As the leading charity promoting technical and professional education in England, the Edge Foundation welcomes the Committee’s interest in measures that can help to close the STEM skills gap. We see this as one of the key priorities of a strengthened system of technical and professional education over the next decade.

The Challenges

As your call for evidence is very clearly focused on solutions, we will not dwell on the evidence for the significant skills gap in this area, except to encourage you to look at our 2016 report *The Digital Revolution*¹ and to use any of the evidence here to support your work.

The Solutions

The STEM skills gap is at the sharp end of the wider skills gap that employers in all sectors point to when they tell us that the education system is not currently producing young people who are ready to work in and add value to their organisations.

We believe that there are just three key ingredients that could reverse this position over the next decade. They are messages that we hope will already have come up many times in your investigations and that is because we believe that all roads lead back to them as the key levers of change in this area:

- **Real opportunities for all young people to explore different careers options**, including in STEM industries, from Year 7 onwards. We believe that this can be achieved through high quality local programmes offering a variety of different ways for young people to interact with professionals at different stages of their schooling (e.g. the Careers Footsteps and Business in Classrooms projects included below). This builds young people’s knowledge and openness to STEM careers from an early age.

- **A school curriculum** that encourages all young people to develop their technical and creative capacity alongside an academic core, with the opportunity and encouragement for those who want to work towards a STEM career to focus more strongly on technical subjects. The government’s narrow 90% EBacc target is the single greatest threat to this area and will significantly widen the STEM skills gap by ensuring that very few young people have an opportunity to engage in any technical education before age 16 – design and technology GCSE entries have already fallen 27% in five years. Our recommendations for a broader Baccalaureate that would enable young people to develop a strong technical and creative core are set out in *14-19 Education: A New Baccalaureate*² and further information about University Technical Colleges as an example of a broad and technical curriculum is included below.

¹ [http://www.edge.co.uk/research/research-reports/the-digital-revolution](http://www.edge.co.uk/research/research-reports/the-digital-revolution)
² [http://www.edge.co.uk/research/research-reports/14-19-education-a-new-baccalaureate](http://www.edge.co.uk/research/research-reports/14-19-education-a-new-baccalaureate)
Written evidence submitted by the Edge Foundation (GAP0026)

- High quality specialist **technical and professional education** must then be available for young people to **develop and master these skills** during a unified 14-19 phase and crucially this route must be seen as the equal of academic education. We recognize that this is a cultural shift that will take time but there is already strong and powerful evidence that is not yet being used widely enough – for instance average salaries two years after graduation from a Bachelor’s Degree are £22,000, exactly the same as two years after completion of a Level 4 apprenticeship but with no student debt\(^3\).

There are a large number of individual initiatives and projects aiming to address the STEM skills gap (as there are more broadly in the field of careers guidance) and we welcome the Committee looking at these in more detail. Anything that can be done to review, evaluate, simplify and prioritise will help to improve the overall effectiveness of our collective intervention in this area.

**Examples**

*Strand 1 – Exploring STEM Careers Options*

There are many different interventions available to improve young people’s understanding of careers options and what works in general will work when applied to STEM areas in particular. Often the best solutions are the simplest.

- **Career Footsteps** is a programme run by the Edge Foundation to match schools with professionals in many different industries. The schools each host an event for their pupils with a selection of professionals from different fields who can provide the young people with an insight into their preparation and career. During 2016 there were events at over 100 schools, with many professionals drawn from STEM businesses like Balfour Beatty, DSA Electrical, Sell International and Transport for London. We want to significantly expand the programme in 2017. The overall cost of the programme is around £50,000 in running costs per year and it is free for schools and businesses to take part. More information is available at [http://www.edge.co.uk/projects/campaigns-competitions/career-footsteps](http://www.edge.co.uk/projects/campaigns-competitions/career-footsteps).

- **Business in Classrooms** is an intervention designed and piloted by the Edge Foundation in Nottingham in 2016, which builds on effective international practice from Nashville, Tennessee. It offers tutors of Year 8 pupils the opportunity to take part in an externship with a local business so that they can provide their students with the latest relevant careers advice. The pupils themselves then undertake a six week project exploring and profiling that business to reveal ‘hidden jobs’. In terms of a specific STEM focus, in the pilot year, businesses involved included Nottingham

City Homes with a particular focus on women in construction and Capital One, focusing on their need for skilled computer coders. The intervention reached around 800 Year 8 pupils in four schools in 2016 and in 2017 we intend to expand in Nottingham and extend the approach to two other cities. More information is available at http://www.edge.co.uk/projects/business-in-classrooms.

