

Engineering A Sustainable Life on Earth (EASLOE) Project Report

Project Summary

The EASLOE project introduced 122 learners (65M, 57F) to a diverse range of environmental and sustainability challenges we are facing, that are having significant impacts on our planet and way of life. In showcasing this range of challenges in greater detail, the learners were then introduced to a wide range of engineering related careers and how engineers are addressing these sustainability and environmental challenges, both directly and indirectly.



Display about air pollution produced by one team of learners

The learners then explored their own sustainability and environmental concerns with volunteer engineers before choosing one area to research in depth, developing ideas, solutions or changes that have (or could have) a positive impact on the challenge in question. The learnings developed through the project were presented by the learners to a panel of industrialists where they faced questions and received feedback. During the early discussions with the engineers, the volunteers steer the conversations to share the various pathways into engineering, the types of work engineers are engaged with and general promotion of the engineering career pathways and journeys.

The project also facilitated careers-based discussions between the volunteer engineers and the teaching staff so that they are better informed of engineering related careers and can better guide the learners. Further, these discussions present opportunities to build relationships between industry and academia such that the volunteers can provide context and insight about where learned skills are applied in an industrial setting and can be used, where appropriate, to support curriculum teaching strategies and improve academic outcomes.

Meeting the Objectives

The objectives were met through developing a project that learners found enjoyable and engaging that involved delivering in school workshops and webinars with engineers. Learners then worked in teams to create displays, models, posters, and presentations that they formally presented to a review panel of volunteer engineers and teachers.

Students Involved – Target 120 – Achieved 122 - (65 Male - 57 Female)

In School Workshops: Target 4 – Achieved 7

Webinars: Target 12 - Achieved 12

Number of teachers involved: Target 4 – Achieved 5

Engineers Involved: Target 18 - Achieved 18

Student Cohort

The background of learners from one school who took part in the EASLOE project were predominately Pakistani and Indian, with a high percentile of English as an Additional Language. The learners reside in an underprivileged demographic, where there are numerous factors limiting access to resources in and out of school. The school has a Pupil Premium of 36% and is situated amongst the 30% most deprived areas in the UK.

Another school who took part in the project has a pupil premium ranging from 25% - 40% and is situated amongst the most deprived areas in the UK.

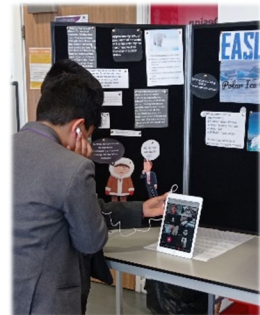
Both schools have reported that a high proportion of their learners have a lack of parental engagement, positive role models and support networks which has led to a poor uptake of science and STEM related subjects.

Objective - Create an engaging and enjoyable learning experience

Feedback data demonstrated that the learners found the project engaging and enjoyable. There was 100% net promoter score agreeing with the statement 'I enjoyed taking part in the EASLOE project.'

Comments from students who took part in the EASLOE project:

- Thank you. I really enjoyed building up and putting everything that everyone did in the project together
- I enjoyed everything about EASOLE project especially doing the presentations
- I really enjoyed thinking about what the problem was we were trying to solve
- I really enjoyed talking to engineers and explaining what my group and I were doing and the problems we were trying to solve
- I enjoyed learning new things and having conversations with my peers and the engineers about different environmental issues I also really enjoyed presenting and discussing my presentation
- Overall, I really enjoyed this project a lot because of the knowledge and skills I developed from it
- I enjoyed the new tasks and opportunities we participated in. Before in year seven we really did minor things but now the subject has developed and has made a lot of people more interested
- I think I enjoyed the most was the amount of communication in our work because no one got left out and everyone was included
- I enjoyed this project. It was something different than normal schoolwork!
- I enjoyed that we had other engineers coming in to speak to us
- I would never believe we could have done this in high school
- I enjoyed learning new things and having conversations with my peers and the engineers about different environmental issues I also really enjoyed presenting and discussing my presentation
- I enjoy talking with other people and see the different projects they were doing. This has given me a great knowledge of sustainability
- Overall, I really enjoyed this project a lot because of the knowledge and skills I developed from it



Learners discussing their work with virtual guests



Objective – Create a project that will foster the learners' appreciation of the wide range of engineering HE, apprenticeship progression and career opportunities that are available

The project fostered the learners' appreciation of the wide range of engineering HE, apprenticeship progression and career opportunities that are available. There was 96% net



promoter score for both male and female students agreeing with the statement 'I now have a greater appreciation of engineering careers.'

