November 2025

# Evaluation of the Lord Bhattacharyya Engineering Education Programme

## Royal Academy of Engineering

Final evaluation report

SQW

# Contents



**Contact:**
Bill Carroll
Tel: 020 7391 4119
email: bcarroll@sqw.co.uk

**Approved by:**
Dr Jo Hutchinson
Director
Date: 05/11/2025

# Executive Summary

## Executive summary

**Introduction**

- The Lord Bhattacharyya Engineering Education Programme ('LBEEP') was launched in March 2020. It works with a network of 20 secondary schools and five Further Education (FE) colleges around the West Midlands, primarily in areas of socioeconomic disadvantage – they are clustered into five groups, each containing an FE college, around South Birmingham, Solihull, Coventry, Rugby and Nuneaton.
- The LBEEP aims to enhance and enrich the STEM curriculum and encourage learners, particularly those from under-represented groups, to progress into careers engineering.
- The Royal Academy of Engineering commissioned SQW to deliver an evaluation of the LBEEP in July 2024 - this report is the final output for this evaluation.

**Delivery**

- The LBEEP delivers a range of activities enjoyed by learners, as well as teachers.
- In-school STEM days/weeks, and projects or competitions were reported as the most common activities, LBEEP funded equipment, and participation in external school trips were the activities spoken about most positively by learners and teachers. Learners also spoke positively about STEM or other clubs supported by LBEEP funding.
- Teachers identified a number of enablers/barriers to the successful delivery of the programme and related activities, including staff capacity, support from the Academy, and support from senior leadership within their settings.

**Outcomes**

- Learners, and their teachers, report an improved understanding of and greater interest in and excitement with engineering, as a result of LBEEP activities.
- There are some anecdotal examples of increased attainment and progression into STEM subjects among learners, although progress is also likely influenced by external factors.
- Teachers also report new resources provided as enriching their teaching practice as well as improvements in confidence and leadership skills, as a result of LBEEP activities.
- In some settings, involvement in LBEEP has enabled the offer of new qualifications, or expand the number of learners that can enter into Engineering qualifications.

- As of yet, there is less evidence of the programme's impact on building connections between participating settings, which may be an area of focus for any future programme activity.

**Conclusion**

- At the time the report was commissioned, the LBEEP had delivered activities involving at least 38,620 learners and a total spend of at least £146,982 across 27 schools and colleges in its first four years.
- Learners spoke overwhelmingly positively about the activities they had participated in, enabling them to learn about engineering in an engaging and exciting way; teachers also praised the programme and the wide range of activities it enabled them to deliver. However, the data used for the evaluation has its limitations.
- The evaluation has resulted in a number of reflections and recommendations for the Academy to consider, including highlighting elements of the programme that should be valued and continued and suggesting modifications or extensions of the programme either to enhance evaluative insights or plug identified gaps in provision. These are outlined in full in Section 5.

# 1. Introduction

## The Royal Academy of Engineering

1.1 The Royal Academy of Engineering (the Academy) is a charity that seeks to deliver public benefit, it hosts a National Academy providing progressive leadership, and manages a Fellowship bringing together a community of leaders from across the engineering and technology sectors.

## The Lord Bhattacharyya Engineering Education Programme

1.2 The Lord Bhattacharyya Engineering Education Programme ('LBEEP') was launched in March 2020. It was launched as a tribute to Professor Lord Kumar Bhattacharyya CBE FREng FRS, who founded the Warwick Manufacturing Group (WMG) at the University of Warwick. The LBEEP works with a network of 20 secondary schools and five Further Education (FE) colleges around the West Midlands, primarily in areas of socioeconomic disadvantage – they are clustered into five groups, each containing an FE college, around South Birmingham, Solihull, Coventry, Rugby and Nuneaton.

1.3 In the Academy's evaluation tender document, the LBEEP's objectives were stated to be:

- The facilitation of new resources and activities for teachers to present to their students and enrich their understanding of engineering and STEM.
- To develop secondary, further education and employer networks that inspire and encourage greater numbers of young people and support their progression to study STEM subjects in post-16 education.
- To provide in-house grants that enhance the "E" in STEM, lead on employer engagement and support the embedding of a long-term STEM culture within the network of schools.
- To provide students with an opportunity to improve core employability skills such as team-working, presentation, and communication skills.
- To provide financial support for pupils from low-income households and under-represented groups to progress with STEM and engineering in further and higher education.[1]

1.4 Each year the programme provides:

[1] The financial support element of LBEEP is not the focus of this evaluation.

- £2,500 of yearly in-house grant funding per school/college to purchase resources and provide experiences for learners, to fund activities to mark Tomorrow's Engineers Week and British Science Week, and to establish and/or resource existing STEM clubs.
- One STEM Challenge Day/Workshop for each of the participating schools / colleges.
- Up to 30 scholarships annually, worth £2000, paid over two years, to incentivise post-16 STEM study among students from low-income households/under-represented groups.[2]
- Up to 10 scholarships annually, worth £15,000, paid over three years, awarded to students from low-income households/under-represented groups studying engineering (or related subjects) at university.[3]
- Up to 5 funded industrial placements for teachers and lecturers to develop skills to enhance their classroom practice.[4]
- Access to a peer-to-peer support network for STEM teachers, providing the opportunity to collaborate and share best practice.
- Teacher CPD and Academy educational resources to introduce students to real-world engineering.
- An annual celebration event designed to showcase programme activity and inspire learners about engineering careers.

## This report

1.5 In July 2024, the Academy commissioned the policy and economic research consultancy, SQW, to deliver an evaluation of the Lord Bhattacharyya Engineering Education Programme. This report is the final output for this evaluation. Throughout the report, we refer to schools and colleges that participated in the delivery of the programme as 'settings'. We also call pupils or students the generic term 'learner', and the term 'teacher' is used for tutors, lecturers or any other educators in participating settings.

1.6 The remainder of the report is structured as follows:

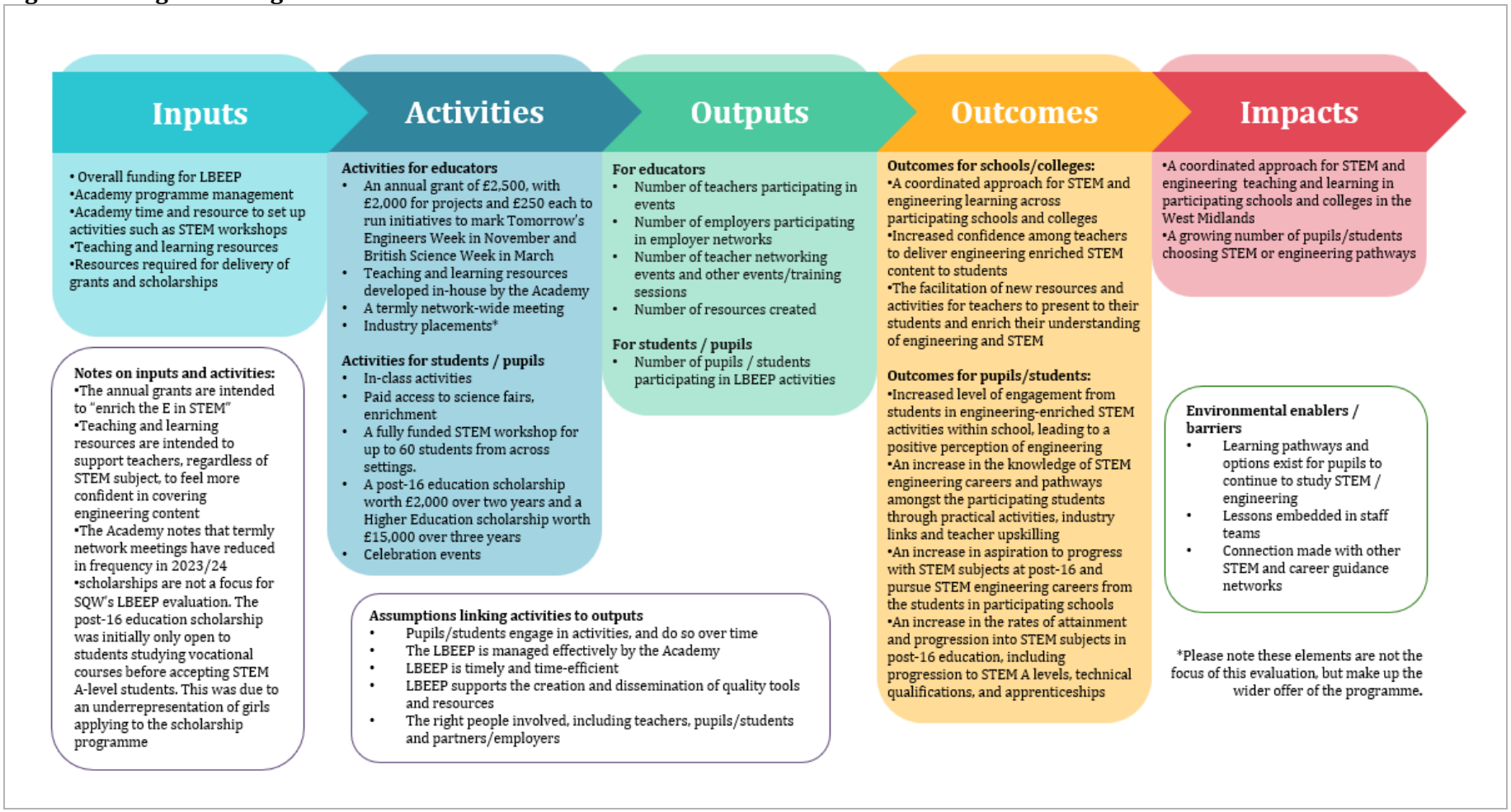
- **Section 2** contains an overview of the context the programme is operating and a regional profile of its settings, as well as outlining the evaluation approach and methodology

[2] Please note these scholarships are not the focus of this evaluation, and a separate evaluation of this element of the LBEEP has been commissioned by the Academy.
[3] Please note these scholarships are not the focus of this evaluation, and a separate evaluation of this element of the LBEEP has been commissioned by the Academy.
[4] Uptake of these industrial secondments has been low –and are not in scope of the evaluation.

- **Section 3** contains an overview of the activities delivered as part of the programme, as well as any enabling factors or barriers to its delivery
- **Section 4** summarises the emerging outcomes and impacts of the programme, for learners, teachers and their organisational settings
- **Section 5** contains a set of reflections, recommendations and next steps for the programme
- **Annex A** contains the full analysis of participating schools' profiles.

1.7 Using the information provided by the Academy during scoping, we designed a logic model for the programme that outlines how the LBEEP's inputs and activities are expected to achieve outcomes and impacts related to programme objectives (Figure 1-1).

**Figure 1-1: High-level logic model for the LBEEP**




*Source: SQW*

# 2. Context, regional profile, and this evaluation

## Context and regional profile

### Industrial context

**2.1** The West Midlands has a long heritage of engineering innovation and manufacturing industry. There are strong connections between some of the major engineering companies in the region and higher education, notably including the WMG. The LBEEP network was developed by bringing together schools and colleges in areas of socio-economic disadvantage who also had connections with WMG through the university's outreach and widening participation teams. Teachers consulted as part of the evaluation noted this history and its enduring importance to the area, citing companies such as Jaguar Land Rover, CrossCountry, and High Speed 2 (HS2) Ltd.

*"Historically, Coventry has been an industry driven area (pre- and post- war) where there was a lot of manufacturing, especially around the city centre, […] I think it has dwindled a bit since, but I think there is massive interest. We have companies like Jaguar and loads of business parks, and they're all STEM- and engineering-heavy."*

**Teacher**

**2.2** Teachers consulted as part of the evaluation described their settings as having some pre-existing links with employers and industry, but a number described these as limited, or that these connections had fallen by the wayside in recent years. Teachers said they hoped to use LBEEP activities (as expanded on in Section 3) to show learners that they lived in an area with *"lots of opportunities"*, and to improve connections with industry and employers.

### Geo-economic context of participating schools and colleges

**2.3** To understand the context of LBEEP settings, the evaluation team analysed local authority (LA) level school and college data published by the Department for Education. The analysis draws data from schools and colleges with pupils aged 12 years or older, focusing on the four LAs in which LBEEP settings are located – Birmingham, Coventry, Solihull, and Warwickshire. This analysis found that;

- Schools and colleges participating in LBEEP typically have a higher proportion of pupils from disadvantaged backgrounds. Moreover, a lower proportion of disadvantaged pupils attending LBEEP settings remain in education or employment compared to disadvantaged pupils in the wider local authority.

- 20 out of the 27[5] LBEEP settings having a 'Good' or 'Outstanding' Ofsted rating.
- LBEEP settings typically have a higher number of students compared to the regional average. 16-18 provision varies in scale, with many, smaller Sixth Form Colleges attached to secondary schools, complemented by a few (1-2 per local authority) large, standalone FE colleges.
- Provision for STEM subjects varies by setting. LBEEP KS4 schools have a generally high level of at least double science, but below average rates of triple science. Some specialist settings (e.g. WMG Academy for Young Engineers) have a high proportion of pupils undertaking Engineering-related qualifications, but the opportunities to undertake these qualifications in other settings are either limited or non-existent (in cases where courses are not offered).

