



Practical Technical Skills Development

Gatsby Working Group – Project-Based Learning
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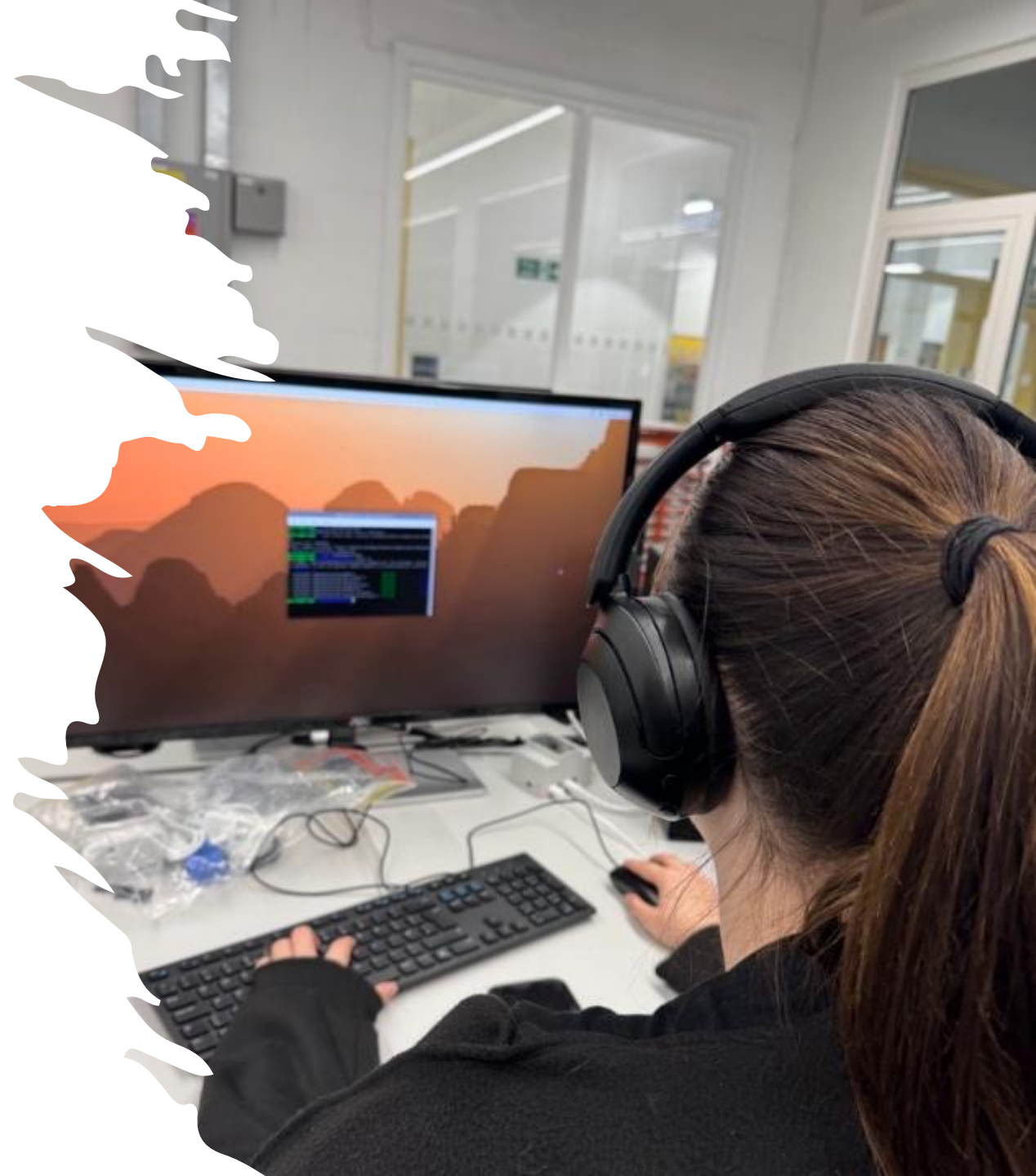
What we already provide

