

City, University of London

Strategic partnership impact report



Table of Contents

01

Forward

02

Introduction

03

Purpose of the
partnership

04

Objectives of
year one

05

Achievements
to date

13

Next steps

14

Summary

Forward

Engineers Without Borders UK has been working in universities since 2004, and we are extremely proud to have launched our first strategic partnership with City, University of London.

In the first year of this mutually beneficial partnership, we took the time to create a strong foundation to encourage long lasting impact. This has enabled us to begin to shape the education of over 650 students, run three research projects, support the National Symposium on Developing Socially Responsible STEM Professionals and develop a core team to drive this partnership forward.

A partnership milestone has been to, once again, support City to deliver the Engineering for People Design Challenge to all engineering first year students for the third year, in addition to delivering the Design Challenge to foundation year Computer Science and Mathematics students. Annually, these students join over 10,000 of their peers from 43 universities across South Africa, Cameroon, Ireland, the UK and USA who are also participating in the Design Challenge.

Another highlight has been City's participation in the Efficiency for Access Design Challenge. Students from City were teamed up with students from the Independent University of Bangladesh, competing alongside peers from 23 universities across Benin, India, Kenya, Lesotho, Mozambique, Nigeria, Pakistan, Senegal, Sweden, Uganda, the UK and Zimbabwe. You can explore the work of the two City team's (Team 31 and 41) on our open-innovation platform.

Through partnerships such as ours we can ensure a more safe and just future by shaping the education of students today. There is much to be done, but by reconsidering how we educate the STEM professionals of tomorrow we can encourage the change we must see.

We are looking forward to year two of this critical collaboration.

*Emma Crichton,
Head of Engineering, Engineers Without Borders UK*

Introduction

Global indicators show us that the way we live is creating complex challenges for humanity and the planet we inhabit. Millions of people continue to live without access to the basics for a safe and just life, yet in providing for the few that have, we've already overshot the ecological limits of planet Earth.

Mathematicians, computer scientists and engineers play a key role in promoting and enabling sustainable development. Our reliance on technology is increasing and the relationship between human progress and STEM is intensifying as we look to navigate the complexity of our current situation. Professionals who contribute to systems and technology will play an increasingly important role in shaping the environments of all of our day to day lives and our collective response to addressing global challenges.

Education needs to evolve to keep pace with the changing role of STEM professionals in society. However, largely it is still based on a past in which people, the environment and the planet did not experience the considerable constraints and challenges that we face now. Today, the greatest challenges that professionals face in their daily work often relate to people, policies and ethics, yet these challenges are not sufficiently covered in curricula around the world.

Social responsibility is a core part of the history of City, from when it was originally founded in 1894 to address societal inequality. Today, we need critical thinkers, driven by their responsibility to society, who can navigate complexity and address problems holistically. To do so, we need to support them, prepare them through education, and access to support.

In 2021, Engineers Without Borders UK introduced a new strategic partnership model to increase our impact to respond to the pressing need for new skill sets within the engineering profession. The Skills for net-zero and a green recovery 2021 report by the Institution of Engineering and (IET) shows only 7% of engineering companies in the UK with a sustainability strategy say they have the skills needed to fulfil it. We need to embed collaboration, empathy, cross-disciplinary learning, ethics, systems thinking, inclusive approaches, in addition to real-world examples alongside technical education, to provide the opportunity for engineers to learn how to produce globally responsible solutions.

Purpose of the partnership

Purpose statement

Together we will support City alumni from the School of Engineering, Computer Science and Mathematics to go on to be socially and globally responsible in their professional lives.

We will lead by example and put social responsibility as a core and cultural feature of education and the student experience within the School of Engineering, Mathematics and Computer Science. Where students gain a strong ethical and international perspective, and have the drive to bear the full extent of this responsibility within their future careers. This partnership aims to shape alumni who not only enjoyed and are proud of their education but see it as foundational and distinctive in developing them to make a positive contribution to society and their profession.

"City is delighted to be partnering and making history with Engineers Without Borders UK. This outstanding charity is establishing its first-ever strategic partnership with our university and deepening its five-year relationship with our School. This will further our commitment to educating socially and globally responsible STEM professionals, clearly illustrated through joint innovative engineering design programmes, such as the Engineering for People Design Challenge and our soon to be launched, Efficiency for Access Design Challenge."

**Professor Rajkumar Roy,
City's School of Mathematics, Computer Science and Engineering**

Objectives of year one

The three-year partnership set out to:

Run project-based Designathon and Design Challenges, both in and out of curriculum.

Co-create real-world educational resources and accelerate training of early-career academics.