**2.4** The full analysis of school and college data is presented in Annex A.

## Evaluation method

**2.5** The evaluation addresses three core questions posed by the Academy and presented in Table 2-1:

**Table 2-1: Evaluation research questions**

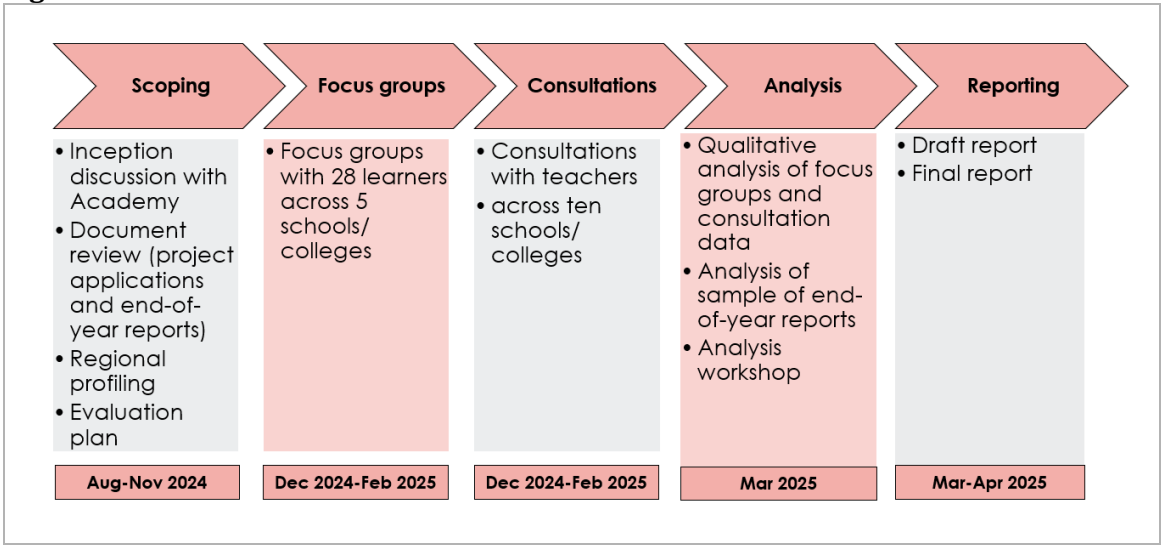
| Research questions and sub-questions |
|---|
| **1. How is the LBEEP implemented and delivered in practice?**<br>a) Have activities been delivered as anticipated? What adaptations have been made since March 2020 when it was launched?<br>b) How many learners have participated in activities provided directly through LBEEP? (e.g., in workshops)<br>c) How many learners have been indirectly involved? (e.g., being taught by teachers involved in LBEEP)<br>d) What other career guidance or STEM enrichment and engagement have taken place at participating schools/colleges? Would LBEEP activities have happened anyway?<br>e) What processes are working well, and have enhanced the delivery of the programme?<br>f) What processes are working less well, and could be improved to enhance the delivery of the programme? |
| **2. What difference has the LBEEP made to pupils and students?**<br>a) What impact has the LBEEP had on participating learners? (Specifically, in terms of their enjoyment of the activities, knowledge and perceptions of engineering, knowledge and perceptions of pathways, and aspirations relating to engineering careers) |

[5] LBEEP works with 25 settings – this 27 figure encompasses two additional settings who dropped out of the programme and were subsequently replaced by new settings.

| Research questions and sub-questions |
|---|
| b) How, if at all, has LBEEP impacted pupils'/students' attainment and progression in STEM subjects in post-16 education? (e.g., progression into relevant A-levels, technical qualifications, apprenticeships, etc.)<br>c) Has LBEEP had any other unforeseen impacts? |
| **3. What difference has the LBEEP made to teachers, in-school coordinators or any other staff?**<br>a) How has the LBEEP impacted participating school/college staff? (e.g., in terms of knowledge, skills, confidence)<br>b) How has LBEEP shaped provision in wider schools/colleges?<br>c) How useful and effective have staff found LBEEP resources? (In supporting their own knowledge or in teaching?) |

**2.6** Figure 2-1 outlines the key phases of the evaluation, which are then described in further detail.

**Figure 2-1: Overview of evaluation**




*Source: SQW*

## Scoping activity

**2.7** As part of the scoping phase, SQW undertook;

1. An **inception discussion** with the Academy's project team

2. A **document review**, incorporating all project applications and end-of-year reports from all schools throughout the LBEEP.[6] The Academy also shared relevant documentation to

[6] SQW developed a template to review applications and end-of-year reports (214 documents in total), including school name, location, demographic information and information about activities and learning outcomes. This ensured documents were systematically analysed. This template was shared and approved by the Academy prior to use.

inform the review; this included 12 documents deemed relevant by the Academy, including evaluation papers delivered by WMG and papers from PhD students in WMG.

3. **Regional profiling**, examining characteristics of schools and colleges participating in LBEEP compared with other schools and colleges in relevant local authorities, to understand the representativeness of LBEEP schools/colleges and to inform the sampling of schools/colleges for pupil focus groups.

4. Delivery of an **evaluation plan**, including a logic model, a set of research questions, research tools, the evaluation approach, a plan for fieldwork and analysis, and a related timeline.

### Primary data collection

**2.8** Two research activities collected primary data to build evaluation evidence:

- focus groups with pupils from five LBEEP schools and colleges each involving between five and seven participants

- 1-to-1 consultations with ten co-ordinators at nine schools and one college [7].

**2.9** Table 2-1 summarises key characteristics of the ten schools and colleges. These were selected from a longer list of 14 possible settings suggested by the Academy and deemed 'warm leads' likely to be willing to participate in the evaluation.[8] The shortlisted schools have all participated in a range of LBEEP activities.

**Table 2-2: Fieldwork settings sample**

| Setting | Cluster | % FSM eligibility | Oftsed assessment | % of disadvantaged pupils achieving standard 9-4 passes in GCSE English and maths |
|---|---|---|---|---|
| **Focus groups with learners and interviews with teachers** | | | | |
| Setting A | Rugby | 32% | Good | 56% |

[7] While it was originally proposed that SQW would also engage with in-school coordinators who had taken part in industry secondments under LBEEP, the uptake was lower than expected and, as such, SQW reallocated this resource to enable delivery of a higher number of pupil focus groups.
[8] Not all settings were included on this list for a number of reasons, including: staff turnover and therefore challenges for key staff members to be able to speak about the LBEEP; settings only recently having started delivering LBEEP activities; previous challenges in engagement with the settings.

| Setting | Cluster | % FSM eligibility | Oftsed assessment | % of disadvantaged pupils achieving standard 9-4 passes in GCSE English and maths |
|---|---|---|---|---|
| Setting B | Birmingham | 48% | Requires improvement | 31% |
| Setting C (FE College) | Coventry | N/A | Requires improvement | N/A |
| Setting D | Coventry | 39% | Good | 40% |
| Setting E | Solihull | 35% | Good | 60% |
| **Interviews with teachers** | | | | |
| Setting F | Coventry | 19% | Good | 53% |
| Setting G | Coventry | 39% | Outstanding | 82% |
| Setting H | Nuneaton | 35% | Good | 29% |
| Setting I | Solihull | 29% | Good | 45% |
| Setting J | Rugby | 29% | Good | 51% |

*Source: SQW*

### Consultations with in-school coordinators

**2.10** SQW conducted 1-to-1 consultations with ten teachers, lecturers or other in-school coordinators across LBEEP settings (following initial introduction from the Academy), covering:

- Duration and type of involvement in the programme
- Setting, local and regional context
- Which activities have led to what sorts of impact, and observations about attribution of outcomes to the programme
- How impact has changed/evolved over time
- The design and delivery of the activities and how delivery could be adjusted to support greater impact
- How participants would prioritise programme elements in future

**2.11** All consultations were recorded and transcribed.

### Pupil focus groups

**2.12** The focus groups were delivered as follows:

- Teachers were asked to recruit learners for focus groups who were involved in LBEEP activities, and to ensure a mixed group of pupils to capture perspectives from different backgrounds.
- All learners received a briefing note, explaining the nature and purpose of the study, what participation for pupils involves, how their data will be stored and used, consent and safeguarding.
- Teachers were also provided with a briefing note for parents/guardians, should these be required for learners aged 15 and under.
- All focus groups were delivered in-person; hard copies of the briefing note were also shared at the outset of each focus group, and consent was sought at the outset for learners to participate.
- Learners were provided a £15 'thank-you' voucher for their time at the conclusion of each focus group.

**2.13** Table 2-3 contains an overview of the five focus groups delivered across Settings A-E, including number of focus group participants, the year group and gender of participants, and a description of profile of engineering within each educational setting.

**Table 2-3: Overview of focus groups**

| Setting | Year group of participants | Number and gender of participants | Engineering focus in setting |
|---|---|---|---|
| Setting A | Year 7<br>Year 10 | 5 female<br>2 male | The setting runs a STEM club. |
| Setting B | Year 10 | 3 female<br>2 male | The setting has a strong focus on engineering. The school runs a robotics club and offers an engineering BTEC qualification. |
| Setting C | Level 2 Engineering<br>Level 3 Engineering | 1 female<br>4 male | The setting has a strong focus on engineering, offering multiple engineering qualifications and running a Robotics Club. |
| Setting D | Year 9 | 1 female | The setting offers supports a variety of extra-curricular STEM activities, including a pupil- |

| | | | |
|---|---|---|---|
| | Year 12 | 4 male | led STEM club and a multi-academy challenge. It will also offer an engineering A-Level from next year. |
| Setting E | Year 8 | 2 female<br>4 male | The school does not offer an engineering qualification and does not deliver any extra-curricular STEM activities, such as a STEM club. |

*Source: SQW*

**2.14** The focus groups with learners covered:

- Involvement in LBEEP activities, as well as external activities related to STEM
- Impact of LBEEP activities, in relation to:
  - Perceptions of engineering
  - Knowledge of engineering career pathways
  - Aspirations to become an engineer
  - Aspiration to pursue engineering-related subjects post-16
- What learners enjoyed most about LBEEP activities.

## Analysis and reporting

**2.15** The evaluation team adopted a structured approach to the analysis of qualitative interview and focus group data, using the specialist software package MaxQDA. Our 'coding framework' was based around the study's research questions and was shared with the Academy for sign-off prior to analysis. Other topics that emerged during the analysis were also added to the coding framework.

**2.16** The evaluation team also analysed the Year 4 (2023/24) end-of-year reports for 17 settings.[9] These reports provide an opportunity for teachers in each setting to describe their activities, any observed effects, and raise delivery challenge issues with the LBEEP partnership team. The evaluation team again used the specialist software package MaxQDA to code outcomes in these reports in order to draw out further examples of impact. The initial aim was to undertake a systematic summative analysis of impact across the programme; however, some inconsistencies in the end of year reports, in terms of outputs reported and data used, meant that it was too challenging to conduct a full summative analysis of their impact.

**2.17** Once the data analysis was completed, SQW's project team held an analysis workshop to share and review the findings from across the study and discuss the emerging narrative and

[9] A number of end-of-year reports were still outstanding at the time of transfer and were not shared with the evaluation team.

structure of the final report. This workshop was also attended by the Academy, to allow them to identify any gaps or priorities in the emerging findings.

## Data limitations and conceptual challenges

**2.18** The study findings – presented in the following sections – should be interpreted with the following limitations in mind:

- **Representativeness of the sample.** Fieldwork was conducted in ten settings, with ten teachers and 28 learners (while there have been at least 38,620 learners involved in the first four years of the programme). As such, the views presented here are not intended to be representative of all settings involved in the LBEEP, nor all learners involved in LBEEP activities. Similarly, teachers were tasked with recruiting learners for the focus groups; it is possible that selection bias may have led to learners who were most likely to speak positively about the delivery of LBEEP activities they were engaged with as part of the evaluation.

- **Student questionnaire.** The evaluation was also originally planning to include a review and analysis of a student questionnaire shared with all students who had participated in LBEEP activities across the settings. However, due to a low response rate to the questionnaire, it was agreed with the Academy that this data would not be included, and that the evaluation should focus squarely on the primary data collection and findings from the scoping phase (including the documentation review). As such, it has not been possible to triangulate the qualitative data from the focus groups with questionnaire data from a wider sample of learners, as originally planned.

- **End-of-year reports.** As noted above, the evaluation team reallocated the resource originally planned for the student questionnaire to deliver an analysis of the Year 4 (2023/24) end-of-year reports from settings. However, the end-of-year reports are self-reported without consistency between settings, and without critical challenge to include evidence or test attribution – therefore the extent to which this analysis could be used to evidence the impact of the programme was limited.

- **Attribution.** LBEEP has involved the delivery of multiple activities, targeting staff and learners respectively, over time and in different settings, alongside adjacent subject teaching and enrichment activities. The evaluation has sought to address this by taking into account the issue of attribution in the design of research tools, which asked consultees about the extent to which any impact can be ascribed to LBEEP versus other, external factors. However, the extent to which consultees can articulate this proved challenging (particularly for learners who may have had limited involvement in activities), and this question of attribution should be considered when interpreting the evaluation findings, as outlined in closing reflections of the reports.

- **Monitoring data**. The evaluation has made use of monitoring data provided by settings to the Academy, in the form of application forms and end-of-year reports. However, this data is presented differently by different settings and across different years of the programme, and in some cases there are disparities and missing data between application and end-of-year reports, which limits the ability of the evaluation to have an overall view of key metrics such as number of learners, and staff, involved in LBEEP activities, planned versus actual spend, etc.

- **Setting and geographic context.** Schools/colleges have different priorities, and some schools/colleges are proximate to opportunities for science enrichment or have local engineering employers. The evaluation has sought to address this issue by recruiting from across all five clusters involved and considering the diversity of settings in the development of the sample (across a range of different factors), as well as the inclusion of questions on local context in research tools. However, the impact of setting and geographic context on the delivery and impact of LBEEP activities should be considered in the interpretation of findings.

# 3. Delivery of programme and activities

## Key findings

- The LBEEP delivers a range of activities enjoyed by learners, as well as teachers.
- In-school STEM days/weeks, and projects or competitions were reported as the most common activities,
- LBEEP funded equipment, and participation in external school trips were the activities spoken about most positively by learners and teachers. Learners also spoke positively about STEM or other clubs supported by LBEEP funding.
- Teachers identified a number of enablers/barriers to the successful delivery of the programme and related activities, including staff capacity, support from the Academy, and support from senior leadership within their settings.

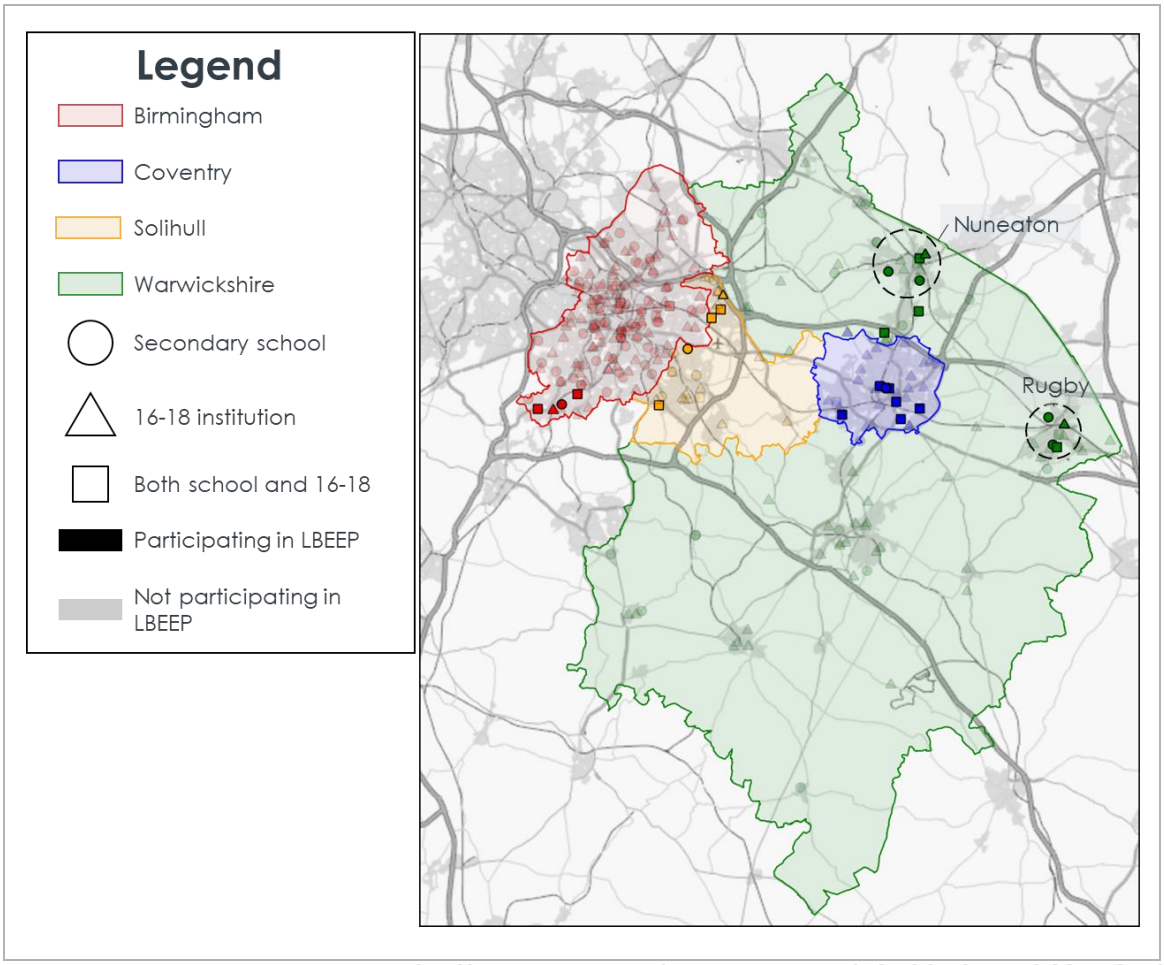
**3.1** This section contains an overview of the activities delivered as part of the LBEEP, alongside enablers and barriers to delivery identified by teachers and learners.

