HIGH VOLUME TRANSPORT
APPLIED RESEARCH

UK ENGINEERS WITHOUT BORDERS

Reshaping Transport

Final Report | Bringing Sustainable Transport to Life

December 2024

DT Global

UK International Development
Partnership | Progress | Prosperity

This research was funded by UKAID through the UK Foreign, Commonwealth & Development Office under the High Volume Transport Applied Research Programme, managed by DT Global.

The views expressed in this report do not necessarily reflect the UK government's official policies.

Reference No.	HVT/021.016
Lead Organisation/ Consultant	Engineers Without Borders UK
Partner Organisation(s)/ Consultant(s)	
Title	Bringing Sustainable Mobility to Life - Reshaping Transport
Type of document	Project Report
Theme	Capacity Building
Sub-theme	
Author(s)	Constance Agyeman
Lead contact	Tim Wilson
Geographical Location(s)	Global, particular focus on Global South

Abstract
This report summarises the activities and insights gained by Engineers Without Borders UK while undertaking a portfolio of work that helped bring sustainable mobility to life for university students and professionals. The scope of work included two innovation design challenges, a context review of High Volume Transport Applied Research Programme (HVT) funded projects over the last 7 years, and the development of a Reshaping Transport Playbook, to support educators to introduce their students to sustainable transport in globally responsible ways.

Keywords	sustainable mobility, transport, global responsibility, low-and middle-income countries, capacity building, Global South, Global majority
Funding	High Volume Transport Applied Research Programme (HVT), The Foreign and Commonwealth Office (FCDO) and UK International Development Aid.
Acknowledgements	We thank all participants, mentors, judges, partners, and stakeholders who contributed to the success of Bringing Sustainable Mobility to Life (Reshaping Transport). Also UNESCO for partnering on the Reshaping Transport Design Challenge.

Contents

Acronyms

DTG	DT Global
DRC	Democratic Republic of Congo
EwB UK	Engineers without Borders UK
FCDO	Foreign, Commonwealth & Development Office
GAATES	Global Alliance on Accessible Environments and Technologies
GBVAH	Gender Based Violence and Harassment
HVT	High Volume Transport Applied Research Programme
IPT	Informal Public Transport
ITDP	Institute for Transportation and Development Policy
LIC	Low Income Countries
LMIC	Low and Middle Income Countries
MIC	Middle Income Countries
NMT	Non Motorised Transport
PMU	Programme Management Unit
PPP	Public Private Partnership
PSBCT	Prototype Scheme Business Case Tool
RfP	Request for Proposal
RPW	Resource Poor Women
SAARC	South Asian Association for Regional Cooperation
SBCT	Scheme Business Case Tool
SOK	State of Knowledge
TIP	Trafficking in Persons
TOD	Transit Oriented Development
T-TRIID	The Transport-Technology Research and Innovation for International Development
TUMI	Transformative Urban Mobility Initiative
WFPR	Work Force Participation Rate

Executive Summary

High Volume Transport Applied Research (HVT) programme, funded by the Foreign and Commonwealth Development Office (FCDO) and UKAID, commissioned Engineers Without Borders UK (EwB UK) to deliver a project to build capacity and capability, **Bringing Sustainable Mobility to Life**.

The objectives of Bringing Sustainable Mobility to Life were to:

- Build the capabilities of people to contribute to improving the sustainable transport sector in the Global South;
- Fast-track the learning and ability of students and professionals to explore career paths in sustainable transport;
- Convert research findings into an interactive design month in July 2024, where people develop themselves;
- Convert research findings into an online toolkit (i.e. playbook) that could improve how universities and other stakeholders share knowledge about sustainable transport to better consider the needs of transport in the Global South.

Engineering without Borders UK carried out a comprehensive portfolio of work to achieve these objectives from January 2024 to December 2024 that included:

- The Reshaping Engineering Design Challenge
- A Context Review
- Playbook Version 1
- Consultations with stakeholders in the Global South
- Reshaping Transport Design Challenge
- Playbook Version 2

This report provides an overview of the work carried out and insights derived from these activities.

Highlights of the Design Challenge included significant contributions from young professionals and students, and a gender participation rate exceeding typical industry benchmarks. Participants developed actionable solutions guided by interdisciplinary mentorship, real-world contexts, and globally responsible principles. Each activity contributed to building capacities, improving education, and enabling real-world solutions for sustainable mobility. The outcomes reflect significant engagement, capacity-building achievements, and a strong emphasis on equity, inclusion, and global responsibility.

EwB UK was given access to over 150 pieces of research output as source material for review, including summaries of 40 selected HVT projects. This was used to develop the first version of the Reshaping Transport Playbook. The second iteration of the Playbook focused on several themes mainly using HVT resources but also other reference materials.

Key achievements

- **Engagement** - 228 participants (Reshaping Transport Design Challenge), 79.5% from the Global South, and over 25 mentors and 23 judges contributing expertise.
- **Capacity-building** - Enhanced understanding of sustainable transport systems through challenges, workshops, and resources.
- **Innovative Outputs** - The Reshaping Transport Playbook and real-world solutions developed through the Reshaping Transport design challenge and engagement with key stakeholders from the Global South.