Work with educators to provide a programme of support and facilitate volunteering opportunities for a broad and diverse group of people to shape the education of 3,000 students.

Re-establish a University Chapter as a mechanism for student-led activities.

Share our work, approach, and learnings broadly to influence a wider sector change.

Gather evidence from our partnership to track the success and failings of approaches that focus on how to take action on the need to develop socially and globally responsible professions.

Achievements to date

Launch partnership at the National Symposium for Socially Responsible STEM professionals

This was completed in January 2020 and 2021, with Engineers Without Borders UK supporting both events. TEDI-London, our other Strategic Partner, were also involved.

Have 650 students participate in the Engineering for People Design Challenge 2020/21 and 2021/22

In the 2020/21 academic year we had 300 students take part in Engineering for People Design Challenge, and over 350 students took part during the 2021/22 academic year. Excitingly, this included the introduction of the Design Challenge to the Mathematics and Computer Science cohorts.

Introduce the Efficiency for Access Design Challenge for post-graduate students

The design challenge was introduced in October 2021

Introduce new project/campaigns to inspire students within School of Mathematics, Computer Science and Engineering to deliver equitable solutions

Achieved in part due to the introduction of the Engineering for People Design Challenge to Computer Science and Mathematics foundation year students.

Students were invited, via the Chapter and educators, to participate in a month-long collaborative student design challenge in February 2022. This extra-curricular design challenge provides multidisciplinary students with the opportunity to collaborate and develop solutions for real-world problems.

Partnership promotion

The partnership was promoted and shared on both the City website and the Engineers Without Borders UK website in April 2021.

Offer training to academics in both April and August/September

City participated in Inspiring Community Leaders in April 2021 and were invited to Building Community Leaders in August in 2021. Raj represented City during a session at Building Community Leaders, where he joined TEDI-London in discussing how global responsibility is being adopted within their universities.

Engineers Without Borders UK coordinate and train a group of five champions and leadership team/social responsibility board to both drive cultural change from the top down and bottom up

We have established a core team and held a number of sessions with these individuals to scope out the activities planned for the year ahead.

The partnership contributed to seven new Engineering undergraduate programmes by organising a workshop with relevant academics and City, University of London and the Deputy Dean from TEDI-London on the incorporation of ethics in the curriculum

With champions, scoping out activities to transform and improve teaching for up to 3,000 students

Additional work

Maryam Lamere, City Alumni, led a webinar on Teaching Global Responsibility in Engineering: A Project Based Learning Approach in September 2021 for City staff.

Engineers Without Borders UK supported three research projects:

- Measuring Corporate Social Responsibility focusing on company's ethics
- Developing Measures of Social Responsibility Focusing on Organisations Sustainability and Economic Circularity
- Development of a Maturity Model for Sustainable Corporate Governance from ESG Standards

City, University of London contributed to the development of Engineers Without Borders UK 2021 strategy.

Engineering for People Design Challenge

City has been participating in the Engineering for People Design Challenge since 2017/18, joining us in reaching over 52,500 students since 2011. The first year of our strategic partnership covers both the 2020/21 and 2021/22 academic years. Across these two academic years City has delivered the Engineering for People Design Challenge to over 650 undergraduate students.

In addition to the delivery of the Design Challenge to a cohort of students, in 2020/2021 four teams had their submissions entered into the national competition. Their designs were reviewed by an international reviewer pool, with one team reaching the top 36 and attended the Grand Finals event in June 2021.

"I learnt valuable skills such as teamwork, leadership, management and communication skills. As well as engineering skills such as designing."

Student participant, 2020/21

In the 2021/22 academic year the strength of our partnership supported the School of Mathematics, Computer Science and Engineering to expand their delivery of Engineering for People Design Challenge from one module to two modules, as well as increasing the delivery from one discipline to three. This growth enabled City to broaden the delivery of the design challenge to their 57 foundation year Mathematics and Computer Science students, as well as the 300 students within Engineering. This growth aligns with the importance of ensuring our programmes are reaching students outside of engineering, and we're excited to see City leading the way in this space.