## Overview of activities and outputs

**3.2** As noted in Section 1, the LBEEP works with a network of 20 secondary schools and five Further Education (FE) colleges around the West Midlands, primarily in areas of socioeconomic disadvantage, and clustered into five groups, each containing an FE college - South Birmingham, Solihull, Coventry, Rugby and Nuneaton. Figure 3-1 maps the schools and colleges that have been involved in the LBEEP alongside all secondary school and further education provision in the region.

**3.3** Notably, the map indicates the geographical spread of the programme, with LBEEP settings clustered around Birmingham, Coventry, Solihull and north Warwickshire. Academy colleagues noted that this geographical spread is due to the programme's relationship with WMG at the University of Warwick; the LBEEP programme originated as a partnership between the Academy and WMG, and the spread of settings across these clusters (rather than focusing on schools and colleges solely in Birmingham, for example) is largely to do with pre-existing links and partnerships of settings with the outreach team at WMG.

**Figure 3-1: Map of the secondary school and 16-18 provision in the four LBEEP local authorities**




*Source: Produced by SQW. Contains OS data © Crown copyright [and database right] [2025] and Royal Mail data © Royal Mail copyright and Database right [2025]*

**3.4** The following section outlines the nature and scope of the activities funded by the programme across the LBEEP settings.

## Learners participating in LBEEP activities

**3.5** Annual end-of-year progress reports completed by all LBEEP settings provide monitoring data about learner participation (Table 3-1). It shows that across the first four years of the programme, the planned number of learners involved in LBEEP activities was 50,323 across settings, while the actual number of learners involved in LBEEP activities over this period was 38,620. However, as indicated in footnotes throughout the table, this is due to actual figures being less consistently reported by settings in end-of-year progress reports; across all years of the programme, there are a number of settings where *actual* numbers of learners involved in LBEEP activities is missing from these reports. As such, it is unclear whether or not LBEEP activities are reaching fewer learners than planned, or whether this is an issue with reporting for settings (potentially related to challenge with recording the number of learners involved in activities).

**Table 3-1: Number of learners involved in LBEEP activities**

| | Number of learners involved in LBEEP activities (planned) | Number of learners involved in LBEEP activities (actual) |
|---|---|---|
| **Year 1** (2020/21) | 9,706 | 8,834[10] |
| **Year 2** (2021/22) | 9,394 | 7,713[11] |
| **Year 3** (2022/23) | 11,668 | 8,576[12] |
| **Year 4** (2023/24) | 19,555 | 13,497[13] |
| **Total** | **50,323** | **38,620** |
| **Year 5** (2024/25) (application data only) | 11,745 | N/A |

*Source: SQW analysis of LBEEP application and progress report data*

**3.6** Table 3-2 outlines the activity types across all five years of the LBEEP. It indicates that the delivery of projects or competitions, and in-school STEM days/weeks (including British Science Week or Tomorrow's Engineer Weeks) were by far the most common activities across settings.

**Table 3-2: LBEEP activity types**

| | Project or competition | In-school STEM days/ weeks[14] | Visit | Capital investment | STEM club | Workshop | General curriculum | External talk |
|---|---|---|---|---|---|---|---|---|
| **Year 1** | 16 | 11 | 9 | 4 | 3 | 2 | 2 | 1 |
| **Year 2** | 16 | 7 | 4 | 5 | 3 | 1 | | 3 |
| **Year 3** | 9 | 11 | 3 | 3 | | 2 | | |
| **Year 4** | 9 | 8 | 8 | 2 | 6 | 2 | 4 | 2 |
| **Year 5** (application data only) | 14 | 1 | 1 | 3 | 3 | 7 | 2 | 1 |

[10] Planned figure based on data from 22 settings; actual figure based on data from 21 settings.
[11] Planned figure based on data from 24 settings; actual figure based on data from 20 settings.
[12] Planned figure based on data from 19 settings; actual figure based on data from 15 settings.
[13] Planned figure based on data from 23 settings; actual figure based on data from 16 settings.
[14] Some activities delivered as part of British Science Week or Tomorrow's Engineers Week may also be captured under other activity types e.g. if an external visit or trip was organised as part of Tomorrow's Engineers Week.

| | Project or competition | In-school STEM days/ weeks[14] | Visit | Capital investment | STEM club | Workshop | General curriculum | External talk |
|---|---|---|---|---|---|---|---|---|
| **Total** | 64 | 38 | 25 | 17 | 15 | 14 | 8 | 7 |

*Source: SQW analysis of LBEEP application and progress report data*

## Delivery of activities

**3.7** Focus groups with pupils/student and interviews with teachers highlighted a range of activities that had been delivered through the programme. These included:

- **Equipment to support curriculum delivery**, such as milling machines, laser cutters, digital vernier callipers, robotics, materials for experiments, 3D printers, and Lego STEM kits. This was complemented by the purchase of relevant software licences (e.g. CAD/CAM; HPC laser software) and learning programme subscriptions (e.g. Tassomai) where relevant.
- **Equipment to support delivery of extracurricular activities**, including STEM Club and Robotics Club, which involved activities such as building and coding robots, 3D printing and bridge building projects.
- **Trips and visits** to museums, industry sites, and engineering-based events, such as careers fairs and the Big Bang Fair.
- **In-school STEM days/weeks**, involving a range of activities such as externally-delivered workshops and events, lectures/external talks, whole school experiments, multi-academy challenges, and careers fairs.

**3.8** Teachers mentioned how they often used a collaborative approach when determining which activities they planned to deliver, including discussions with other members of department staff, and learners who would benefit from the activity. Moreover, they spoke of how the nature of activities delivered in their setting as part of LBEEP had evolved over time, either to cumulatively build on what had been funded in previous years, or to address emerging needs and learning gaps. In some instances, teachers had used learning from their own experiences and the shared experiences from other LBEEP settings to inform their intended activities for the following year.

*"We've had a number of meetings where we can actually go to Warwick University and do some STEM activities that we can bring back to school. This also helps us talk to other schools participating. […] The networking opportunities have been so helpful to see what other schools are spending their money on."*

**Teacher**

**3.9** Learners were asked to reflect in the focus groups on the activities they had been involved in, considering what they liked and didn't like about activities. Learners' feedback about programme activities was overwhelmingly positive with most learners struggling to find anything they didn't like about activities. Constructive feedback from learners mostly consisted of them wanting more opportunities to be involved in STEM/engineering activities.

**3.10** Learners' reflections on activities funded as part of LBEEP is summarised as follows:

- **Learners enjoyed the trips that had been funded through the programme**. In particular they spoke positively about the interesting and diverse range of activities they experienced relating to STEM, and that the trips often "brought to life" curriculum topics. There was lots of positive feedback across settings about the Big Bang event (a careers event at the National Exhibition Centre in Birmingham), mainly due to the range of career options learners were exposed to, as well as the exciting and interactive way in which these careers were presented. Learners reported that they would like to have more trip opportunities, including to engineering-based competitions (examples offered included a Robotics competition and a multi-academy challenge set up by an academy trust) .

*"I think maybe adding more competitions and challenges, where everyone could get involved, or doing more trips. Trips are a good way of learning new things, experiencing new things, and also helps with confidence and getting to know other students with similar interests. Seeing scientists at some of the speaker events was really cool – you learn a lot about them and what they did; it's interesting to see all these types of people who have done all these types of things."*

**Learner**

- **Learners emphasised the value of equipment that had been purchased through the programme.** For learners undertaking an engineering qualification, the equipment purchased supported the practical element of engineering coursework. This is because the new equipment was more reliable, and they were able to complete their coursework more efficiently because they no longer had to wait their turn for the equipment:

*"In class we were using mechanical equipment to take measurements, but we recently got digital equipment which is more accurate and gives you precise measurements – this has helped me because makes it easier to read the measurements. Mechanical equipment is harder to use because they're older and less efficient. There used to be only one or two digital measures, but now we have lots."*

**Learner**

- **Equipment, such as robotics kits and Lego, was critical for clubs.** Learners said that they enjoy using equipment that they wouldn't ordinarily get the opportunity to use in lessons. They also enjoyed being able to experiment with the equipment,

finding the process of figuring out how to make something work both rewarding and useful for their wider understanding of subject matter.

*"Making the robot was hard, especially when you put the parts together and realise that it hasn't been done right. It can be frustrating but it has taught me to persevere and have resilience and learn from my mistakes."*

**Learner**

- Learners enjoyed being involved in STEM Club or Robotics Club for a range of reasons including: activities are **different to what they normally do in lesson time**; clubs give them the **time, space and independence to experiment** with equipment/kit and **be creative**; club activities provide **an introduction to future years' curriculum topics**, supporting their learning; and they can **meet and spend time with other like-minded learners**.
- In one setting, where an engineering qualification was not offered, learners said that they would like to use the equipment purchased through the programme more during science lessons.
- Learners thought that **in-house STEM days/weeks enabled them to explore engineering and STEM beyond the requirements of the curriculum**, and in a more engaging and exciting way than they would normally do in lessons. They enjoyed the diverse range of activities on offer at STEM days, many of which were exciting and memorable.

**3.11** In addition to the activities reported by learners which had already taken place, teachers reflected on the sustained impact of purchasing new equipment, which will benefit both future classroom learning and continue to enhance the delivery of extracurricular activities. Moreover, some teachers noted the cumulative effect of equipment purchased through the programme, suggesting that LBEEP may provide even greater value for learners in future.

*"It's a snowball effect – receiving the funding in increments year by year, we start small and build up, and slowly accumulate all the equipment we need."*

**Teacher**

**3.12** Focus group learners were asked to select which activities were "most enjoyable". The most common response related to practical activities undertaken through the programme, either in lesson time or in STEM/Robotics Club. This was for a range of reasons, including: **the development of practical skills**; **increased understanding and confidence in subject matter**; having **the freedom to think creatively and problem solve**; and **being part of a team**. This highlights the importance of the equipment purchased through programme, which generally was critical to the delivery of practical activities in settings.

*"I enjoy making things… and appreciate the skills and way of thinking that it offers."*

**Learner**

*"I think the practical[s]; it helps you to use your brain… when I see the practical, it makes more sense. Now, with things around the house, I do my own practicals."*

**Learner**

*"Starting from scratch and seeing the robot build up, and seeing my hard work and dedication, improving technical skills and problem solving and learning how to code"*

**Learner**

**3.13** Across several settings, learners emphasised the value of trips in supporting their engagement with and enjoyment of STEM.

## Enablers and barriers to delivery

While all LBEEP settings were eligible to receive equal amounts of funding to deliver their activities, the extent to which activities were able to be delivered was influenced by other external factors. In some instances, these factors enhanced the ability to deliver activities, and in others they acted as a hinderance to delivery.

### For teachers

**3.14** The most frequently reported factor influencing delivery was the **capacity of staff involved in programme delivery**, which acted as both an enabler and a barrier to delivery, dependent on the setting. In some cases, teachers felt well-supported by other members of staff within their departments, and they were able to share responsibilities to deliver LBEEP activities. In other cases, individual staff members were solely responsible for all LBEEP activities, in addition to their usual responsibilities. School or college resourcing often linked to the setting's emphasis on STEM with those settings that prioritise STEM allocating more resource to the programme alongside other activities. This was also influenced by individual enthusiasts who were responsible to drive and promote LBEEP activities in their settings.

*"I'm the STEM coordinator and it's all on me to deliver the activities. […] A couple of key staff members who were leading activities using LBEEP equipment in other subjects left the school, which meant they stopped."*

**Teacher**

**3.15** Related to staff capacity, **the extent to which a setting's leadership supported STEM** and **learning outside the classroom** was felt to have influenced delivery of LBEEP activities. In some settings, senior leadership were perceived as supportive and helped to facilitate the running of extracurricular activities.

*"We have two science teachers on our Senior Leadership Team and that really helps, because they kind of understand it and have genuine interest. We can take kids off the timetable and do these programmes with them."*

**Teacher**

**3.16** This wasn't always the case, and in a few instances, teachers felt that their setting presented obstacles to delivering LBEEP activities. To some extent, this is a product of the curriculum, and the perceived need for schools to emphasise exams over learning outside the classroom. This poses particular barriers for learners with upcoming exams, who are least able to participate in and benefit from LBEEP activities delivered during teaching hours.

*"It's really difficult to get pupils out of lessons now. The focus is very much on exams and the curriculum. It's the younger years that tend to get taken out on trips – the older they get the harder it is because of exams."*

**Teacher**

**3.17** **Programme support from the Academy** was felt to help mitigate against staff capacity challenges, as there were a number of instances where teachers had engaged with the Academy to seek advice, guidance or resources that might assist in their delivery of activities. This was particularly valued by teachers most limited by internal capacity constraints. Support from the Academy – in the form of advice, guidance or resources – was felt to have led to successful delivery of activities, and helped the programme to generate additional value, including via the provision of useful resources for teachers to use in their teaching, beyond the provision of grant funding.

*"They tell us how to use equipment which makes it more accessible because sometimes we don't have the time to research how to do something. [Programme Manager] comes in as and when required, and they also send booklets."*

**Teacher**

**3.18** Another barrier to the delivery of LBEEP activity was the **Covid-19 pandemic and the associated public health measures enforced within educational settings**. This prevented cohorts of learners from taking part in external events such as visits and trips. However, the programme's flexibility was felt to have helped overcome these challenges, by enabling settings to reallocate funding to other activities which were possible at this time, such as the purchase of equipment to be used in classroom teaching and extracurricular clubs, or materials for internally run STEM days.

