

HOW DO WE INSPIRE OUR FUTURE SCIENTISTS?



Kirsten Bodley
Chief Executive of STEMNET

Kirsten Bodley, Chief Executive of STEMNET, outlines the results of an independent report into the charity's programmes, measuring their effectiveness in inspiring employers, schools and individuals to develop the next generation of skilled workers.

Encouraging and enabling young people to see the opportunities within a career in STEM is an essential part of supporting the UK economy. Recent research from the Royal Academy of Engineering suggests that the UK needs to increase the number of STEM graduates by as much as 50 per cent to remain competitive globally.

The role of STEMNET

Inspiring young people in STEM subjects is one way of addressing this shortfall, and it is what STEMNET, an independent educational charity, which receives grant funding from government and the Gatsby Charitable Foundation, was set up to do.

We achieve this through working in partnership with government, industry, professional institutions and our UK-wide network of local organisations, skilled in facilitating education and industry links to deliver STEM programmes and support.

STEMNET delivers to schools, pupils and employers through three programmes: our Ambassadors programme, bringing volunteers working in STEM professions in to the classroom to stimulate and enthuse young minds; STEM Clubs programme, supporting teachers in taking pupils beyond the curriculum; and Schools STEM Advisory Network, providing schools with help to deliver exciting STEM lessons and projects.

We have 26,000 STEM Ambassadors with more than 3,000 UK employers supporting the scheme, and in ten years we have undertaken over

100,000 activities to inspire young people. Crucially, these programmes have been proven to work.

STEMNET works in partnership with a number of organisations in the UK,

schools operating STEM Clubs will continue doing so.

The results also showed a positive impact on individuals. Pupils involved in STEM Clubs who participated in the evaluation perceived an

... UK-wide network of local organisations ...

including the British Science Association and the Wellcome Trust, whose complementary work promotes and inspires STEM across the UK and has contributed to the 36 per cent rise in young people taking GCSE science in 2012.

Independent evaluation

To evaluate STEMNET's activities we commissioned the National Foundation for Educational Research (NFER) to evaluate the impact of our programmes.

... remain competitive globally ...

The results were published on 9 October 2013 and launched in the House of Commons. These were very encouraging – showing a positive impact on pupils, teachers and the employers who allow their staff to volunteer.

All schools highly recommend getting involved with STEMNET's programmes and also feel that STEMNET's involvement has been of great benefit. Almost three quarters of

improvement in their achievements, choosing to "agree" or "strongly agree" with the statements: "I am doing well in this subject" and "I have been doing better in this subject since taking part in STEM activities". Pupils' enthusiasm for STEM careers also rose, while teachers find the support they receive from STEMNET invaluable, and report that their links with our programmes have enhanced their understanding of the application of STEM subjects.

Below is an in-depth analysis of the NFER's findings in relation to the three key audiences which STEMNET targets – pupils, teachers and employers.

1. Pupils

The NFER report emphasised that involvement in STEM activities positively affects pupils' attitudes and their own perception of their achievements in, and engagement with STEM subjects. Teachers listed the top impacts on pupils as:

- **Increased awareness of the importance of STEM subjects and real world applications**

Direct interactions with STEM Ambassadors dispel negative

... these programmes have been proven to work ...

stereotypes and perceptions of people working in STEM sectors. Since taking part in STEMNET programmes, pupils know more about why STEM subjects are important for everyday life and their relevance to exciting careers.

Understanding the opportunities to work in exciting jobs motivates pupils to work hard in relevant subjects and ensure they choose an appropriate course of post-16 study. Indeed, pupils reported to the NFER that they feel they know enough about jobs in STEM to make good decisions and know where to get more information on STEM jobs.

... increased enthusiasm for STEM subjects ...

A Year Nine pupil quoted in the NFER report stated that STEM Ambassadors "...provide such a great opportunity for young people like us, teaching us to be open-minded, when we see something that we might consider doing for the rest of our lives we want to research it more."