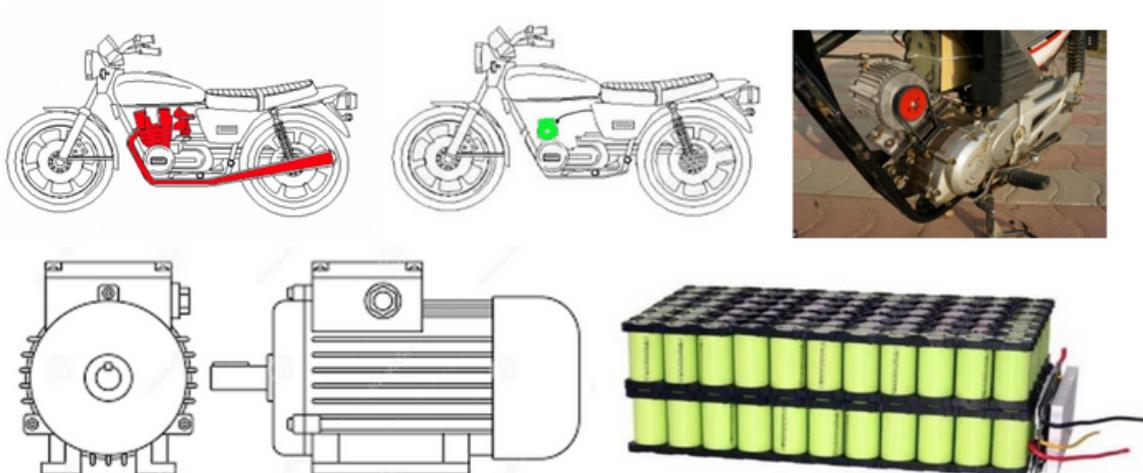
Efficiency for Access Design Challenge

In 2021/22 City, University of London introduced the Efficiency for Access Design Challenge to their students. Five students from different disciplines and different schools at City, have joined over 160 students from 14 countries and 24 universities participating in a truly global initiative that challenges student teams to create affordable, high-performing off-grid appliances and enabling technologies. Taught through project based learning, students are considering how engineering design can improve the lives and livelihoods of those living in off-grid contexts.

At City the participating students have engaged in the new 'inter-university team' aspect of the Challenge, collaborating internationally with two teams being made up of students from City, University of London and Independent University, Bangladesh.

The two teams from City, University of London have joined 39 teams in submitting their concept note to our collaborative CrowdSolve environment where off-grid professionals, acting as mentors to the teams throughout their participation and reviewers of their concept notes, have been sharing feedback.

Both teams have also applied for prototype funding from the Efficiency for Access Design Challenge to develop their concepts.



University Chapters

EWB City, University of London, is one of 25 Chapters operating around the UK running a range of activities for students. Students who engage with the Chapter not only develop their understanding of global responsibility but have the opportunity to build transferable skills in parallel with their studies.

The students who formed the Chapter at City were participants in the 20/21 Engineering for People Design Challenge and were inspired by their learning during this challenge. It has been great to see the continuation of their development and the first hand impact of the Engineering for People Design Challenge in inspiring students.

"The design challenge was one of the best challenges that I participated in. As the challenge was tailored to sustainability, it allowed me to understand the process that needed to be undertaken at each design stage. Climate change is a big part of us and we have to accept the responsibility as an Engineer to make a change. Being part of this Chapter allows me and other fellow members to explore further into the importance of design."

Vithusan Vigneswaran,
City, University of London Chapter President

Designathon

In February we ran our student Designathon, offering an opportunity to students, including those at City, University of London, to work collaboratively to produce ideas for how we can make the engineering sector more globally responsible. We had over 130 students take part from 34 universities. The Designathon provides students with the ability to work in globally diverse teams, as well as providing them with the opportunity to be introduced to and expand their knowledge around the ideas of global responsibility.

"This Designathon was a fantastic opportunity for me to work outside of my comfort zone and work collaboratively with people from different disciplines and backgrounds. I have learnt the value of working creatively with people who can tackle problems with a different mindset, and I will incorporate this creative energy into my work going forward."

Designathon participant, 2021

Research projects

Three students studying City, University of London MSc Project Management, Finance and Risk produced research projects in collaboration with Engineers Without Borders UK.

Andrea Tellarini	Development of a Maturity Model for Sustainable Corporate Governance from ESG Standards
Faud Abbamin	Developing Measures of Social Responsibility Focusing on Organisations Sustainability and Economic Circularity
Valeriia Davydova	Measuring Corporate Social Responsibility focusing on company's ethics

Change Maker

Marayam Lamere, a Engineers without Borders UK Changemaker, is a City alumni and spearheaded the implementation of the Engineering for People Design Challenge into the curriculum at the University of the West of England for engineering students, alongside working on the high-profile PEE POWER® project developed by the Bristol BioEnergy Centre. In September 2021, Marayam showcased her work at an event promoted by City and Engineers Without Borders UK and expanded on her experience to an audience of educators.