*"[The Academy] have been flexible and willing to accommodate. […] We have been able to purchase equipment instead of a trip. It helps to overcome barriers to capacity within the school."*

**Teacher**

**3.19** Teachers reported other factors which had influenced their ability to deliver LBEEP activity, including:

- **Networks and relationships:** this was largely related to the ability to arrange visits, trips and external speakers. Some teachers noted difficulty in engaging with the engineering industry and acknowledged that many settings within the region will likely be contacting many of the same employers. Therefore, the ability for settings to successfully arrange some of these activities was reliant on the pre-existing connections and relationships.
- **Behaviour and engagement of learners:** teachers reported that having a learner population which was both interested in and keen to get involved in STEM activities was important to successful activity delivery. This was linked to learners' perceptions of engineering and STEM, where some teachers felt that learners viewed engineering as boring, difficult and male-dominated, while others felt that learners valued the practical and creative elements of the discipline.

**3.20** Finally, a review of LBEEP monitoring data shows that there may be challenges related to the spending of funding by settings. Table 2-1 contains detail on the total amount of funding applied for by settings across each year of the programme (not including scholarships), as well as the actual funding spent as reported in the end-of-year progress reports. It shows that across the first four years of the programme, the reported actual amount of funding spent is significantly lower than the planned figures. However, as indicated in the footnotes, this is largely due to missing data on actual spend across a number of settings in each year of the programme (similar to the issue related to the number of learners involved, as highlighted in paragraph 3.5 of this section). As such, it is unclear whether or not settings are struggling to spend the amount of funding applied for each year, or whether there are challenges with reporting this spend in end-of-year reports.

**Table 3-3: Funding applied for by LBEEP settings[15]**

| | £ LBEEP funding (planned) | £ LBEEP funding (actual) |
|---|---|---|
| **Year 1** (2020/21) | £55,535 | £42,677[16] |
| **Year 2** (2021/22) | £55,213 | £41,536[17] |
| **Year 3** (2022/23) | £47,988 | £29,400[18] |
| **Year 4** (2023/24) | £54,646 | £33,369[19] |
| **Total** | **£213,382.00** | **£146,982** |
| **Year 5** (2024/25) (application data only) | £47,119 | N/A |

[15] Please note this does not include any figures related to scholarships, which are being evaluated separately.
[16] Planned figure based on data from 23 settings; actual figure based on data from 22 settings.
[17] Planned figure based on data from 24 settings; actual figure based on data from 19 settings.
[18] Planned figure based on data from 20 settings; actual figure based on data from 13 settings.
[19] Planned figure based on data from 23 settings; actual figure based on data from 16 settings.

*Source: SQW analysis of LBEEP application and progress report data*

### For learners

**3.21** In focus groups, learners identified several external factors which supported their engagement in programme activities and, in some instances, contributed to the outcomes described in Chapter 4. These factors generally related to **a pre-existing interest in STEM**, influenced by: family members in STEM professions or with an interest in STEM; STEM experiences outside of school, such as trips to museums; and work experience linked to STEM. Anecdotally, the availability of local engineering and/or STEM opportunities in the West Midlands, such as learning and apprenticeship opportunities at WMG, may have also contributed to learners engagement in the programme.

*"My Dad's a Software Engineer at the National Grid; he tells me a lot about his job and about computer science."*

**Learner**

*"Earlier this year in January I went to the Science Museum, History Museum and the Transport Museum in London. Going around there was really nice because then we get the different aspects of engineering. At the transport museum, I was looking at all the cars and as soon as I see the cars I just flipped back to school and the sport cars we are building now."*

**Learner**

*"When I'm off college I learn about fixing cars, e.g. changing suspension – I volunteer my time. It's useful because I don't have an ambition to become a mechanical engineer […] but I want to explore fields within the engineering sector to explore my ideal career."*

**Learner**

**3.22** It should be noted that the influence of these factors tended to be exclusive to one or two learners in the focus groups, with a larger proportion of learners having limited experiences of STEM and engineering outside of their educational setting.

**3.23** Learners also highlighted a small number of barriers to their engagement in the programme, including conflicting timing with other extracurricular activities and negative attitudes about STEM which they had already formed (e.g. at primary school where learners reported that there was limited focus on science).

# 4. Outcomes and impacts

## Key findings

- Learners, and their teachers, report an improved understanding of and greater interest in and excitement with engineering, as a result of LBEEP activities.
- There are some anecdotal examples of increased attainment and progression into STEM subjects among learners, although progress is also likely influenced by external factors.
- Teachers also report new resources provided as enriching their teaching practice as well as improvements in confidence and leadership skills, as a result of LBEEP activities.
- In some settings, involvement in LBEEP has enabled the offer of new qualifications, or expand the number of learners that can enter into Engineering qualifications
- As of yet, there is less evidence of the programme's impact on building connections between participating settings, which may be an area of focus for any future programme activity.

**4.1** This section outlines the key outcomes and impacts brought about by the LBEEP, in line with those outcomes included in the programme logic model (see Section 1). It draws on focus groups with learners, interviews with teachers and analysis of Year 4 (2023/24) end-of-year reports submitted by participating settings.

## Outcomes for learners

**4.2** The logic model for LBEEP identifies a number of anticipated outcomes and impacts for learners involved in the programme, including:

- Increased level of engagement from students in engineering-enriched STEM activities within school, leading to a positive perception of engineering.
- An increase in the knowledge of STEM engineering careers and pathways amongst the participating students through practical activities, industry links and teacher upskilling.
- An increase in aspiration to progress with STEM subjects at post-16 and pursue STEM engineering careers from the students in participating schools.
- An increase in the rates of attainment and progression into STEM subjects in post-16 education, including progression to STEM A levels, technical qualifications, and apprenticeships.

**4.3** This section seeks to assess the extent to which the programme has achieved these outcomes, and the routes to which programme activity has contributed towards these outcomes being realised.

### Engagement and enjoyment of engineering enrichment activities

**4.4** One of the main intended outcomes for learners was to provide stimulating and enjoyable activities related to engineering, in an effort to challenge negative perceptions. Many teachers noted that LBEEP activities, particularly those involving events and trips, had **generated excitement about engineering among learners and offered a different learning experience compared to traditional classroom teaching**. This was seen as crucial by teachers for improving accessibility to engineering and showcasing various ways it can be enjoyed.

*"Students come in thinking robotics is really hard, then they spend a week or two at the club and come out thinking this is really fun and want to come back next week – I think it is inspiring."*

**Teacher**

*"I really enjoyed the big bang trip. There was lots of stuff linked to science. We saw drones, how planes worked and Formula 1 cars. It was one of the best trips we've ever had!"*

**Learner**

**4.5** Teacher feedback was reinforced in the focus groups with learners. As summarised in Chapter 3, learners' reflections on activities were overwhelmingly positive, with learners first and foremost reporting that activities funded through the programme were enjoyable, memorable and exciting. The primary reason for this was that activities tended to be interactive and practical in nature, and different to theory-based learning that learners would normally experience in a classroom.

**4.6** End-of-year reports further emphasise the benefits of practical activities on learner engagement. Teachers reported that students enjoyed working on projects where they were able to solve problems independently or within their groups, rather than being given directions. Teachers reported that hands-on, problem-solving activities made learners "feel like real engineers" which in turn increased engagement. For instance, when students in Lego club were able to code their own moving structures, they were able to *"think like systems control engineers".* Teachers noted that in particular, these activities led to an increase in engagement from learners who normally would be more passive in lessons.

### Knowledge and perceptions of engineering

**4.7** Focus group feedback highlighted the positive impact the programme had on learners' knowledge and perception of engineering.

**4.8** Anecdotally, feedback that LBEEP activities were highly enjoyable for learners suggests that the programme has contributed to learners' attraction to and interest in engineering.

**4.9** In particular, there is evidence that engineering-related clubs have supported positive knowledge and perceptions of engineering amongst learners. Some learners reported developing a greater interest and confidence in STEM subjects as a result of being involved in STEM clubs, having previously thought that STEM was not 'for them'. This links back to feedback from learners that clubs give them the time, space and independence to engage in practical activities and apply creative thinking, supporting their understanding, interest and overall engagement with STEM.

*"In year 7, I didn't really like science because I didn't know what I was doing most of the time. But after getting involved in STEM club I started to like science a lot."*

**Learner**

*"I'm more of a musical theatre person – into the arts and dance, so I'm not the biggest STEM person. But after going to STEM club I've actually really enjoyed building the robots and the bridges. I now feel more positive about science and confident doing STEM."*

**Learner**

**4.10** This was particularly relevant for female learners who, across several settings, reported examples of how their involvement in clubs had changed their perception of STEM and engineering. One female learner, for example, described how they had gained a sense of belonging in engineering in the school through their participation in Robotics Club and that this motivated their interest in engineering:

*"I was the only girl in robotics – it has improved confidence around people. I was a bit put off that it was all boys, but everyone was friendly and I was part of the team. I've encouraged my friends to take part – one of my friends is now involved. I'm keen to get other girls involved."*

**Learner**

**4.11** This sentiment was echoed in the end-of-year reports, with three settings noting that they felt LBEEP activities had helped to address gender stereotypes in engineering within their settings. For example, one teacher noted that in electricity practicals (where equipment had been provided through LBEEP funding), girls in particular really enjoyed getting involved and made comments such as, *"oh, I can do this"*, contrary to the perception that electrical engineering was for boys only. Along with external talks and visits where female engineering role models were present, these activities effectively encouraged learners to rethink stereotypes.

**4.12** Linked to this, learners reported that their perception of what engineering is had broadened. Several learners said that they had previously considered engineering to be limited to "fixing cars" before becoming engaged in programme activities, such as clubs and STEM careers-

based trips. Having had the opportunity to see the breadth of engineering, and engage in hands-on activities like robot building, learners reported an improved understanding of the creative side of engineering, making the subject more aligned with their interests in some cases. Recognising the creativity involved in engineering was particularly relevant for female learners in the focus groups, with most examples of this cited by female learners.

*"I used to think engineering was just fixing cars, but I realised later on that everything can relate to engineering. I really like making things, and I think engineering comes into that. I'm interested in graphic design because I can create things."*

**Learner**

**4.13** The end-of-year reports highlighted how hands-on projects and real-world problem-solving scenarios, including in-house competitions and design challenges, were more interactive/exciting and fostered a deeper interest in the subjects. A number of teachers highlighted a notable shift in students' awareness and perceptions of engineering in their reports – for example, learners were described as now viewing engineering not just as a theoretical field, but as a dynamic and impactful career choice. Other settings similarly noted that students now realised how much engineering affects everything around them, and had been able to develop a deeper awareness of engineering – including its social value, including impacts on local community – beyond abstract concepts.

**4.14** This sentiment was echoed by teachers. They noted how activities delivered through LBEEP, particularly STEM days and extracurricular clubs, have engaged learners in activities which they may have not previously had an interest in. One teacher highlighted the importance of LBEEP in helping to boost science capital – the cumulative science-related knowledge, attitudes, experiences – among learners.[20]

*"Before, they perceived engineering as a word for clever people, academics, and geeks. Actually, now students understand that engineering is something that is so broad – it's open to everybody."*

**Teacher**

### Knowledge and perceptions of career pathways

**4.15** Learners reported having a **greater understanding of the variety of career opportunities on offer in STEM and engineering**, which they attributed to careers-focused activities like the Big Bang trip and in-school careers fairs. These opportunities were reported to be particularly valuable in providing an insight into what careers look like in action through live and interactive demonstrations. Learners also reported learning about career opportunities that they were not previously aware of.

**4.16** The end-of-year reports also suggested that trips, workshops and partnerships with companies in the industry were particularly helpful for improving knowledge of career

[20] See the Aspires research programme led by Professor Louise Archer at University College London.

pathways among learners. By visiting the companies or attending their workshops, teachers reported that their learners were able to gain insight into the range of engineering pathways within a company, how different departments are integrated, how industry supply chains work, as well as practical information like how or where to apply for apprenticeships.

*"[After the Big Bang trip] I learned that there are lots of jobs in STEM that I didn't know about before."*

**Learner**

*"I enjoyed speaking to the scientists at the Birmingham symphony. I liked hearing about what they were doing."*

**Learner**

*"Students gained an insight into the range of engineering careers pathways within an SME engineering company and how the different departments within the company are integrated and work together on their bespoke projects."*

**End-of-year report, following visit to a manufacturing company**

*"Students had the opportunity to learn about […] a range of engineering career pathways within the automotive sector and their supply chains. […] Students got to meet inspiring engineers and leaders in industry along with apprentices from the early careers team."*

**End-of-year report, following visit to a 'Future of mobility' conference**

### Aspirations relating to engineering careers

**4.17** A number of learners, particularly those in KS4 and above who had started thinking about their future, expressed **aspirations to pursue engineering post-16/after college**. The routes to pursuing these aspirations varied, spanning A-Level engineering, engineering-based degrees and engineering-based apprenticeships. Furthermore, learners reported having an interest in a range of engineering careers, such as mechanical engineering, electrical engineering, architecture, and graphic design. Some learners also reported having aspirations in fields not directly linked to engineering, but where technical engineering skills are likely to be useful, such as the Royal Air Force.

**4.18** Whilst it is difficult to exclusively attribute learners' career aspirations to the programme, given the influence of external factors, and that a small sample participated in the evaluation research, there are several examples of ways in which the programme has directly or indirectly supported or influenced pupils' career aspirations in engineering:

- Some learners directly linked their engagement in programme activities to their career aspirations. For example, one female participant said that their involvement in Robotics Club encouraged her to pursue electrical engineering after college: *"I am now looking into Warwick University (WMG) who have an apprenticeship programme – if I*

*can get an apprenticeship there that would be good because it is the best programme in country for engineering. It is a mix of mechanical and electrical."*

**4.19** Furthermore, several learners, most of whom were also female, said that the programme had opened their eyes to more creative engineering careers such as architecture and graphic design.

- Evidence from teacher interviews indicate that the purchase of equipment through the programme has enabled some settings to offer engineering qualifications, such as GCSE engineering, A-Level engineering and BTEC engineering. For instance, one school plans to introduce A-Level Engineering starting in the 2025/26 academic year. The teacher emphasized that LBEEP equipment was vital in showcasing the department's capabilities and capacity to deliver the qualification, thereby strengthening the case for school leadership to approve the offering. Consequently, LBEEP has opened up opportunities for students to pursue further qualifications aligned with their interests, potentially influencing their career aspirations.
- Career-focused trips and activities increased awareness of the variety of engineering careers and presented them as aspirational through engaging demonstrations.
- Learners considered programme activities to be highly enjoyable, contributing to their positive perception of engineering and STEM and making them more likely to aspire towards a STEM-based career.

**4.20** It should be noted that focus groups involved learners from a range of year groups (see Table 2-3 for an overview of the sample). Therefore, for a number of learners, particularly those in younger year groups, it was too early for them to say what they wanted to do after leaving school. For these learners, their engagement in programme activities was more impactful in terms of their overall enjoyment and perception of engineering, and their knowledge and perception of engineering career pathways.