Comments from students who took part in the EASLOE project

- Thank you for this project. It gave me a better understanding of engineering. At the start I thought engineering was just fixing cars but now I know there is so much more
- I enjoyed talking to engineers about the work they do and the different careers there are



Learners working in a team to design EASLOE workshop for younger learners

Teacher Feedback

- The project gave the students ideas for possible career pathways, which they may have not yet thought of

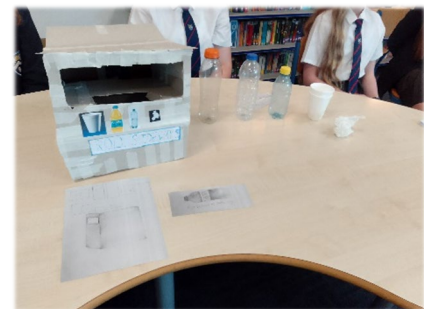
Objective - An increased number of learners who will consider a career in engineering and have a greater appreciation of what a career in engineering could involve

There was an increased number of learners who will consider a career in engineering. There was a **58% improvement** in net promoter score for **male students** and a **68% improvement** in net promoter score for **female students** between the pre-project statement: 'I am thinking about a career in engineering' and the post-project statement – 'I would now consider a career in engineering.'

There was a 98% net promoter score for male students and an 89% net promoter score for female students for the statement 'I now have a better understanding how engineering can help address sustainability challenges.'

Comments from students who took part in the EASLOE project:

- I enjoyed working as a team to solve problems. I enjoyed this so much and it has made me want to pursue engineering more than before
- It gave me a better understanding of Engineering. At the start I thought engineering was just fixing cars but now I know there is so much more. I enjoyed talking to engineers
- What I enjoyed the most is knowing that engineering could have a big impact on the world future and our future thank you. My view of engineering has now changed for the better
- I enjoyed the bit where we talked to the engineers about the problems they face everyday
- What I really enjoyed was working with new people trying to present my ideas to the engineers
- I like the improvement of engineering and how it's heavily upgraded the things we do



Plastic bottle collection kiosk designed by one team

Teacher Feedback

100% of the teachers who worked on the project rated it as very good or excellent. There was an 85% net promoter score for the statement 'This project will have a lasting impact on the learner', 100% net promoter score for the statement 'The project was pitched at the right level for the learners', and a 71% net promoter score for the statement 'The webinars made a positive contribution to the project.'

Feedback from teachers showed that the project helped them engage with learners about engineering progression routes and careers, whilst developing their own appreciation of what careers in engineering could involve:

- *The EASLOE project helped me significantly develop my understanding as to what a vibrant profession engineering can be. I certainly feel more ready and willing to discuss it as a potential career with students which I am sure I will have to next year as I'll be mainly teaching physics including to A level*
- *Gave me a realistic insight to issues faced by engineers and careers that can help with sustainability issues. This is effective as some issues raised are not on the curriculum at all and so gives a broader insight and allows learners to think and question*
- *The project gave me an insight into the application of engineering technologies in the workplace. I now have a deeper understanding of the work engineers are doing, for example, the impact of waste and some of the solutions we can look at*
- *Both I and pupils realised that contrary to our original perception, engineering and environmental chemistry is extremely interesting and multifaceted*

Outputs

Through the EASLOE project 122 learners aged between 11 to 16:

- Participated in workshops and webinars (7 workshops and 12 webinars overall) with engineers to learn about the work they are doing to address sustainability and environmental challenges, their career journeys, engineering progression and career opportunities and the benefits of higher education and degree apprenticeships
- Worked as part of a team to research the work engineers are doing to address environmental challenges

24 learners from one UTC took part in the introductory workshop with two engineers and two webinars with 6 engineers. However, due to staff absence, they did not have the opportunity to complete and present their work or complete the evaluation. This meant that 93 students presented their work in their teams to a panel of engineers and people who are working on addressing sustainability and environmental challenges, as 5 students were absent when the final workshop took place.

A Virtual Sustainable Futures Expo environment was developed that learners were able to access, and teachers will be able to use to enrich future work with learners. <https://www.4wardfutures.org.uk/sustainable-careers-expo>

Phase 2 of the Expo, which will be launched in December 2022, will have an increased number of exhibitors. We had several positive conversations with engineering companies with a view to getting them to exhibit. However, they reported that they did not have the bandwidth at this time to meet to the deadline to include them in phase 1 of the Expo. We intend to stay engaged with these companies and bring them on as exhibitors within later phases of the Expo.



Sustainable Futures Expo



An exhibition stand

A specific EASLOE section of the 4wardFutures website has been developed. This will be expanded as part of phase 2 of the Expo and will contain resources that teachers and learners can use.

<https://www.4wardfutures.org.uk/engineering-a-sustainable-life-on-earth>

4wardFutures have developed a network of individuals representing a diverse range of careers within the engineering sector who can support the schools beyond the timescale of the project.

Volunteer Time - 128 hours

Volunteers and Trustees who worked with on the EASLOE project spent **128 hours** taking part in initial discussions about the project with the 4wardFutures team, their own planning, presenting, and giving feedback to students.

Social Value (SV)

Overview

The EASLOE project outcomes directly contribute to the wider governmental commitment to build social capital. In particular, the EASLOE project has been targeted at educational establishments that support learners from the poorer socio-economic geographies.