"I believe engineers have the potential to provide solutions to global challenges we face today. With programs such as the Engineering for People Design Challenge, there is hope that the upcoming generation of engineers will be better equipped to make the right decisions, having the interest of humanity and our planet in mind."

National Symposium on Developing Socially Responsible STEM professionals

Engineers Without Borders UK sponsored the symposium over the last two years and were invited to speak in 2021. Emma Crichton, Head of Engineering shared a keynote focused on 'STEM professionals: are they equipped to tackle global challenges and is this a priority in their education?'. This highlighted the importance of empathy within education, and highlighted how social responsibility is not yet seen as a priority in our education, however hope exists.

During the 2022 Symposium, it was great to hear the Engineering for People Design Challenge being championed by educators, solidifying our partnership and highlighting connected areas of work. In addition to this, TEDI-London were invited to speak during the event, bringing together our two strategic university partnerships and showcasing the impact of effective collaboration in making change within the sector.

Relevant work connected to the aims of the partnership

Navigating ethical decisions

Engineers Without Borders UK has been working with the Royal Academy of Engineering, with a [vision statement on ethics and new case studies now available](#) for educators to adapt.

The 2021 Inspiring Community Leaders training series featured a workshop hosted by Engineers Without Borders International, investigating engineering ethics and the future of engineering education. The themes of the session built on the principles of ongoing advocacy work demonstrated through the [Open Letter](#). The letter was a response to proposed updates to international benchmarks of [engineering competency frameworks](#).

The workshop aimed to provide an opportunity to practice critical reflection about engineering and its impacts. It also aimed to reflect on the current views of engineering that underpin the educational experience so participants can make more informed decisions about their development. Educators from City participated in the session alongside educators from across the world. 2022 will see further workshops such as this, that focus specifically on navigating the complexities and ethical behaviour.

Challenging International competencies

In 2020, we worked with several Engineers Without Borders organisations to coordinate a response to a consultation on proposed revisions to the International Engineering Alliance's Graduate Attributes & Professional Competencies (GAPC) Framework.

Engineers Without Borders UK, Engineers Without Borders Australia, and Engineering Change Lab Canada led the way in coordinating the response, with involvement from Engineers Without Borders Brazil, India, Philippines, Netherlands, USA, and South Africa. As a group, we felt a key component was missing; the critical reflection needed for engineers to be able to address this century's complex problems, deeper comprehension of the ethical issues inherent in engineering and broader appreciation for the knowledge needed to make effective engineering judgments.

The response was followed by an open letter issued by Engineers Without Borders International to the International Engineering Alliance and the World Federation of Engineering Organisations, which was picked up in The Engineer, Electronic Specifier, Global Construction Review and Design Products & Applications. You can read the full open letter on our website.

Power of collaboration

Working together in a partnership has benefitted and strengthened the work of both organisations. In particular, we have:

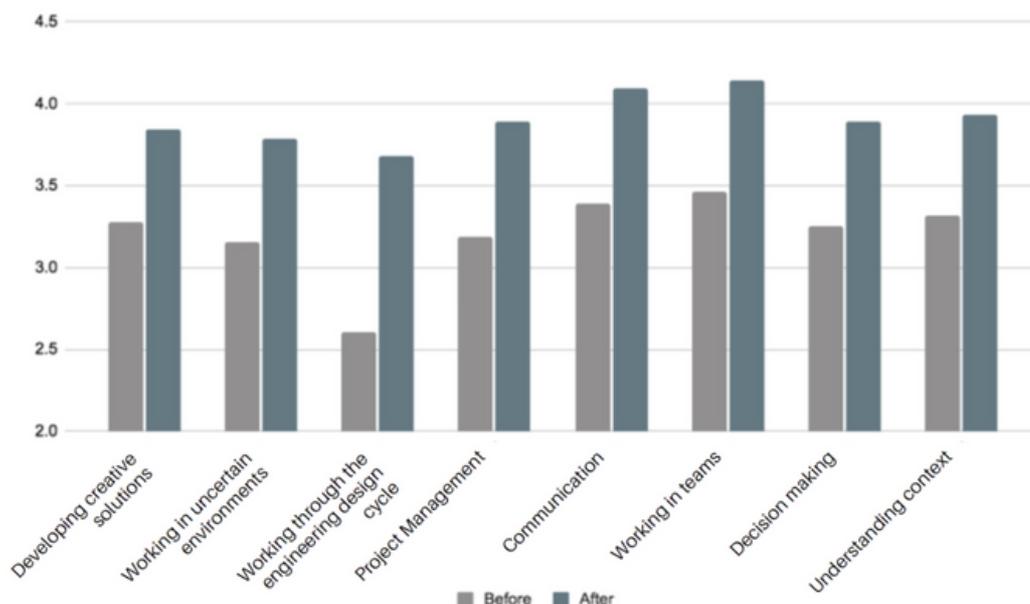
- Challenged each other's perspectives around engineering education and global responsibility
- Established a core team of City educators who are embedding global responsibility into their teaching and learning
- Collaborated across a number of sessions to scope out the year ahead and deepen the partnership
- Shared lessons and understanding from our areas of work, allowing us to reflect on our business as usual
- Introduced City to our other strategic partner, TEDI-London to encourage deeper connections
- Received input from City on the new Engineers Without Borders UK strategy