**4.21** Teachers reflected that, as perceptions of engineering were shifting, so too was the diversity of students pursuing relevant qualifications. Although many recognised that these courses were still disproportionately male students, they had noticed the balance shifting towards greater female representation, which they attributed to LBEEP activities. LBEEP was also felt to be having an effect in encouraging learners who may not have pre-existing interest in engineering to consider pathways into the field.

*"Previously, a girl walked into our engineering course, saw that it was all boys, and went back to change her options. The number of girls taking engineering – or even our construction course and Design & Technology-based subjects - has grown a lot."*

**Teacher**

*"There are more pupils prepared to consider a pathway into engineering. Kids that are considering those pathways that 10 years ago wouldn't have been and that's because of the (LBEEP) opportunity."*

**Teacher**

**4.22** This was also reflected in end-of-year reports; one setting noted that the introduction of new equipment to be used in-class had resulted in more students choosing engineering as an option, including more girls:

*"We now have almost 20% of the [Engineering] cohorts consisting of girls, compared to less than 5% a few years ago."*

**End-of-year report**

**4.23** One teacher highlighted how extracurricular activities, enabled by LBEEP, had motivated some students to pursue further qualifications they might not have considered otherwise.

*"Our Level 1 and 2 courses are mechanical based, the Level 3 course is electrical. A lot of our learners who come to Level 1 and 2 often finish at Level 2 and then go on to apprenticeship, workplace, a different subject or a different provider because they're not always interested in electrical engineering. But the ones that have come to the (Robotics) club are all deciding to progress onto Level 3 electrical engineering because they have tried it and want to do more."*

**Teacher**

**4.24** In addition to sparking interest in engineering careers, a few teachers observed that LBEEP was **elevating the aspirations of learners regarding their potential achievements**. One teacher noted that pupils from disadvantaged backgrounds, who might not typically consider applying for scholarships and awards, had gained the confidence to do so through their participation in LBEEP. Another educator highlighted how LBEEP was instrumental in enhancing pupils'/students' confidence and self-esteem, thereby strengthening their belief in their career goals.

**4.25** Although they had limited data on the destinations of learners, teachers believed that involvement in LBEEP was generating greater interest in engineering careers. Some observed an increase in pupils enquiring about engineering and STEM apprenticeships, while others noted that even if learners weren't pursuing engineering-specific qualifications, LBEEP activities were raising awareness about future opportunities in these fields.

*"It has shown the students how diverse engineering is as a career and gives them something to work on. Even if they don't take DT as an option, they may consider an engineering career later."*

**Teacher**

### Attainment and progression in STEM subjects

**4.26** A small number of teachers reported that LBEEP activities **had contributed towards improved attainment among learners who had been involved with the programme**. This had been achieved through a number of different mechanisms, including:

- use of new equipment, which had contributed towards the production of higher quality work included as part of portfolio submissions, resulting in higher grades.
- use of new equipment, which had created a more stimulating and engaging teaching, resulting in improved learner behaviour, and therefore a better learning environment.
- running extra-curricular activities, which had reinforced learning and supported the development of transferable skills such as problem-solving and teamwork.

**4.27** Similarly, learner focus groups highlighted several ways in which the programme has contributed to attainment and progression in STEM subjects.

**4.28** Learners reported that being involved in fun and interesting activities relating to the STEM curriculum outside of the classroom made science lessons more engaging and brought curriculum topics to life. For example, as part of a curriculum project about space, one setting organised a planetarium visit. Learners spoke about the visit with excitement, saying they liked its interactivity which boosted their understanding and subsequent engagement during formal lesson time.

*"It was an immersive experience where you could feel like you were in space. We were learning about space in lessons at the time so it definitely made it more engaging."*

**Learner**

**4.29** Learners reported being able to **more efficiently undertake the practical requirements of their course**, enabled by having more, new and modern equipment. Learners also reported improving their technical skills through STEM/Robotics Club, which was particularly beneficial for those undertaking an engineering qualification with practical requirements. In another example, learners undertaking a T-Level Engineering described how they are required to take accurate and precise measurements as part of their practical coursework. The purchase of digital measuring tools through the programme meant that they could take more reliable measurements more quickly:

*"In class we were using mechanical equipment to take measurements, but we recently got digital equipment which is more accurate and gives you precise measurements – this has helped me because makes it easier to read the measurements. Mechanical equipment are harder to use because they're older and less efficient. There used to be only one or two digital measures, but now we have lots."*

**Learner**

**4.30** In the end-of-year reports, several settings noted that new equipment, STEM days, STEM clubs and other activities supported by LBEEP funding have increased the uptake of engineering/STEM subjects compared to previous cohorts.

- For example, one setting described a mechatronics project – which highlighted the similarities between manufacturing/mechanical engineering and electrical/electronic engineering career pathways – which resulted in a higher number of learners taking manufacturing/mechanical engineering to choose to progress to electrical/electronic engineering as their preferred progression option upon completion of their current course.

- Another setting noted that increased explore to STEM activities has demystified these subjects and made them more accessible/appealing to learners. This led to an increasingly higher uptake of Triple Science at GCSE compared to previous years (51 students in 2024, 44 in 2023, 30 in 2022).

- Similarly, several other settings noted observing a steady increase in pupils deciding to take STEM subjects at KS5 in the past two years, and a large increase in the number of pupils wanting to progress into post 16 study. In many settings this was reported as leading to additional GCSE / A-Level groups being put on for the next year.

**4.31** In the end-of-year reports, a number of settings specifically commented on how they now have more girls than ever taking A-Level STEM subjects, and consistent improvement in gender balance within the cohort in the past few years. This is promising with regards to overcoming stereotypes, and also speaks to the more general growth/familiarity of STEM within the school over time.

## Case Study – progression

*In their Year 4 end-of-year report, one setting reported that their engagement with employers and industry had seen a sustained increase over the past year, supported by LBEEP activities – they had moved from working with 15 employers to actively engaging with over 40 employers. Students had visited industry locations in settings such as Birmingham Airport and Enzen, and worked closely with industry partners and engineers there. The setting reported that they believe this has supported their student cohort destinations in pursuing higher and further education this year. At the time of reporting, the setting predicted:*

- *73% of KS5 learners would move onto higher education, with 22% of that number specifically targeting Russell Group universities*
- *6% of KS5 learners had successfully secured degree apprenticeships with notable companies such as JLR, BAE, Santander and JNP.*
- *At KS4, 11% of Year 11 learners had secured Level 3 apprenticeships at companies such as JLR, Aston Martin, BMW, Siemens and Rolls Royce.*

## Case Study – progression

*One setting had delivered a total of 81 STEM- focused company engagement events over the past year, supported by LBEEP funding, across sectors such as automotive and industrial engineering, bio-medical engineering, aerospace engineering and electronic engineering. In their Year 4 end-of-year report, the setting reported that their student cohort were showing a "strong inclination" towards Apprenticeship applications this year. At the time of reporting, the setting predicted that 44% of KS5 students would move onto Level 3+/4+ Apprenticeships, marking an increase from just 22% from the previous year.*

### Other impacts

**4.32** Across the focus group settings, learners reported **developing personal and communication skills** through engaging in programme activities. Examples include: increased confidence speaking up in lessons; communication skills; resilience and problem solving skills developed through engaging in practical activities; and team work. In one setting, the STEM-club was pupil-led, which led to pupils developing skills in leadership. This view was shared by a number of teachers, who had noticed greater levels of peer learning between students in the classroom and at extra-curricular clubs.

*"I have improved communication skills, particularly through working as a team and all having the same goal."*

**Learner**

## Outcomes for teachers

**4.33** Teachers also experienced positive impacts from the programme delivery. The programme logic model outlined three key outcomes for schools and colleges:

- The facilitation of new resources and activities for teachers to present to their students and enrich their understanding of engineering and STEM.
- Increased confidence among teachers to deliver engineering enriched STEM content to students.
- A coordinated approach for STEM and engineering learning across participating schools and colleges.

**4.34** This section aims to demonstrate the extent to which the programme has achieved outcomes for teachers, both as anticipated in the logic model and beyond.

### New resources to enrich teaching practice

**4.35** One of the most commonly reported benefits to teachers was an **increase in their skills to teach engineering**. This largely came about through the purchase of new equipment, and the associated learning required to effectively use and teach with this equipment. By purchasing cutting-edge equipment, this meant teachers had been learning skills relevant to modern engineering. For those teachers who had worked with other staff to deliver LBEEP activities, the programme led to more cohesive teaching, whereby different disciplines within engineering (e.g. mechanical and electrical) came together to deliver activities that are both integrated and relevant.

*"When we were delivering the robot cars last year, mechanical staff were helping when usually they don't teach electronics. It has got us working closer together and thinking about projects for the students."*

**Teacher**

**4.36** The programme's focus on careers has benefitted teachers too, **helping them to consider how they can help to connect their teaching to industry**, and connect content taught in the classroom with potential future careers opportunities. For some, this meant designing STEM days and events directly relevant to align with particular engineering disciplines (e.g. civil engineering, electrical, mechanical), and aligning these activities with careers events, so as to help learners to gain awareness as to the types of careers they may be most interested in.

*"Last year, we had a careers fair that lined up with Tomorrow's Engineers Week. We had a marble run challenge. […] We lined that up with the careers fair, so we informed them about all the different sectors of engineering and who in industry might get involved in something like that at a professional scale."*

**Teacher**

**4.37** As noted in Section 1, the industrial secondments were an unfulfilled element of the LBEEP, due to low uptake among teachers (likely due to resource and capacity issues); however, this finding implies that wider programme activities being delivered in-school may indirectly have improved their knowledge of and insight into industry. In the end-of-year reports, teachers noted that this improved knowledge and insight into industry placed them in a better position to advise students on potential career pathways, such as providing more informed guidance on the diverse careers available and the various opportunities within engineering (including apprenticeships and university courses).

### Knowledge, skills and confidence

**4.38** Beyond improvements to teach about engineering and engineering careers, teachers reported that involvement in the programme had **boosted their overall confidence and motivation for teaching.** Some teachers mentioned the pressures which teachers face in delivering the curriculum, and highlighted the role of LBEEP in enabling confidence to experiment with innovative activities and new ways of teaching. They reported how this translated into staff motivation, by allowing teachers to think differently and feel empowered in the delivery of learner enrichment activities.

*"The staff that have gotten involved in our STEM days and clubs have really enjoyed it, and it has given them a bit of a boost. […] The additional funding/new equipment/clubs has really helped give some staff a bit of a new lease of life."*

**Teacher**

**4.39** This increased confidence was echoed in the end-of-year reports, where teachers also noted that the planning required by the LBEEP funding and delivering the same activities (e.g. Tomorrow's Engineer Week, STEM days, running projects/challenges) over the years have allowed them to gain confidence in facilitating them and using these opportunities to encourage students to see the wider relevance of engineering.

**4.40** Some teachers felt that their involvement had **contributed towards their wider personal development**, particularly in relation to **project management and leadership**. They mentioned how the programme has taught them skills in managing budgets, organising and delivering events, as well as self-reflection and learning based on previous years delivery. For those which have delivered activities as part of a team, this has presented an opportunity for other staff to develop too.

*"It has been run by three members of staff here at school (including myself). It enabled the other two members really develop as leaders. Having a project like this helps build staff's confidence in leadership."*

**Teacher**

## Partnerships and networking

**4.41** There are some examples of teachers which have shared learning across LBEEP settings, to gather ideas as to how they could use future funding and gain advice for delivery of certain activities. A small number of teachers mentioned workshops facilitated by the Academy, which were found to be valuable in building these connections. However, other teachers felt that more could be done to bring settings together and build partnerships between those responsible for delivering LBEEP activities.

**4.42** Overall, there was limited evidence as to how LBEEP had contributed towards a more coordinated approach for STEM and engineering learning across participating schools and colleges, identified as an Impact of the programme in the logic model. This may be related to the capacity constraints highlighted by teachers as a key barrier, as they were primarily focused on the delivery of activities within their own setting rather than collaborating with other participating settings. Some teachers felt they didn't have the initial connections to engage with others, which may be reflective of staff turnover challenges which some settings have faced.

**4.43** This presents an opportunity for the Academy to help facilitate a more coordinated approach, while being mindful to limit time commitments for teachers' participation. One suggestion involved the Academy conducting more dissemination activity, such as bulletins which highlight recent activity within LBEEP settings and signposting to relevant resources.

## Outcomes for schools and colleges

### Marketing/ raising the profile

**4.44** A number of teachers reported that LBEEP activities had helped to raise the profile of STEM within their setting. Specifically, teachers mentioned how the programme had helped to stimulate interest among learners and had helped to address some of the negative perceptions they may have of engineering.

**4.45** Not only this, but a few teachers felt that the programme had helped to **improve the overall profile of the setting**. Through acquiring high-specification equipment and demonstrating a commitment to engineering, teachers mentioned how the programme had enhanced their ability to showcase their capabilities at Open and Options Evenings, as well as helping learners to be more competitive at inter-setting competitions. This was felt to be particularly impactful given the financial constraints experienced by the education sector.

*"Schools, all across the country, are tightening the belts. It's getting more difficult to buy resources, to spend money on materials and tools and equipment because obviously it's seen as a privilege or a not really an essential. […] Continual involvement with RAE, with people coming into the school to talk to the year groups, I think that's helped promote and raise the profile of the department itself, but also raise the profile of STEM."*

**Teacher**

### Wider impact on curriculum

**4.46** In some settings, involvement in LBEEP has enabled them **to offer new qualifications, or expand the number of learners that can enter into Engineering qualifications**. This has been achieved primarily through the acquisition of new equipment, which enhances teaching capabilities, and by generating interest among learners and senior leadership, thereby strengthening the case for introducing new qualifications. While an Engineering qualification may not be essential for pursuing an engineering career, it provides learners with a strong foundation in engineering principles, enhancing their prospects for higher education, apprenticeships, or direct entry into the industry.

*"We've elevated engineering to a much higher level in our school, and having the funding from LBEEP is like a badge of honour – we can say, when people come to visit, this equipment was funded by the Royal Academy of Engineering, and we wouldn't have had funding otherwise. It's because of LBEEP that we are now able to offer A-Level engineering in the coming year."*

**Teacher**

### Other impacts

**4.47** An additional unexpected impact resulting from teacher involvement in LBEEP has been **increased awareness of other similar programmes and support**. A few teachers reported that, because the support received through LBEEP has been valuable, they are now seeking other opportunities which support STEM, including university outreach programmes and industry school partnership programmes.

## Summary of outcomes and impacts

**4.48** There are clear indications that many of the learner outcomes outlined in the programme logic model have been achieved. Both learners and teachers provide evidence demonstrating how the programme has led to increased participation, improved understanding, and greater interest in engineering. Evidence regarding attainment and career progression is more anecdotal, and progress in these areas is subject to influence by external factors. Moreover, these outcomes are likely to become more apparent in the long- term as the benefits of sustained activities, such as the use of equipment in teaching and extracurricular activities, are fully realised.