- **Increased knowledge and understanding of STEM concepts or topics which can lead to increased engagement**

Pupils have increased enthusiasm for STEM subjects as a result of their involvement in STEM Clubs, interacting with Ambassadors and other enrichment sessions. They appreciate having time dedicated to exploring and learning through a fun and challenging approach to STEM and also sharing their interest with others.

Nine out of ten teachers said that participating in STEM Clubs has increased pupils' knowledge and understanding of concepts and topics. STEM Clubs are

proven to engage pupils, regardless of educational attainment and can introduce new ways for students who struggle with STEM to engage with the subjects, as well as stretching gifted pupils.

2. Teachers

As a result of the funding to support delivery of STEMNET's programmes, teachers gain access to new ideas and resources to support their teaching. Our Ambassadors help to inject new perspective and creativity into science, technology and maths lessons and STEM Clubs provide an opportunity to boost enjoyment and learning outside of the classroom.

The NFER report found that the delivery and impact of STEM activities in schools would have been much more difficult and time-consuming without engagement with STEMNET's programmes. 51 per cent of teachers reported that they had experienced challenges in the wider delivery of STEM activities

... to boost enjoyment and learning ...

in their schools. Lack of time was the most widespread challenge faced by these schools. The extra resource of STEM Ambassadors can be a huge help.

The increase in the provision of STEM activities has given STEM an enhanced profile within UK schools. All schools taking part in the NFER research said that they feel that STEMNET's involvement has been of great benefit.

On a personal level, getting involved with STEM Clubs, engaging with STEM Ambassadors and other activities, give teachers

continuing professional development (CPD) opportunities. Teachers feel more motivated to teach their STEM subject as a result of their involvement in STEMNET's programmes, as they are inspired by new ideas for activities.

3. Employers and volunteers

STEMNET's programmes are built on the enthusiasm and dedication of a huge network of individuals and organisations. STEMNET could not succeed without the thousands of volunteers and their employers who pledge their time to support our programmes.

While it is essential to have the skills, passion and expertise of individual volunteers, the support of their employers in allowing staff time to engage with young people is critical. Around 3,000 employers, large and small, are already involved through the STEM Ambassadors Programme, with many more supporting in other ways.

Dan Doleman, a Technical Director at Studioworx, and STEM Ambassador, said, "Visiting schools and finding out the level of competency of young people keeps you in touch as a business with the quality of people you should employ."

The Future

Our activities are designed to bring STEM subjects and careers to life. Through an array of projects limited only by the imagination, STEM Ambassadors and school teachers can use STEMNET's support and resources to find new and exciting ways of enthusing and informing young people.

The report identified the huge demand for STEM Ambassadors to take part in careers fairs and to involve more female STEM Ambassadors in delivery of STEM enrichment and enhancement activities. This is something we currently do well, and will develop through focusing some of our existing work in this area.

... dispel negative stereotypes ...

For example, GlaxoSmithKline provided a Careers Fair at one of its sites for 100 local GCSE students giving them a chance to learn about job roles across the business and develop practical skills through hands-on workshops.

A secondary school in Nottingham held a speed-networking session as part of the 'options evening', bringing in volunteers from local businesses as well as 15 STEM Ambassadors. Each student and their parents spent 5 minutes talking to a business person before moving on to the next professional. The evening was exciting and lively, and changed lots of pupils' and families' minds about working in STEM.

The NFER report underlined the impact and effectiveness of STEMNET's work over the last ten years, and we will develop our work to inspire and encourage the next generation of scientists, technicians and engineers. We will continue to respond to feedback from schools and employers and make sure that we meet their requirements and enable teachers and pupils to benefit from involvement in STEM events, locally, regionally and nationally.

For more information about STEMNET and the report from the National Foundation for Educational Research, go to: <http://www.STEMNET.org.uk/>