Next steps

As we move into the second year of the partnership we'd like to see developments in a number of areas.

Education

We will see the continuation of the delivery of the Engineering for People Design Challenge across various modules and disciplines. In the 2021/22 academic year the Design Challenge will have reached over 10,000 students from across Cameroon, South Africa, the UK and Ireland, and the USA and surveys from previous years have seen students competence and confidence across a range of critical professional skills drastically increase. Taking an average of all students who completed both surveys, what we saw was an increase ranging from 17 to 40% across these critical skills which can be seen in the table below. We also hope to see the continuation and growth of the Efficiency for Access Design Challenge. In addition to the design challenges Engineers Without Borders UK will be supporting programme development across the School of Maths, Computer Science and Engineering, engaging with senior staff and educators to ensure that global responsibility is embedded throughout the curriculum.



Student engagement

As we move into the 2022/23 academic year we hope to see the City, University of London Chapter grow. From September they will be in a place where they can run effective and engaging events for students and will be able to engage in our Inspiring Community Leaders and Building Community Leaders training series , and Designathon 2023.

Working with educators

The 2023 City Symposium will be supported by Engineers Without Borders UK and we look forward to working in partnership to ensure social responsibility is at the forefront of our work together in this area. In addition to this, we hope to see City, University of London and TEDI-London join forces to develop and share advocacy on the interpretation of AHEP4 and its accreditation. We'd also like to see City educators engaging with our educator training, where we will support them in understanding the principles of global responsibility and encourage a collective mindset shift in how they deliver education.

Summary

The purpose of this partnership is to demonstrate tangible evidence for how to place social responsibility as a core cultural feature of education within the School of Engineering, Maths and Computer Science at City, University of London, whilst ensuring it is a natural part of the student experience. A highlight of the first year of this partnership is knowing that it contributed in supporting students studying Mathematics and Computer Science to experience the Engineering for People Design Challenge, in addition to the Engineering cohorts.

The achievements that have shaped the first year of our partnership have been integral in ensuring we are laying the groundwork for future years. Thank you for your support during the first year of our partnership, we look forward to the journey ahead and continuing to work together to ensure we are creating socially responsible professionals.

We thank you for the ongoing support the partnership

Acknowledgements

Core team:

- Raj Roy, Dean of School of Mathematics, Computer Science and Engineering
- Mohson Khan, Head of Industry Engagement & Employability Education
- Sarah Stellabass, Professor of Soil Mechanics
- Alex Taylor, Reader in Human Computer Interaction
- Olalla Castro Alvaredo, Reader in Theoretical Physics
- Luke Smith, Engineering Programmes Manager, Engineers Without Borders UK
- Milly Dyer, Movement Facilitator, Engineers Without Borders UK
- Emma Crichton, Head of Engineering , Engineers Without Borders UK

Contributors:

- Maryam Lamere, University of West of England, and alumni of City, University of London.
- Samuel Brooks, Postdoctoral Research Fellow in Self-Engineer
- Jonathan Truslove, Education lead , Engineers Without Borders UK
- Charlotte Trick, Engagement & Communications Manager , Engineers Without Borders UK
- Valerii Davydova, student of MSc Project Management, Finance and Risk
- Fuad Abbamin, student of MSc Project Management, Finance and Risk
- Andrea Tellarini, student of MSc Project Management, Finance and Risk
- Marjahan Begum, lecturer in Computer Science
- Maria Dymova, lecturer in Mathematics
- Jafar Al-Zaili, lecturer in Power and Propulsion
- Shiqiang Yang, Professor of Computational Mechanics
- 300 1st year engineering students from 2020/21 participating in Design 1 module
- 300 1st year engineering students from 2019/20 participating in Design 1 module
- 57 Foundation year students studying computer science and mathematics in a module called Employability and Transferable Skills
- 5 masters students Module Renewable Energy and Power Systems Management
- Vithusan Vigneswaran, City, University of London Chapter President