The EASLOE outcomes that have tangible benefits that are linked to the following governmental SV themes (as identified in the Procurement Policy Note 06/20); Theme 2: Tackling economic inequality; Theme 3 - Fighting climate change; Theme 4 – Equal Opportunity. Furthermore, these outcomes also reflect a positive contribution to the following United Nations Sustainable Development Goals: Goal 4: Quality education; Goal 5: Gender equality; Goal 8: Decent work and economic growth; Goal 9: Industry, innovation and infrastructure; Goal 10: Reduced inequalities; Goal 11: Sustainable cities and communities; Goal 12: Responsible consumption and production.

Quantification

Using the HACT Social Value calculator it is possible to quantify SV gain for projects like EASLOE. However, with EASLOE being a small project, it is prudent to evaluate it as a component part of the wider 4ward Futures portfolio of themed learning vehicles that are based around STE(A)M Careers Information, Advice and Guidance (CIAG).

Through documented research¹ we know that secondary-aged learners that have four or more meaningful interactions with people from industry are 80% less likely to become NEET. 4ward Futures provides these four interactions across the academic years through a range of similar themed CIAG learning vehicles. So, reflecting pragmatically, it is viable to assume that EASLOE provides one interaction with industry and therefore represents 25% of a quantitative SV calculation for the whole EASLOE cohort i.e., c£400 per learner (taken from the HACT tool).

¹ https://www.educationandemployers.org/wp-content/uploads/2014/06/its_who_you_meet_final_26_06_12.pdf

Social Return on Investment (SROI)

The SROI is calculated as follows:

(Overall SV benefit) – (investment) = SROI 1:3.6

(Cohort size x £400) – (Cost of EASLOE) = £35,200

Lessons Learnt

The activity itself required some significant front-end research & development to ensure quality. This involved a broad approach that validated and verified that the wider context of sustainability and environmental challenges globally was covered. This resulted in a broad range of subject matter and a diverse number of careers being discussed. This demonstrated to the learners that the issues of sustainability are an important concern to everybody and not just those who are currently affected or those working to effect change.

Although staff absence and curriculum tensions meant that some learners did not have the opportunity to complete and present their work or complete the evaluation at one UTC, the project planning and delivery with the other schools produced outcomes that are comparable or better class-leading programmes in this field.

A learning point is to engage with schools as early as possible in the school year to enable inclusion as a part of curriculum planning and delivery rather than as an addition to it.

This would have afforded the learners more time to research, to expand their knowledge and to exercise a greater degree of freedom in which to develop solutions. In addition, this would have afforded the volunteers a larger platform from which to share the different engineering career and education pathways available beyond secondary education; It would have also enabled the learners to have engagement with more volunteers from a wider range of engineering sectors. Feedback from learners indicated that they would have liked to have had longer to work on their projects.

The work presented by the students ranged in quality, format, and style. This made qualitative comparison between workgroups more challenging.

Within the project it was clear that some young people have confidence issues especially when presenting online to people, which has been exacerbated by the last two years of the pandemic. We have found this across all our project delivery. We are researching and looking at ways to develop methods to help students manage these anxieties and enable them to confidently opt in; it is also vitally important that the learners understand that this is a key employability skill which will help in both future education and interview situations, especially given that school is a safe environment in which to develop and practice these skills experiences. For example, presenting as a group to build individual confidence.

Webinars

Feedback from four learners and one teacher recommended that webinars would have more impact if they were restricted to 10 to 15 minutes, whilst others wished the webinars had been longer. We will look at this with a view to making future delivery proportionate to the circumstances of each project delivery.

Future Plans

The EASLOE project will be added to a portfolio of learning journeys delivered by 4wardFutures. The projects in the portfolio overlap and provide various learning journeys that build upon and complement one another, both educationally, creatively, and developmentally. Our journeys provide an enjoyable learning experience that introduces, then reinforces the CIAG messages through the showcasing of a range of careers and progression pathways and explaining their differences, pros, and cons, so as to develop the

learner's knowledge base. This will empower them to make informed education and careers choices.

Through the work we have recently been doing in primary schools we feel that EASLOE would be particularly effective in promoting engineering in the primary setting, particularly with year 6 students, equipping them with good engineering career knowledge as they progress into secondary education. This is an area we intend to develop and seek future funding for.

Virtual Tours of Project Exhibitions

During the delivery of the project, we developed the use of mobile devices for students to do show and tell sessions with engineers joining online. Through this medium, students were able to show and discuss their work and receive live feedback. This is an area we intend to further develop and seek future funding for.

Operational Information

Key Findings

Engage with the curriculum lead early and integrate the EASLOE project as a part of the curriculum with multiple interaction points throughout the programme delivery.

Agree a robust stakeholder agreement which outlines and agrees the responsibility of the school to give learners sufficient time to complete project work and evaluations.

Feedback to the IET/IMechE

The key feedback we would like to provide, that we have learnt from this project is that an effective way of promoting engineering with young people is through showing them how engineering can connect with their values, concerns, and interests.