Strand 2 – A school curriculum that embraces technical options

The Key Stage 4 curriculum is becoming progressively narrower as a result of the focus on the small range of English Baccalaureate (EBacc) subjects, initially as a performance measure and in future as a target for 90% of students. Only a few particular types of school are continuing to prioritise the technical and professional skills that young people need for their future careers, including in STEM.

- **University Technical Colleges (UTCs)** are free schools providing education to 14-18 year olds. They are smaller than traditional secondary schools at around 600 pupils and their curriculum includes one or two technical specialisms linked to skills gaps in their region. As well as their core academic subjects, students can study GCSEs, A-Levels and qualifications matched to their specialisms. Each UTC is backed by employers and a local university who work with staff to develop a curriculum that gives students first-hand experience of working life. Many UTCs have a particular focus on science, technology, engineering and maths subjects. There are 48 UTCs open and their progression results are very strong. Of those leaving UTCs in 2016, 44% went to University (the national average is 38%), started a job and 29% an apprenticeship (compared to 8% nationally). More information is available at http://www.utcolleges.org/.

- **Studio Schools** also cater for 14-18 year olds of all abilities. They are smaller schools of around 300 students designed to feel more like a workplace than a school. As well as core GCSEs in English, maths and science, Studio Schools use an innovative approach to curriculum design that involves teaching through enterprise projects and real work experience. This helps to ensure that pupils get much more relevant experience to enable them to secure and sustain employment. The results of the Studio Schools Trust’s 2016 satisfaction survey are very positive from students (90% agreed they had access to opportunities not available in their previous school), parents (83% agreed their children were happier at this school) and employers (94% felt that the school was providing the experience and skills needed for work. More information is available at http://studioschoolstrust.org.

- **School21** is a pioneering free school in Stratford, East London providing education from ages 4 to 18. Like studio schools, School21 has a particular focus on real-world learning with pupils getting involved in hands-on projects with local employers. Students are particularly supported to create beautiful work with their hands and this is exhibited to their peers and the pupils on a termly basis. They are supported by teachers with real experience from industry. The School makes an active decision
to enter its pupils for one fewer GCSE than their maximum load to provide sufficient
time to focus on real projects. More information is available at

Strand 3 – Respected technical and professional routes

We are strong supporters of Apprenticeships and support the current drive for a significant
expansion in the number offered. We think that these should be focused particularly at
Level 4 and above, with a significant expansion of Degree Apprenticeships so that these
move from a very small part of the programme to a major focus of our Higher Education
system. We have worked with a number of other excellent STEM-focused projects over
recent years:

- We have worked with **Barking and Dagenham College** to support the development
  of the Siemens Mechatronics Academy. The Academy is a cutting edge training
  environment with equipment sourced by Siemens to ensure that it meets the latest
  industry standards. The Academy is used to train young people in a wide range of
  qualifications and routes including BTECs and Apprenticeships. Key lessons from this
  example include the need to build strong partnerships between technical education
  providers and employers and the need for access to the latest industry standard
  equipment to ensure that students are learning in an environment as close as
  possible to their future workplace. More information is available at

- At **Blackburn College**, the team have developed ground breaking relationships with
  five major car dealerships (BMW, Skoda, Nissan, Toyota and Audi) as part of their
  Regional Automotive Technology Hub. This has enabled the College to develop the
  automotive curriculum offer to ensure students gain the skills, knowledge and
  experience that employers need. As part of this, three master technicians have been
  recruited from Nissan, Skoda and BMW – skilled employees from the industry who
  have committed to regularly visiting the college to deliver industry based sessions to
  students alongside College tutors. The Hub is already supporting over 300 learners,
  60% of whom are studying towards Level 3 apprenticeships. This example reinforces
  the importance of industry partnerships in particular to gain access to the human
  capital of skilled technicians – training providers often cannot offer a sufficient salary
  to draw these individuals in full time and it is much more effective for both sides for
  them to combine student tuition with a ‘day job’ that keeps their experience current
  and relevant. More information is available at

- **Prospects College of Advanced Technology (PROCAT)** is the first FE College to be
  incorporated in 21 years. It was built around an ethos of strong employer
  engagement, which shows strongly in their Career Academy for Railway Engineering
  and Aviation. This provides a unique approach to careers advice through a
partnership between employers, schools and young people. The College uses a series of Boards that include 3 PROCAT representatives, 10 large employers and 6 small businesses in the relevant sector to provide advice and keep their curriculum and approach completely current. The project also uses apprentice ambassadors to provide advice to young people about the opportunities available and a Young Engineers Club held on a Saturday morning to give young people the opportunity to develop their engineering skills and raise aspirations outside of core curriculum time. More information is available at:

January 2017