- **City & Guilds 2850 L2, Automotive IMI L2 and EAL PEO** practical engineering programmes
- A strong focus on **hand skills**, safe tool use and workshop discipline
- Structured delivery of fabrication, machining, assembly and electrical basics
- Introductions to CAD and digital measurement tools
- Employer engagement through **guest speakers** and occasional visits
- Staff expertise, which ensures high-quality demonstrations and support
- **Task-based** learning, which has only limited long-term project integration



What we would like to provide

- A **coherent, project-based curriculum**, linking theory and practice
- Multi-stage engineering projects that mirror real industry workflows
- Strong alignment with **Gatsby Benchmarks 4, 5 and 6** (linking the curriculum, employer encounters and experiences of workplaces)
- Employer partnerships providing **live briefs**, mentoring and feedback
- Increased use of **CAD, 3D printing, CNC** and digital tools
- A culture of **ownership, purpose and professional behaviours**



Evidence



MK Sportscars

- Neil Barker and Stephen Hope from MK Sportscars presented their kit-car build programme, which enables students to construct a fully functioning sports car over a 35-week academic year using Mazda MX-5 donor components.
- The programme develops strong practical competencies, including tool use, component reconditioning, interpreting technical instructions and working through a structured build process.
- MK Sportscars are also working with City & Guilds to align the project with qualification requirements and outlined opportunities to extend learning through motorsport participation, university partnerships and potential future developments, such as electric powertrain applications.



Evidence

East of England Energy Group (EEEGR)

- John Best introduced the Coastal Energy Internship Programme, which provides students with a 20-day, industry-based placement in the energy sector.
- The programme offers meaningful, project-based experience with local employers, supported by an £850 bursary to remove financial barriers to participation.
- Students develop practical, analytical and professional skills through real industry projects, with outcomes including written reports, poster presentations and the opportunity to achieve CREST Gold Awards.
- The programme has demonstrated strong impact in building confidence, clarifying career pathways, and supporting progression into higher education and employment.



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EEEGR

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Coastal Energy Internship Programme

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SKILLSforENERGY
EAST OF ENGLAND ENERGY GROUP

Coastal Energy Internship Programme

This directory lists the projects that are available to East Anglia-based Coastal Energy Interns in the 2026 programme. To apply for an internship, please contact your College Champion.

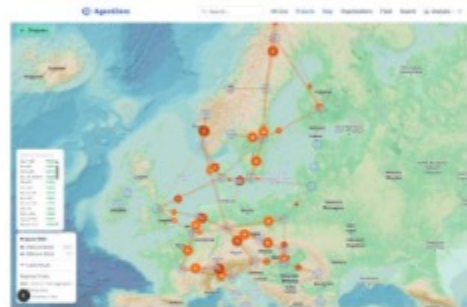
The Lowestoft Eastern Energy Facility (LEEF) Berth Utilisation & Services Audit



Associated British Ports: ABP Port office, 2nd floor, OrbisEnergy, Wilde street, Lowestoft NR32 1XH

[Click here for project details](#)

Testing and Improving AI Research Agents for Offshore Wind Data



AgentZero Energy Ltd: OrbisEnergy, Wilde street, Lowestoft NR32 1XH

[Click here for project details](#)

Exploring the Use of AI in Offshore Engineering Analysis



Aquaterra Energy: Innovation House, Alkmaar Way, Norwich, NR6 6BF, UK

[Click here for project details](#)

Installation of Onsite Gas Facilities



Armultra Ltd: Armultra House, Hewett Rd, Garton Hall Ind Est, Great Yarmouth, NR31 0RB

[Click here for project details](#)

