

Implementing co-ordinated STEM engagement in schools

Research tells us that one-off activities and events have minimal long-term impact on students' aspirations towards STEM careers (Archer et al, 2021). So how can schools offer a co-ordinated, ongoing programme of STEM activities to open up these opportunities for students? In 2022, we commissioned [Everfi](#) to conduct research with teachers to find out what schools are currently doing and how we can support them to do more co-ordinated and high impact STEM engagement.

Most schools run some STEM engagement activities, but these are often infrequent and one-off. Three-quarters of teachers in our survey said they were doing fewer STEM engagement activities than ideal.

“I currently run zero STEM engagement activities but I would like to next year.”

- Science teacher

Among the teachers who engaged in this research, STEM related school trips were common, but many struggled to do more than 1 or 2 of these activities for students across KS3.

“The Science department do a STEM day in the summer. I do a Year 10 trip to the Cambridge Computing History museum and a Year 9 trip to Bletchley park.”

- Physics lead

Generally schools were not considering how STEM engagement activities might build on each other to create a sustained impact. Each activity is assessed on its own merits and the benefits it can provide to students.

STEM clubs are often seen as the answer to providing sustained STEM engagement activities for students.

STEM clubs rely on individual, passionate teachers who give up time to run them. They provide an opportunity for some students to take part in longer-term activities. But often teachers find it hard to plan activities for STEM clubs in a way that allows for progression towards longer-term objectives.

STEM clubs also tend to attract a narrow group of students and may not help to widen participation. In some cases teachers said that school clubs were competing with each other for the same group of highly engaged students.

“I know we're competing for about the same 20 students. Lots of departments offer after school activities, but it seems to be the same small group that all of the activities appeal to.”

- Head of Design and Technology

About the research: The research was conducted in summer 2022, in two phases.

1. A survey was distributed to STEM teachers to understand how they currently run STEM engagement activities in their schools. They received 45 completed surveys.
2. Focus groups were carried out with 24 teachers from across the UK to understand how they find and engage with STEM activities and to gather views on whether and how a more co-ordinated approach could be implemented in their schools.

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There is typically very little collaboration across STEM departments, let alone with non-STEM subject areas.

The research did, however, find some examples of co-ordination across different subjects, particularly across STEM subjects. This was made possible where schools had a STEM lead or where several passionate teachers drove this themselves. Tracking tools were used to see planned activities across subject areas, and to look across curricula to identify where

different skills and knowledge were being covered.

“For example, I’m going to be doing stuff on using coding to solve maths problems, I’ve also got another person in the maths department who is wanting to do some stuff on building rockets because they have experience in aerospace so I’m allowing all the teachers in the STEM department or in the STEM subject to essentially show off their subject knowledge.”

- STEM club co-ordinator



Teachers and schools have many - often competing - priorities, from Ofsted criteria and attainment goals to individual teacher and department goals. STEM enrichment activities struggle to get high up on this list.

Time is the biggest constraint for busy teachers. Even those who are passionate about STEM activities often do these in their own time. It is also difficult to find time in the school day for students to do activities not linked to curriculum studies.

Cost is also a barrier. Even where activities are free, transport and staff cover costs can prevent engagement.

Careers leads have an important role to play in co-ordinating engagement activities that seek to inspire and inform students about potential careers. But these tend to be broad, with limited focus on STEM.

Most careers leads do not have STEM subject expertise. They seek to give equal priority across a wide range of careers and often have very general objectives, usually linked to the Gatsby Benchmarks. STEM-specific careers activities are still generally reliant on the involvement of STEM subject teachers.

Towards a sustained engagement approach in schools - EngineeringUK's next steps

What does this research mean for organisations like EngineeringUK who seek to build the aspirations of more, and more diverse, young people towards engineering and technology careers? We are planning to use this learning as we develop new ways to support schools with co-ordinated STEM engagement.

There is an appetite, at least among some teachers, to do much more STEM engagement than they currently deliver.

“I would like to do loads more. We're not close to where I really would like our girls to be.”

- Computer science teacher

Furthermore, teachers in this research saw the value in moving beyond one-off activities towards something more sustained across the student journey.

“A student who's choosing to [engage in STEM activities] in Key Stage 3, is then interested in STEM subjects within GCSE, has an interest and understanding, and wants to explore careers in that field, and then hopefully if they stay onto our 6th form, it's sustaining the engagement and then wanting to choose the STEM subjects that we offer at 6th form.”

- Head of D&T and engineering

The challenge for these teachers is not to provide more types of one-off engagement, but to develop the school 'eco-system' (Archer, et al, 2021) that will allow these activities to be delivered in a co-ordinated, sustained and impactful way.

At EngineeringUK, we are doing further work to develop a model of co-ordinated STEM engagement that schools can implement. As part of this, we are looking

at how we can help teachers overcome these barriers.

Supporting teachers to raise the priority of STEM engagement within their schools: we are looking at how we can support teachers to make the case for investing in these activities, through better evidence of impact, strong curriculum links and raising the profile within the school community, including parents and carers.

Supporting better co-ordination across subjects: using tools like [Neon](#), we are exploring how we could facilitate school level teacher networks which reduce the effort needed to provide engineering careers information.

Reducing the time and cost burden: we will continue to help schools find free and low-cost activities and to access bursaries so that cost is less of a barrier. As well as making individual activities as easy for schools as possible, through quality resources or facilitation, we will look at how we can support schools to easily build on these with further guidance and signposting.

Developing further evidence about how to engage a more diverse group of students in STEM activities: particularly where STEM clubs continue to be an important space for ongoing STEM engagement, we are keen to learn how to widen participation so that more students see themselves in STEM careers.

Reference: Archer, M., DeWitt, J., Davenport, C., Keenan, O., Coghill, L., Christodoulou, A., Durbin, S., Campbell, H. and Hou, L. (2021) 'Going beyond the one-off: How can STEM engagement programmes with young people have real lasting impact?'. *Research for All*, 5 (1), 67-85.