**4.49** There is also evidence of outcomes relating to teacher development as a result of programme, despite lack of secondment uptake. The programme's focus on careers has also benefitted teachers too, helping them to consider how they can help to connect their teaching to industry, and also has boosted their overall confidence and motivation for teaching. Some teachers felt that their involvement had contributed towards their wider personal development, particularly in relation to project management and leadership.

**4.50** A number of teachers felt that the programme had helped to improve the overall profile of the setting. In some settings, involvement in LBEEP has enabled them to offer new qualifications, or expand the number of learners they can enter into Engineering qualifications. There is less evidence as to the programme's impact on building connections between participating settings, which may be an area of focus for any future programme activity.

# 5. Next steps and recommendations

**5.1** The LBEEP programme has delivered activities involving at least 38,620 learners and a total spend of at least £146,982 across 27 schools and colleges in its first four years. The most common activities across settings have been the delivery of projects or competitions, and in-school STEM days/weeks (including British Science Week or Tomorrow's Engineer Weeks).

**5.2** The programme evaluation has used a combination of monitoring data (including applications and end-of-year reports) and insights from ten teachers, 28 pupils during ten interviews and five focus groups to inform its findings. The evaluation established a logic model and associated theory of change to summarise what the programme was intended to achieve. It found, using a contribution theory approach, sufficient evidence that the programme has been delivering an improved understanding of and interest in engineering among students, and also their teachers. It also found anecdotal examples of increased attainment and progression into STEM subjects among learners, although progress is also likely influenced by external factors.

**5.3** Learners spoke overwhelmingly positively about the activities they had participated in, enabling them to learn about engineering in an engaging and exciting way. Equally, teachers praised the programme and the wide range of activities it enabled them to deliver. They also spoke highly of the overall delivery of the programme itself, including ongoing support from the Academy. In particular, they noted the programme's resilience and flexibility during and post the Covid-19 pandemic.

**5.4** However, the data used for the evaluation does have its limitations – both in relation to representativeness of the sample and the question of attribution. It was also limited in scope with some aspects of the programme being considered through alternative investigations (namely scholarships) or excluded from the evaluation due to lower-than-expected uptake (industry secondments for teachers).

**5.5** The evaluation team have revisited the logic model designed during scoping phase to summarise learning across the logic chain, where changes have been observed and any evidence gaps pertaining to specific elements of the model. This review has resulted in two key changes to the logic model, as displayed in Figure 5-1:

- Updating the activities to more accurately reflect the activities delivered across settings as part of the LBEEP
- Separating the activity types and outcomes for learners into two packages.

**5.6** The evaluation has sought to consider whether specific aspects of the programme or activity types are more likely to contribute to specific objectives or outcomes. Evaluation findings

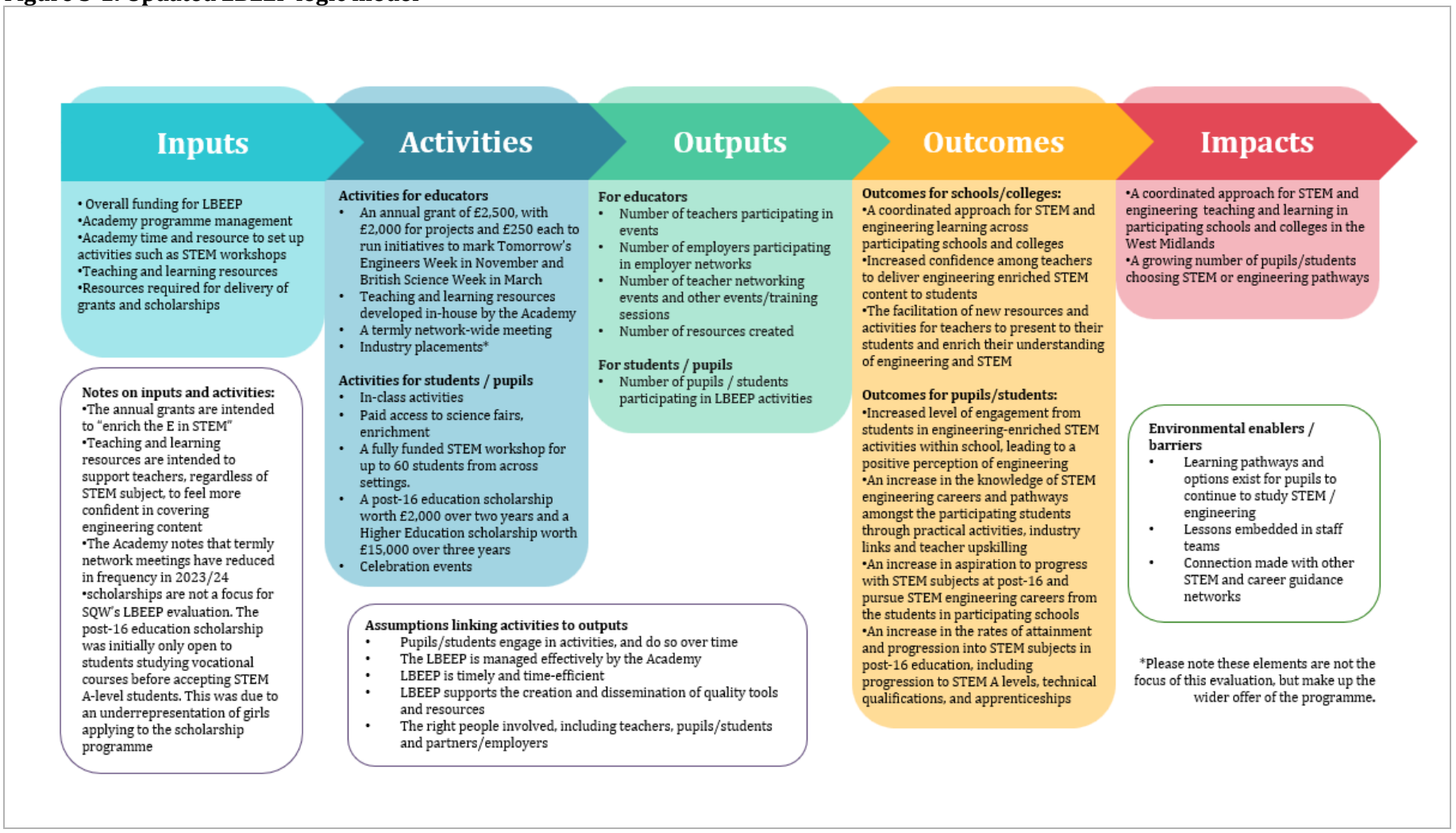
suggest that there are two distinct "work packages" of activities that are associated with groups of outcomes, as follows:

- Whole class or year group enrichment-focused activities that engage a wider, and potentially more diverse, range of learners, raise their awareness of engineering careers and pathways, and potentially pique their interest in STEM and engineering. For example, learners highlighted activities like external trips to the Big Bang event as increasing their interest in or leading to a more positive perception of engineering for them. This strand of activities and outcomes is indicated by the green dashed line in the logic model.

- Optional, additional enrichment activities that inspire learners to pursue engineering subjects or career pathways or reinforce their learning. For example, learners highlighted activities such as the provision of new equipment or extracurricular clubs as increasing aspirations to progress with STEM subjects or in some cases having a positive impact on attainment and progression. This enrichment strand of activities and outcomes is indicated by the blue dashed line in the logic model.

**5.7** It is possible that these are mutually reinforcing for some pupils but, the Academy may want to consider the intended objectives and impact of the programme and promote the relevant activity/outcome group among settings accordingly – i.e. whether it should focus on widening awareness and interest in STEM and engineering, or whether it should invest in targeted interventions to enable interested students to progress with STEM subjects and career pathways.

**Figure 5-1: Updated LBEEP logic model**




*Source: SQW*

# Reflections and recommendations

**5.8** The evaluation has resulted in a number of reflections and recommendations for the Academy to consider. The recommendations that follow have two objectives – to capture learning from the evaluation about best practice and elements of the programme that should be valued and continued; and secondly, to suggest modifications or extensions of the programme either to enhance evaluative insights or plug identified gaps in provision.

### Recommendation 1: Revisit the objectives of the programme.

- The Academy should in the first instance **revisit the LBEEP's rationale and its associated objectives** and ensure these are aligned with the logic model. The Academy should consider whether a wider more generalist approach is more aligned with the aims of the programme, or a targeted approach to further reinforce interest and learning in STEM and engineering.

### Recommendation 2: Support learning between delivery partners.

- There are further opportunities to **share learning and develop networks** as part of LBEEP. There are three tiers:
  - **Within LBEEP schools/colleges.** Teachers within LBEEP settings should ensure they are connecting with their own careers infrastructure to further boost any impact of LBEEP activities in improving awareness of engineering career pathways, and ensuring learning from LBEEP activities doesn't stay localised within specific departments, but instead is shared across their setting.
  - **Between LBEEP schools/colleges.** Teachers expressed an appetite for further opportunities to learn and share good practice with other LBEEP settings. While a small number of teachers mentioned workshops facilitated by the Academy, feedback would suggest that more could be done to bring settings together and build partnerships between those responsible for delivering LBEEP activities. The Academy should consider its role in further facilitating these connections and networks, whether via Communities of Practice, networking event, 'buddying' or pairing of specific settings, or other mechanisms. This would also lead to progress towards the intended impact of a more coordinated approach for STEM and engineering learning in participating schools and colleges in the West Midlands – as the evaluation observed little evidence of this impact being achieved.
  - **Between LBEEP schools/colleges and external organisations, employers and academic institutions**. In particular, it may be worth considering whether more can be done to foster connection between WMG and LBEEP settings, given the historic association. The evaluation found that consultees did not reference projects or connections with WMG; consequently there may be more opportunities to capitalise

on this existing connection via activities such as summer schools, student mentors, open days, etc.

### Recommendation 3: Invest in teachers

- Teachers suggest that limited capacity is a major barrier to the effective delivery of LBEEP activities, and that **protected time and resource to plan and deliver LBEEP activities** could greatly enhance their efficacy. It is worth considering whether the programme has any remit to address this i.e. via the use of funding to 'buy' or protect teacher's time to focus on LBEEP.

### Recommendation 4: Connect with other Academy diversity programmes

- Teachers fed back that greater diversity when engaging with external speakers/organisations as part of LBEEP activities would be appreciated, to ensure that young people are seeing a diverse range of people represented in engineering careers rather than specific demographics, which may in turn increase their own aspirations to pursue engineering careers. The Academy should consider any potential ways to tie in LBEEP activities with the Academy's existing programme of work related to diversity and inclusion, such as the Diversity Impact Programme.

### Recommendation 5: Promote engineering as a creative and practical career

- The link between creativity and STEM was and could be further explored as part of the programme; an emphasis on the creative and practical solving parts of engineering as part of teachers' toolkits may encourage a wider range of younger people to participate in engineering who may otherwise not have considered it (and potentially leading to a more diverse range of young people).

### Recommendation 6: Improve monitoring data

- Finally, the requirements for monitoring data collected as part of the programme should be revisited to ensure that data is collected in a more consistent way across settings, without necessarily increasing the burden on participating schools. This would also enable a clearer understanding of whether the issue with the disparity between planned and actual spend is to do with reporting, or whether it actually relates to settings having challenges related to spending the allocated funding. If it's the latter, it warrants further exploration or consideration of how the Academy can mitigate against this or support settings in this regard.

# Annex A: Full school profiles

**A.1** This section outlines analysis of school and college data, published by the Department for Education (DfE).[21] Data analysed related to the 2022 to 2023 academic year, unless stated otherwise (e.g., some destinations data relates to cohorts from previous academic years).

**A.2** To understand the context of LBEEP settings, analysis has been conducted at a local authority (LA) level. The analysis draws data from those schools and colleges that are operating and that have pupils aged 12 years or older. It focuses on the four LAs in which LBEEP settings are located – Birmingham, Coventry, Solihull, and Warwickshire.

**A.3** All 27 LBEEP settings are captured in DfE's 'school information' dataset. Of these, 22 have pupil characteristics data (as this data is not captured for 16-18 only). Attainment (either KS4 or 16-18) data is also only captured where relevant to the setting.

## Overview of LBEEP settings

**A.4** In all, there are 27 schools which have been involved in the LBEEP. Of these, 17 provide both secondary and further education, six are secondary schools only, and four are further education institutions only. Table A-1 provides a full list of these schools.

**Table A-1: List of LBEEP settings, by age of pupils (as of 2022/23)**

| Secondary (11-16 only) | 16-18 only | Both (11-18) |
|---|---|---|
| • The Avon Valley School and Performing Arts College<br>• Eden Girls' School, Coventry<br>• George Eliot Academy<br>• Harris Church of England Academy<br>• King Edward VI Northfield School for Girls<br>• Lyndon School<br>• Nuneaton Academy | • Coventry College<br>• North Warwickshire and South Leicestershire College<br>• Warwickshire College Group<br>• Solihull College & University Centre<br>• South and City College Birmingham (Longbridge Campus) | • Ash Green School<br>• Barr's Hill School<br>• Blue Coat Church of England School and Music College<br>• Colmers School and Sixth Form College<br>• Ernesford Grange Community Academy<br>• Etone College<br>• Grace Academy Solihull<br>• Light Hall School<br>• Meadow Park School<br>• Nicholas Chamberlaine School |

[21] Available here: Download data - Compare school and college performance data in England - GOV.UK

| Secondary (11-16 only) | 16-18 only | Both (11-18) |
|---|---|---|
| | | • Rugby Free Secondary School<br>• Sidney Stringer Academy<br>• St Thomas Aquinas Catholic School<br>• WMG Academy for Young Engineers<br>• WMG Academy for Young Engineers (Solihull) |

*Source: LBEEP MI data. Note: while South & City College Birmingham is predominantly 16-18 , it does offer some 14-16 provision.*

# School profile analysis

## Key Stage 4

**A.5** Table A-2 below compares pupil characteristics data (which are only available for KS4 institutions) of LBEEP settings with the LBEEP LAs as a whole. Generally, LBEEP settings are larger than average, have a lower proportion of pupils with an EHC plan, but a higher proportion who receive SEN support. LBEEP settings also generally have a lower proportion of pupils who speak English as a second language, and a higher proportion of pupils eligible for free school meals (FSM). In summary, 16% of pupils across all LBEEP settings receive SEN support, 24% have English as their second language and 34% are eligible for FSM.