Evidence

Student Motorsport

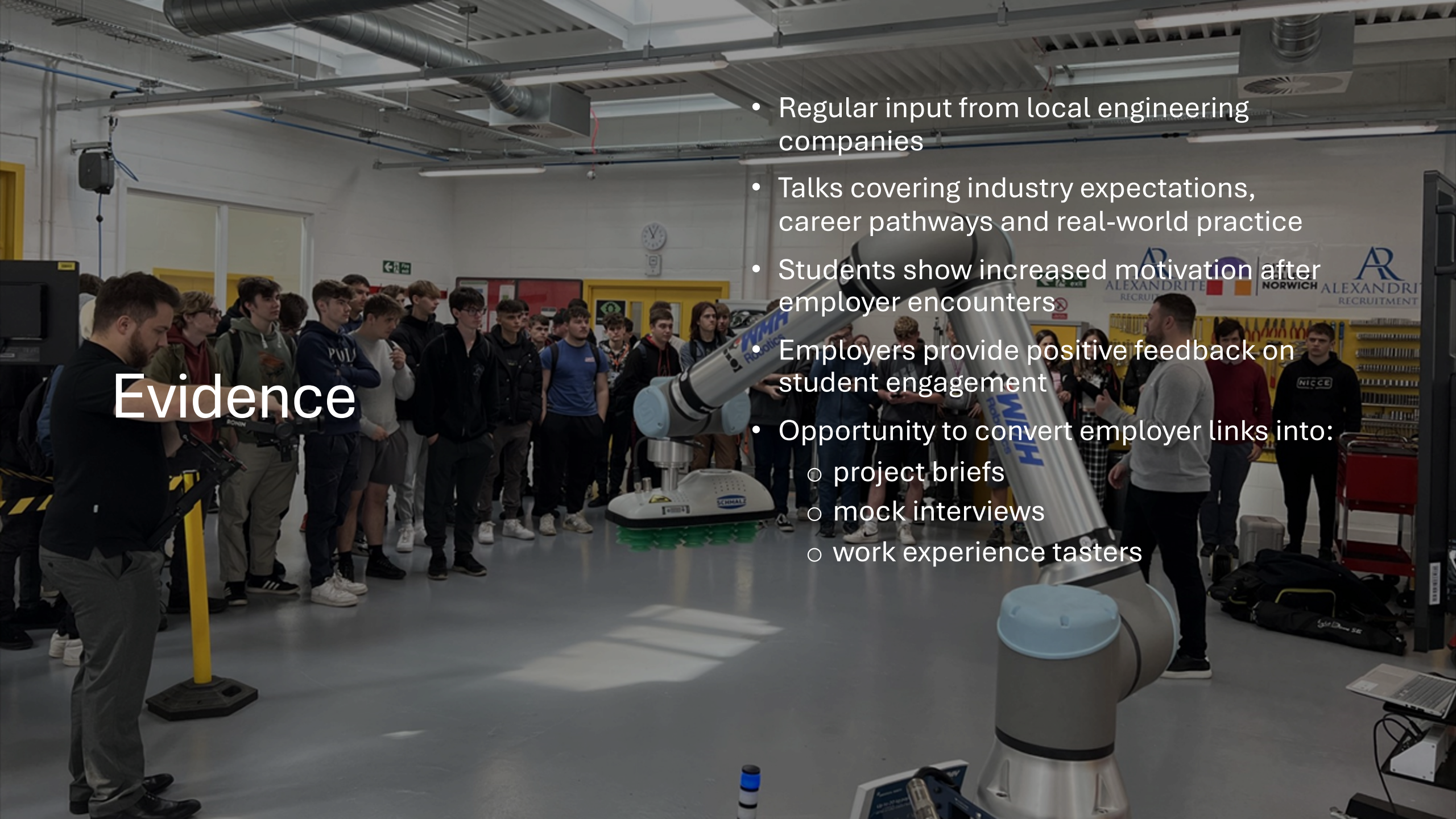
- John Paul Latham outlined Student Motorsport's competition-based learning model, where students collaboratively build and race a competition-ready vehicle, typically based on the C1/107/Aygo platform.
- The project engages learners from multiple disciplines, including engineering, business, logistics and media, reflecting real motorsport operations.
- Students take responsibility for planning, budgeting, sponsorship, vehicle preparation and race-day operations, supported by extensive online build resources.
- The programme develops teamwork, leadership, problem-solving and industry awareness, and has a strong track record of supporting progression into apprenticeships and employment in the motorsport and engineering sectors.





