, *Today Programme*, BBC Radio 4 (15 May 2017)

‘At the heart of the Industrial Revolution was the steam that drove the industrial engines of the 18th and 19th centuries. Steam continues to drive the turbines in many of the power stations that generate the electricity on which we completely depend. But it is steam of a different sort that is powering the industrial revolution of the 21st century – STEAM in the form of science, technology, engineering, arts and mathematics.’

Sir Mark Walport, Government Chief Scientific Adviser, *Times Higher Education* (February 2017)

Productivity

Studying the arts fosters creativity, innovation and resilience (Cultural Learning Alliance, 2017) – skills that are essential to the employability of young people and future productivity of businesses. Nesta has found that firms combining arts and science skills outperform those that utilise only arts skills or science skills. They have 6% higher employment growth and 8% higher sales growth (Siepel, et al. 2016).

‘Participating in structured arts activities increases transferable skills, including confidence and communication, of between 10-17%.’

The Culture and Sport Evidence Programme (CASE) *Understanding the impact of engagement in culture and sport* (2010)

‘Firms combining arts and science skills outperform those that utilise only arts skills or science skills.’

Siepel, et al. (2016)

‘Cultural education is integral to the happiness of our children and their families; to the strength of our communities and to the economic progress and international standing of our country. It turns STEM into STEAM: it fires the curriculum and creates individuals who are more inquisitive, persistent, imaginative, disciplined and collaborative.’

Business

In the 2016 CBI/Pearson Education and Skills Survey, 87% of businesses said that the right attitudes and aptitudes were among their top considerations when recruiting graduates, ahead of subject studied.

Businesses said that when recruiting school and college leavers a positive attitude and resilience 'consistently ranks far ahead of every other factor by a wide margin.' In the same survey, 48% of businesses said they were not satisfied with the resilience and self-management of young people.

'Businesses are clear that first and foremost they want to recruit young people with attitudes and attributes such as resilience, enthusiasm and creativity.'

The Right Combination CBI/Pearson Education and Skills Survey (2016)

'... In an age where anyone can produce anything anywhere through 3-D printing, where anyone can broadcast their performance globally or sell to China whatever the size of their business, there is an opportunity for mass employment through mass creativity.'

Mark Carney, Governor of the Bank of England, Roscoe Lecture, Liverpool John Moores University (5 December 2016)

Engaging young people

The Edge Foundation's recent report, *The Skills Mismatch*, has highlighted the shortage of STEM-trained young people entering the workforce. Young people surveyed about their career aspirations by the Education and Employers Taskforce in 2013 did not express any interest in STEM careers (Mann, et al. 2013). STEAM could help to reverse this trend, motivating and engaging young people in STEM subjects.

'The blending of art and STEM into STEAM offers student experiences that are both inspirational and integrated.'

Rachel Connolly, Director of STEAM, PBS LearningMedia (America's Public Broadcasting Service education arm)

'A highly skilled and talented workforce is the basis of our hugely successful creative industries. These creative and technical skills are also key to growth in sectors such as engineering, automotive and aerospace.'

Creative Industries Federation, *A Blueprint for Growth* (2017)

References

- ¹ Bakhshi, et al. (2015) *Creativity vs. Robots: The creative economy and the future of employment*
- ² Bakhshi, et al. (2017) *The Future of Skills: Employment in 2030*
- ³ Sleeman & Windsor (2017) *A closer look at creatives*
- ⁴ Siepel, et al. (2016) *The Fusion Effect: the economic returns to combining arts and science skills*
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- LaMore, et al. (2013) *Arts and Crafts: Critical to Economic Innovation*
- Mann, et al. (2013) *Nothing in common: The career aspirations of young Britons mapped against projected labour market demand (2010-2020)*
- Root-Bernstein (2008) *Arts Foster Success: Comparison of Nobel Prizewinners, Royal Society, National Academy, and Sigma Xi Members*
- Full references available:
www.culturallearningalliance.org.uk/briefings

'World-renowned institutions, including the British Library, the Francis Crick Institute and Central Saint Martins College of Art and Design, alongside companies such as Google UK and ASOS, have the potential to inspire and support our young people to aim high and forge exciting careers in the 21st-century economy. Succeeding in this economy will increasingly require young people to have a fusion of skills – creativity blended with digital and science ability.'

The STEAM Commission's ambition is to link businesses strongly with schools and further education colleges to help deliver the 21st-century talent they need and, in so doing, to guarantee the best opportunities and futures for all our young people.'

Georgia Gould, Leader, Camden Council, *Creating Camden's 21st Century Talent: STEAM Commission report*, June 2017

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The Cultural Learning Alliance (CLA) is a collective voice working to ensure that all children and young people have meaningful access to culture.

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