**Table A-2: Overview of pupil characteristics in LBEEP settings and local authority schools (KS4 only)**

| | LBEEP (N=22) | LBEEP LAs (N=267) | Difference |
|---|---|---|---|
| **KS4 cohorts only (inc. schools with 16-18 provision)** | | | |
| Average number of pupils (KS4 only) | 993 | 715 | +278 (+38%) |
| % with an EHC plan | 1.7% | 4.3% | -2.6pp |
| % receiving SEN support | 15.8% | 13.1% | +2.7pp |
| % where English is an additional language | 24.0% | 26.3% | -2.3pp |
| % eligible for free school meals (FMS) in past six years | 34.2% | 29.5% | +4.7pp |

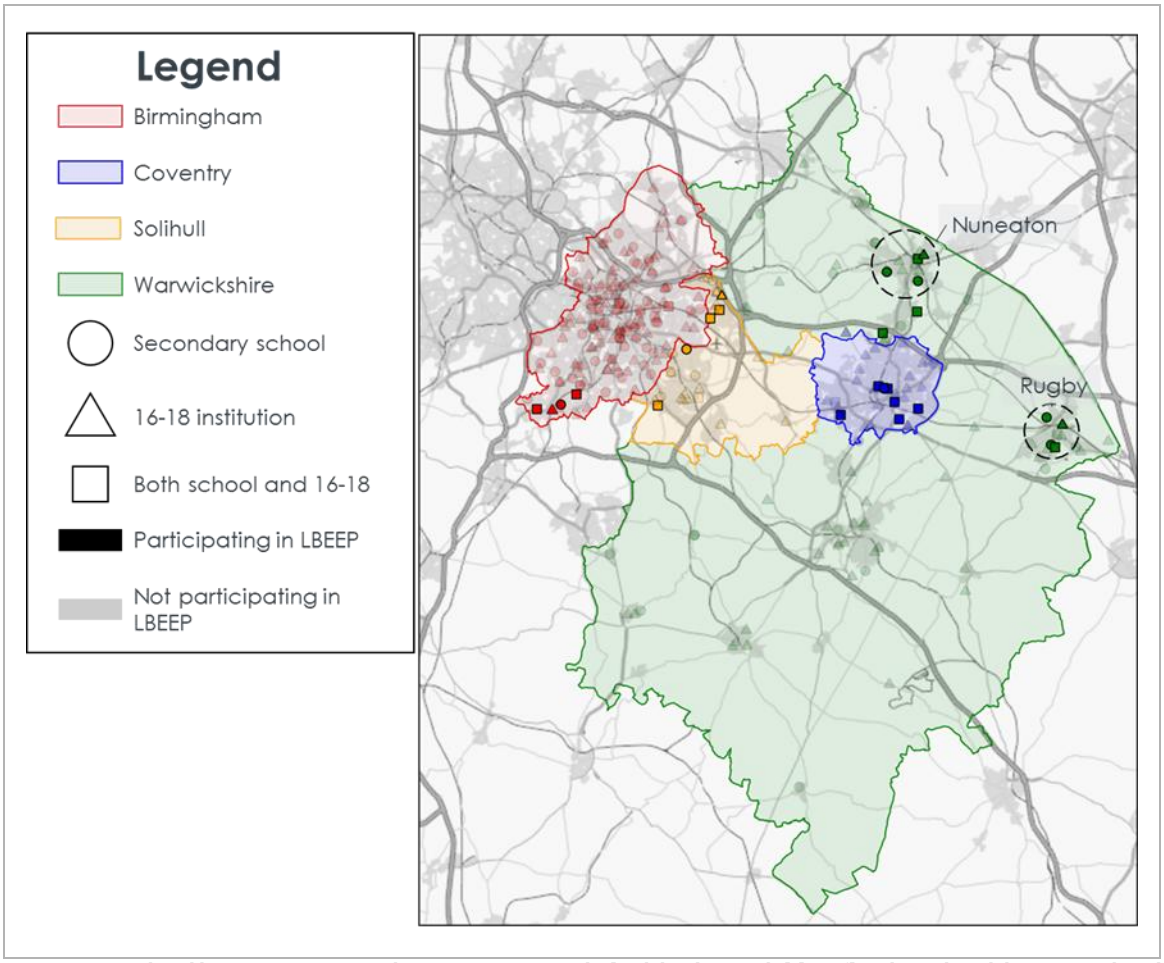
*Source: SQW analysis of school performance data. Note: FE college data are not available in pupil characteristic data. Note: South and City College Birmingham has not been included due to pupil characteristic data not being collected.*

## 16-18 provision

**A.6** Most (21) LBEEP settings have 16-18 provision. Of these, the majority (16) are combined with a school, four are FE-only colleges, and one is a predominantly an FE college with some 14-16 provision (South and City College Birmingham). The map provides a plot of LBEEP Further Education provision within the LBEEP local authorities. It shows that:

- All four participating organisations in Birmingham are clustered to the south, around Northfield and Longfield.
- Participating schools in Solihull border Birmingham and do not form a geographically close network
- In Coventry, the schools are located in the City, and in Warwickshire the schools are to the north of the county in Rugby and Nuneaton, both being proximate to Coventry city.

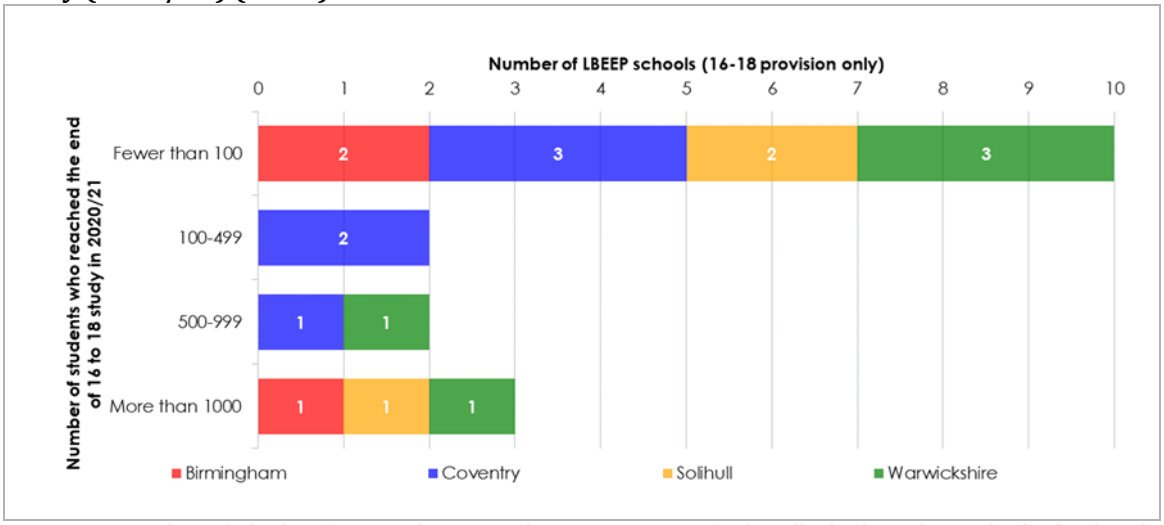
**Figure A-1: Map of the secondary school and 16-18 provision in the four LBEEP local authorities**




*Source: Produced by SQW. Contains OS data © Crown copyright [and database right] [2025] and Royal Mail data © Royal Mail copyright and Database right [2025]*

**5.9** Figure A-2 below shows the size of these 16-18 institutions based on the number of students reaching end of 16-18 study in 2020/21. Three LBEEP settings (Light Hall School, Meadow Park School and Rugby Free Secondary School) are missing from the data as their 16-18 provision did not begin until after the 2020/21 academic year. More than half (10 out of 17) of the 16-18 institutions had fewer than 100 pupils enrolled in 2020/21. Each local authority also has at least one major FE institution with more than 500 students reaching the end of 16-18 provision (with Warwickshire having two, Warwickshire College Group and North Warwickshire and South Leicestershire College).

**Figure A-2: Number of students at LBEEP settings who reached the end of 16 to 18 study (2020/21) (N=17)**

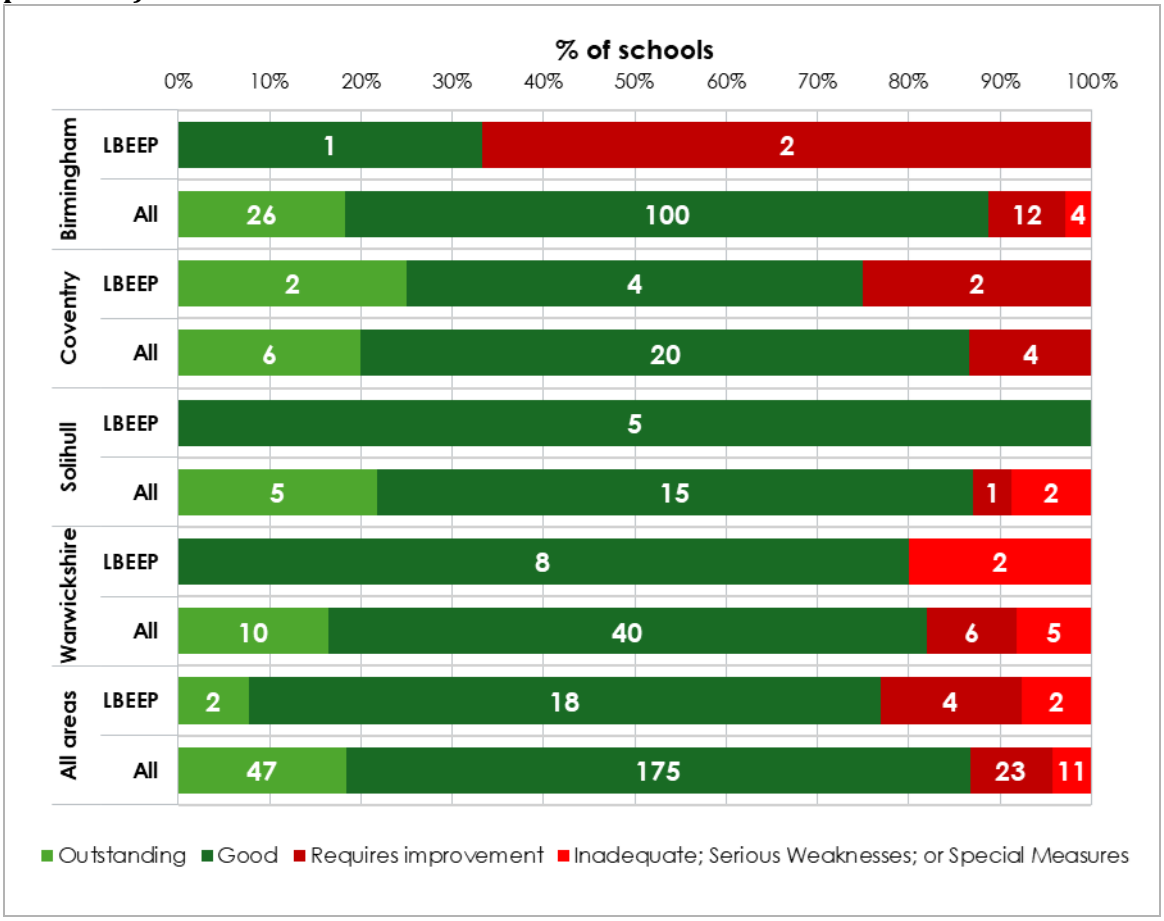



*Source: SQW analysis of school performance data. Note: Three LBEEP settings (Light Hall School, Meadow Park School and Rugby Free Secondary School) are missing from the data as their 16-18 provision did not begin until after the 2020/21 academic year.*

## Setting performance

**A.7** Ofsted ratings are provided for most educational settings in England, for both KS4 and 16-18 provision. Figure A-3 below shows how LBEEP settings compare at a local authority level, as well as across the LBEEP local authorities. The majority (18) of LBEEP settings are rated 'good', some (six) are rated 'requires improvement' or worse, and a couple are rated 'outstanding'. There is some over-representation of schools which require improvement (15% of LBEEP settings, compared to 9% across the four local authorities), and under-representation of schools rated outstanding (8% and 18% respectively).

**Figure A-3: Ofsted ratings per local authority (LBEEP and total) (KS4 and 16-18 provision)**




*Source: SQW analysis of school performance data. Note: One LBEEP school (King Edward VI Northfield School for Girls) did not record an Ofsted rating*

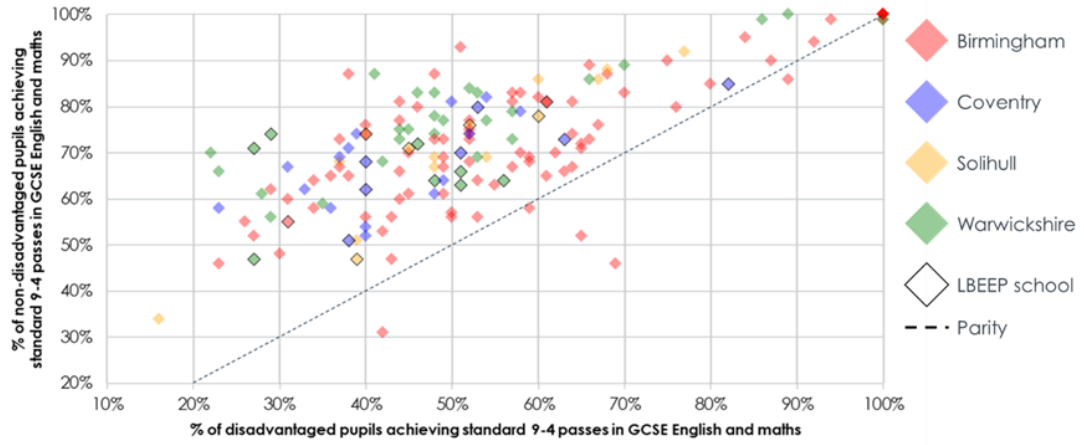
**A.8** Figure A-4 below considers attainment, for both disadvantaged (defined as FSM in past six years) and non-disadvantaged pupils. The dotted line shows parity in student attainment - the points at which there would be no difference in the proportion of disadvantaged and non-disadvantaged students which achieve a standard pass in Maths and English. The table in Figure A-4 shows the proportion of disadvantaged and non-disadvantaged children achieving a standard pass in Maths and English in the median school within each local authority.

**A.9** Overall, Figure A-4 shows how, much like across the LBEEP LAs, the settings which participate in LBEEP vary in terms of their academic attainment, and follow the general trend of non-disadvantaged pupils generally performing better than disadvantaged pupils. This said, there is some variation across local authorities:

- Birmingham generally has a higher standard pass rate in Maths & English (M&E) compared to the other local authorities, and the attainment gap between disadvantaged and non-disadvantaged pupils in Birmingham schools is smaller than other areas. There are a few schools (all in Birmingham) where there are higher standard pass rates among disadvantaged pupils than non-disadvantaged pupils. None of these schools have participated in the LBEEP.

- Most (15 out of 22) LBEEP settings have a disadvantaged pupil standard pass rate between 40-65%, and a non-disadvantaged pupil standard pass rate between 50%-80% (for 18 of 22). This is broadly in line with all KS4 settings across the four local authorities.
- Three (out of eight) of Warwickshire's LBEEP settings have fewer than 30% of disadvantaged pupils achieving a standard 9-4 passes in English and Maths.
- One LBEEP setting - Eden Girls' School, Coventry - has a very high standard pass rate in M&E, with 82% of disadvantaged pupils and 85% of non-disadvantaged pupils achieving a standard pass.