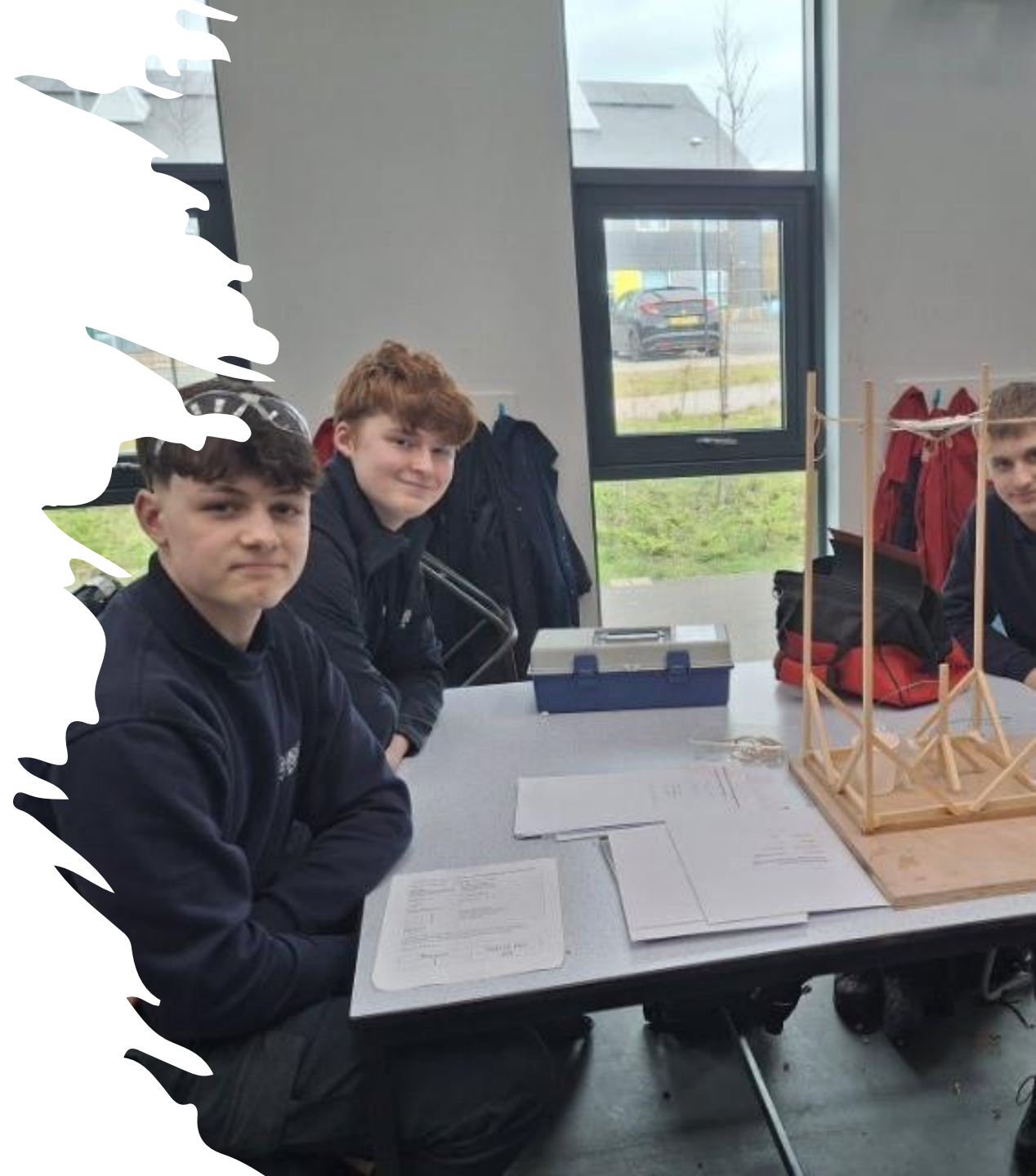
Evidence

- Regular input from local engineering companies
- Talks covering industry expectations, career pathways and real-world practice
- Students show increased motivation after employer encounters
- Employers provide positive feedback on student engagement
- Opportunity to convert employer links into:
 - project briefs
 - mock interviews
 - work experience tasters



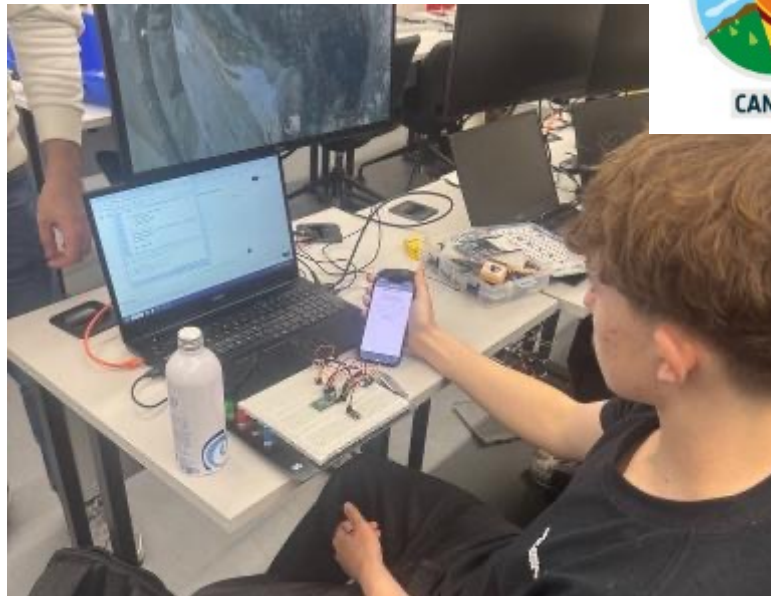
Project-based learning (PBL)

- PBL develops **problem-solving**, independence and resilience
- Projects encourage planning, sequencing, teamwork, and communication
- WorldSkills standards offer a **benchmark for excellence**
- Employer-set projects
- Example project themes:
 - CAD → 3D print → test a mechanical component
 - Fabricate and assemble a small engineered product
 - Create a jig/fixture to solve a workshop problem
 - Reverse-engineer a component and document the process
- PBL naturally embeds unit outcomes from **City & Guilds 2850** and **EAL PEO**



CANSAT

- Students designed and built a monitoring system for a rocket
- The project was part of the national CanSat competition
- It involved launching their system into space
- The competition brought together teams from across the country
- Focused on innovation and technical skills
- CCN won the **Engineering Excellence Award**





SHOESTRING DIGITAL MANUFACTURING

- Students worked on an employer-set project with the University of Cambridge. The project is called Shoestring
- The project focused on sustainability
- They designed and programmed systems to monitor equipment performance
- They assessed compressor efficiency
- Goals included reducing costs and lowering the college's carbon footprint

Added value and progression to level 3, apprenticeships and higher education?



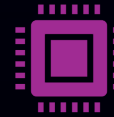
Hand skills: accuracy, measurement, tool competence



Communication: presenting ideas, writing reports, explaining decisions



Soft skills: teamwork, time management, problem-solving



Maths & English: embedded through tolerances, calculations, documentation

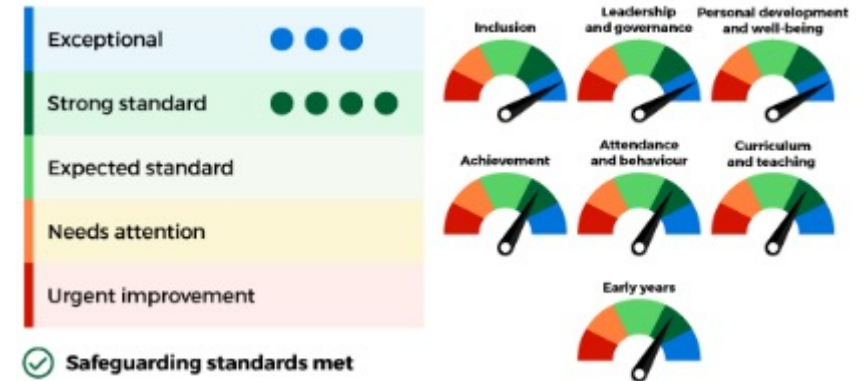


Builds confidence for progression to:

Level 3 BTEC diplomas
T-levels
Apprenticeships
Higher education (longer-term progression)



- Curriculum must be **coherent, sequenced** and knowledge-rich
- Students should develop:
 - **Substantive knowledge** (engineering principles, maths/science)
 - **Disciplinary knowledge** (how engineers think and work, problem-solving, fault, cause, rectification)
- Learning must be **meaningful** and linked to future employment
- Strong emphasis on **technical skills**, employability and real-world application
- PBL provides clear evidence of progress, independence and mastery



Who else could benefit?

NEET learners: hands-on, purposeful learning increases engagement

Schools: Key Stage 4 engineering tasters and transition pathways

SEND learners: structured, practical tasks with clear outcomes

Disadvantaged learners: increased cultural capital through employer exposure

Opportunity to widen participation and strengthen community links

Barriers

- **Time:** PBL requires longer project windows and planning
- **Staffing:** need for upskilling in CAD/CAM and digital tools
- **Cost:** materials, consumables and equipment maintenance
- **Qualification constraints:** unit-based frameworks are not designed for PBL
- **Generic tasks:** some units lack modern relevance
- **Grade boundaries:** risk of disengagement if tasks feel irrelevant



Funding

- Short-term project funding:
 - Local enterprise partnerships
 - Employer sponsorship
 - Community engineering challenges
- Long-term sustainability:
 - Shared resources across departments
 - Employer-donated materials
 - Investment in reusable digital tools (CAD, simulation)
 - Alignment with T-level capital funding



Qualifications

City & Guilds 2850 Level 2

- Engineering principles
- Health & safety
- Fabrication and welding basics
- Machining and fitting
- Electrical and mechanical fundamentals
- CAD introduction
- Technical drawing

IMI Autocare Level 2

- Health & safety
- Chassis
- Engine, fuel, air
- Roles and responsibilities

EAL Performing Engineering Operations (PEO)

- Working safely in engineering
- Efficient engineering practices
- Hand tools, power tools and machinery
- Fabrication, machining and assembly
- Optional electrical/mechanical pathways

Opportunity: Deliver units through **one integrated project** rather than isolated tasks (Health & Safety)



Progression from level 2 to level 3 quals such as BTEC diplomas & T-levels

- Common learner challenges:
 - Higher-level maths
 - Academic writing
 - Independent study
 - Managing long-term assignments

PBL builds these skills gradually and naturally

- Students gain confidence with:
 - Technical vocabulary
 - Documentation
 - Problem-solving
 - Meeting deadlines

Stronger preparation for apprenticeships and level 3 study



Moving forward/Vision

- A programme that **connects** theory, practice and employer input (dual coding)
- Move towards **work-based qualifications** and authentic engineering challenges
- Replace outdated tasks with **modern, industry-relevant projects**
- Integrate **3D printing, CNC, CAD** and digital workflows
- Build a culture where learning has **value, relevance and purpose**
- Improved **attendance and engagement** through meaningful learning

“If it doesn’t feel real, learners will vote with their feet”





ANY QUESTIONS?