**Figure A-4: Percentage of pupils achieving standard passes in both GCSE English and maths, disadvantaged and non-disadvantaged (KS4 provision only)**



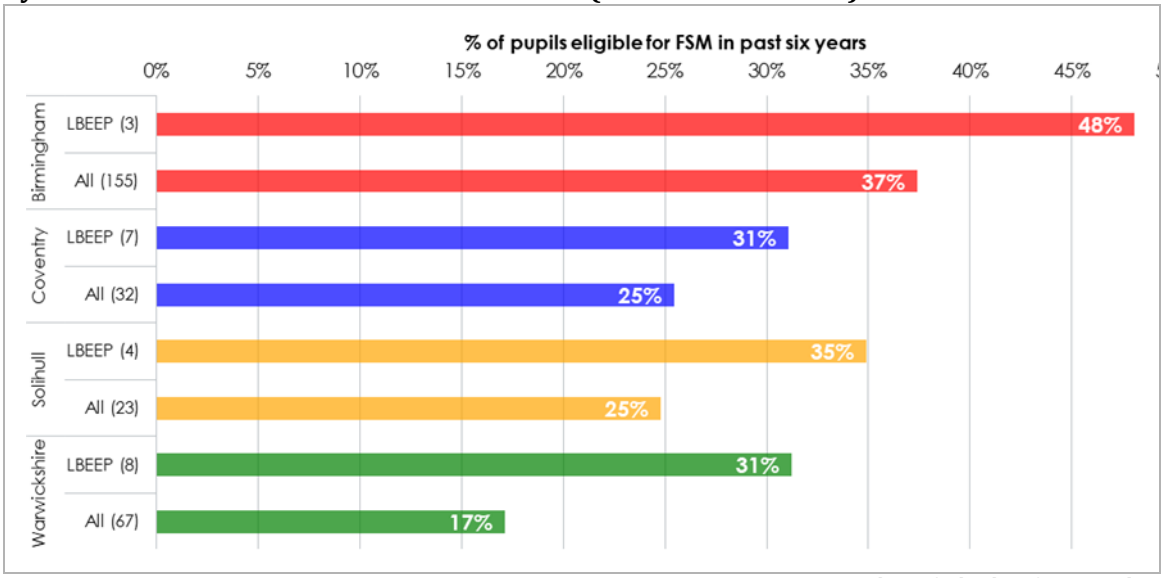

| Local authority | % of disadvantaged pupils achieving 9-4 passes in M&E (median school) | % of non-disadvantaged pupils achieving 9-4 passes in M&E (median school) | Percentage point difference |
|---|---|---|---|
| Birmingham | 52% | 62% | -10% |
| Coventry | 40% | 59% | -19% |
| Solihull | 48% | 64% | -16% |
| Warwickshire | 46% | 63% | -17% |

*Source: SQW analysis of school performance data*

**A.10** Figure A-5 shows free school meal (FSM) eligibility per local authority, split by LBEEP settings and all schools in the area. Across all four local authorities, LBEEP settings consistently have a higher than average rate of FSM eligibility. Settings in Birmingham generally have a higher rate of FSM eligibility (37% across all settings), and for the three LBEEP settings in Birmingham, nearly half (48%) of pupils are eligible for FSM.[22]

[22] FSM eligibility data are not available for South and City College Birmingham.

**Figure A-5: Percentage of pupils eligible for FSM in past six years, per local authority, by LBEEP school and all KS4 cohort schools (number of schools)**




*Source: SQW analysis of school performance data*

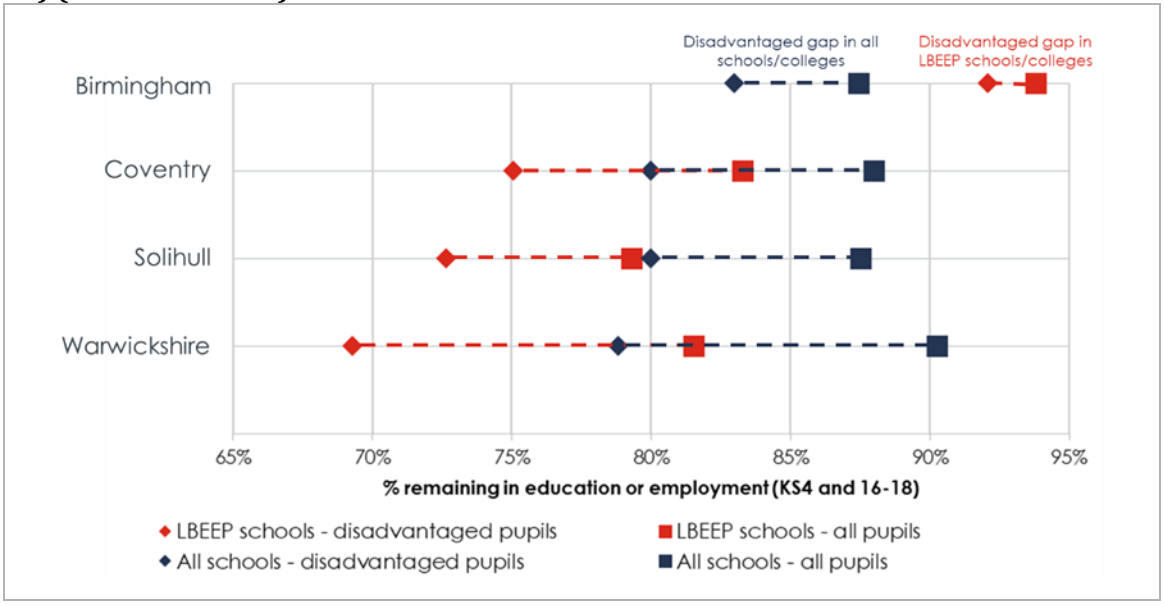
## Destinations

**A.11** Figure A-6 below shows the proportion of pupils (all and disadvantaged only) which remained in education or employment for at least two terms after completion of either KS4 or 16-18 study, for both LBEEP settings and all schools within the local authority. The most recent data are available for those completing study in 2020/21 academic year. The figure below shows a series of findings:

- In every case (whether LBEEP or local authority as a whole), a lower proportion of disadvantaged students remain in education or training compared to total pupil population.
- 90% of students in Warwickshire progress to either education or employment. This is the highest progression rate of the four LAs. However, only 79% of disadvantaged students have positive progression compared to 92% of non-disadvantaged. This is the highest percentage point gap for all four LAs.
- In all local authorities except Birmingham, LBEEP settings have a lower proportion of pupils remaining in education or training, when directly compared to the average within their respective local authority. However, it is important to note how this is influenced by exclusion of South and City College Birmingham, which has both a low rate of disadvantaged pupils remining in education or employment (51%), and a high number of disadvantaged pupils overall (508).
- Birmingham also has the smallest gap between the proportion of disadvantaged pupils remaining in education or employment compared to all students in Birmingham, at two percentage points for LBEEP settings and four percentage points overall.

- Coventry and Solihull are quite similar at a local authority level (with 86-87% of all students and 79-80% of disadvantaged students remaining in education or employment), although the LBEEP settings in Solihull are further below the local authority average than those in Coventry.

**Figure A-6: Percentage of pupils remaining in education or employment (KS4 and 16-18) (2020-21 cohort)**

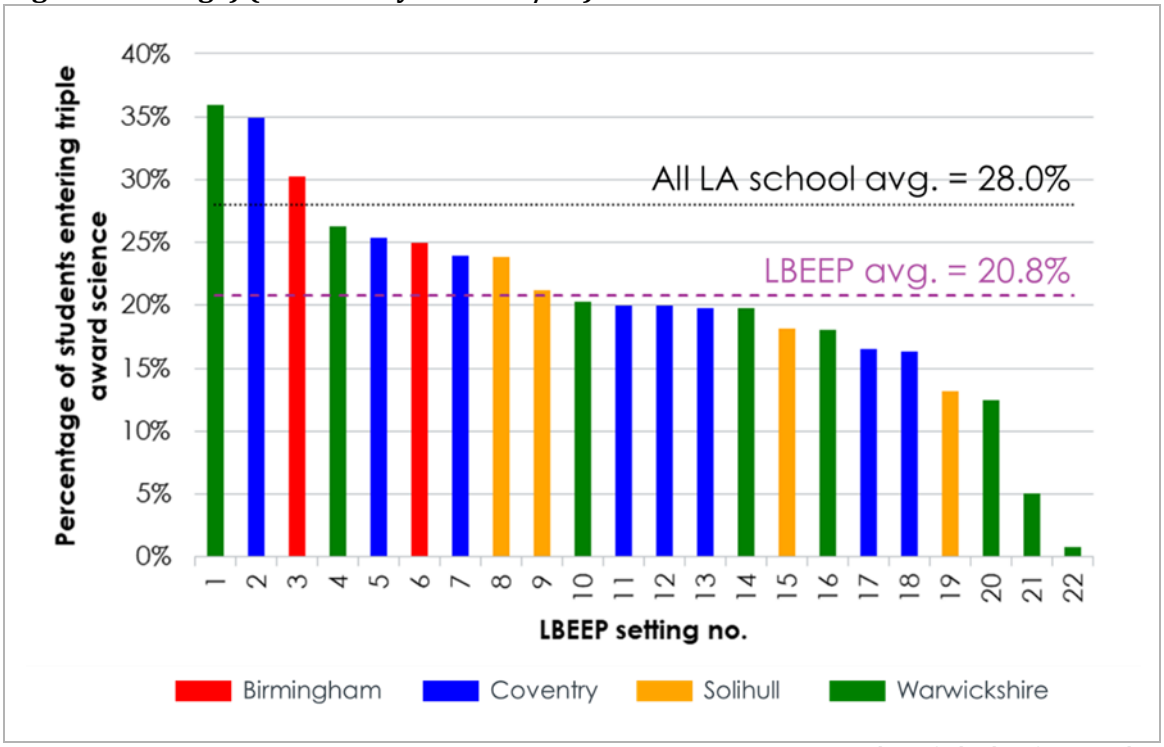



*Source: SQW analysis of school performance data*

## STEM

**A.12** Figure A-7 shows the how LBEEP KS4 schools have a below average rates of triple science, although this rate varies between schools. Three LBEEP settings are above the regional average, where nearly a third of pupils enter triple award science. In contrast, there are a two LBEEP settings where fewer than 10% of pupils are entering triple award science. This said, the majority of LBEEP settings are entering between 10%-25% of their pupils into triple award science GCSE, across all four local authorities.

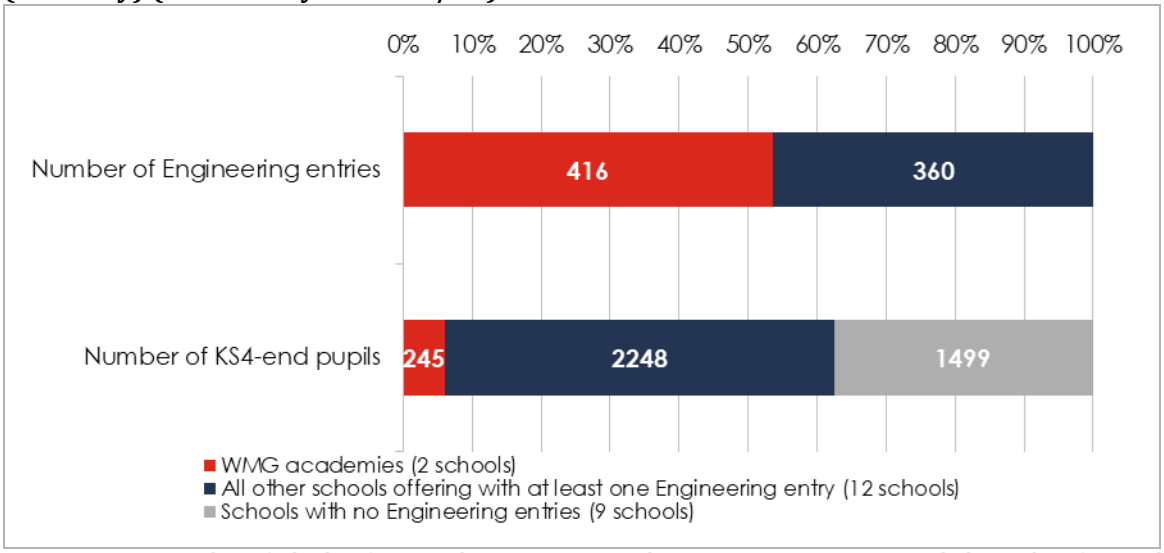
**Figure A-7: Percentage of students entering triple award GCSE science (LBEEP and regional average) (Academic year 2022/23)**




*Source: SQW analysis of school performance data*

**A.13** Of the 23 LBEEP settings which offer GCSE courses, 14 (61%) offer at least one engineering-relevant qualifications (as of 2022/23). However, the extent to which these courses are offered within schools varies significantly. For example, the WMG Academy for Young Engineers had 121 KS4 students at the end of KS4 in 2022/23, and recorded 202 entries across two engineering-related qualifications: Engineering Studies (82) and Manufacturing Engineering (120). In contrast, King Edward VI Northfield School for Girls offered only one Engineering-relevant course (Design & Technology), which had 11 entries (out of 149 end of KS4 pupils). The figure below demonstrates this difference, where more than half of Engineering-related entries come from the two WMG Academies for Young Engineers, despite representing less than 10% of the total pupil population within LBEEP settings. It also shows how roughly one third of pupils attending LBEEP settings did not have access to KS4 Engineering-related courses in AY2022/23.

**Figure A-8: Number of entries into Engineering related subjects in LBEEP settings (KS4 only) (Academic year 2022/23)**




*Source: SQW analysis of school performance data. Note: WMG academies Engineering entries exceeds the number of KS4-end pupils as pupils can be entered into more than one engineering-relevant qualification.*

SQW

## Contact

For more information:

**Dr Jo Hutchinson**
*Director, SQW*
T: 07436 108 312
E: jhutchinson@sqw.co.uk

2nd Floor East
Greenhill House
90-93 Cowcross Street
London
EC1M 6BF

**www.sqw.co.uk**

## About us

### SQW Group

SQW and Oxford Innovation are part of SQW Group.
**www.sqwgroup.com**

### SQW

SQW is a leading provider of research, analysis and advice on sustainable economic and social development for public, private and voluntary sector organisations across the UK and internationally. Core services include appraisal, economic impact assessment, and evaluation; demand assessment, feasibility and business planning; economic, social and environmental research and analysis; organisation and partnership development; policy development, strategy, and action planning.
**www.sqw.co.uk**

### Oxford Innovation

Oxford Innovation is one of the UK's leading providers of services to support innovation systems and help local economies thrive. It manages incubation spaces and innovation centres (OI Space); it delivers programmes of advice and other business support (OI Advice); and it helps to finance ambitious and innovative businesses (OI Finance). Its services are delivered to local authorities, central government departments, arms-length bodies and private sector clients.
**www.oxin.co.uk**