1. Aims and objectives

Aim: To build capabilities, convert research into actionable tools, and inspire solutions for sustainable mobility, particularly as it relates to the Global Majority

In a world where mobility shapes livelihoods, access, and opportunity, sustainable transport systems are no longer a choice but an imperative. The Global South, home to the world's majority populations, stands at a critical juncture. Rapid urbanisation, increasing demand for transportation, and the pressures of climate change require immediate action to reimagine mobility and the transport systems that enable them.

Our goal at Engineers Without Borders (EwB) UK through the 'Bringing Sustainable Mobility to Life' programme of activities was to:

- build capabilities by empowering individuals, organisations, and communities with the knowledge, skills, and;
- develop tools to understand and consider how to address mobility and transportation challenges.

We aimed to bridge the gap between research and action, translating insights and data into practical, context-specific tools to drive real change. By fostering innovation through design challenges, we aimed to inspire solutions that prioritise sustainability, equity, and resilience.

To achieve that, four main objectives were pursued:

- Build the capabilities of people to contribute to improving the sustainable transport sector in the Global South;
- Fast-track the learning and ability of students and professionals to explore career paths in sustainable transport;
- Convert research findings into an interactive design month in July 2024, where people develop themselves;
- Convert research findings into toolkits (i.e. playbook) that improve how universities and other stakeholders share knowledge about sustainable transport to consider deeply the needs of transport in the Global South.

1.1 Methodology

The methodology for this programme was developed through six interconnected activities, each designed to build a robust, context-specific approach to addressing sustainable mobility challenges in the Global South.

These activities moved from foundational research and context assessment to hands-on, participatory design challenges, and iterative tool development. The process began with *The Reshaping Engineering Design Challenge and* a comprehensive *Context Review* to situate mobility challenges within local and global realities, followed by *Consultations* to incorporate diverse stakeholder perspectives.

The main challenge *was the Reshaping Transport Design Challenge,* which provided opportunities for applied learning, capability-building, and innovation. Alongside these, iterative versions of the *Playbook* were developed to translate research and insights into actionable tools for educators, practitioners and others to better support the development in understanding of sustainable mobility and transport.

1.1.1 Methods

Context review

The Context Review was a foundational methodology for understanding the complex ecosystems within which sustainable mobility challenges exist.

Engineers Without Borders UK conducted a deep dive into over 150 pieces of HVT-funded research output as source material for the review and summaries of 40 selected projects. The documentation also included guides, toolkits and resources specifically designed to support decision-makers and planners.

This information was used to develop an overarching context of sustainable mobility that would be pertinent in shaping the Playbook and Design Challenge activities, especially to those in the Global South

The question that guided the Engineers Without Borders UK review was:

'What are the key topics and thematic areas related to sustainable transportation in the Global South that are important to share with educators, learners and others to raise their awareness of the impacts of sustainable mobility within the context of globally responsible engineering?'

The document was intended to create a contextual landscape of sustainable mobility that also considers how HVT research can be used in more practical ways to support broader education and knowledge sharing in this sector.

Reshaping Engineering Design Challenge

The Reshaping Engineering Design Challenge provided a hands-on, problem-based methodology to build capabilities and inspire design solutions. By engaging learners, practitioners, innovators across disciplines involved in transport planning and decision-making in a structured design process, the challenge encouraged participants to address real-world challenges through sustainable engineering solutions.

Reshaping Engineering is a collaborative learning process, where participants move from problem identification to prototyping actionable concepts. The challenge combines creative and design-based thinking with systems-oriented problem-solving, emphasising the critical role of design in developing context-specific solutions. This method not only builds technical and analytical skills but also empowers individuals to apply these skills, creating solutions that are both impactful and implementable.

Playbook Version 1

Playbook Version 1 served as a prototype methodology to test the translation of research into actionable tools for educators, practitioners and others. Designed as a modular resource, it introduced key concepts such as eco-systems thinking and globally responsible practice, while facilitating project-based learning.

This iterative approach allowed us to gather feedback on the tool's structure, usability, and relevance, ensuring that insights from real-world applications informed the development of a more refined and impactful Playbook Version 2. By testing and adapting the tool in context, this methodology ensured it remained responsive to user needs and practical for achieving sustainable mobility goals.

Consultations

Consultations formed a participatory methodology that ensured inclusivity and relevance in the design of the programme. Engaging key stakeholders—such as policymakers, educators, industry leaders, and community representatives—through an online sandbox, interviews, and focus groups brought diverse perspectives into the conversation.

These methods prioritised co-creation and knowledge-sharing, enabling stakeholders, including in the Global South to buy into and own the consultation process. By actively listening to those directly involved, consultations validated priorities and uncovered other key nuances. This ensured that the programme and materials were designed equitably and were contextually appropriate. This approach also strengthened partnerships and bridged the gap between top-down strategies and community-driven needs.

The Reshaping Transport Design Challenge

The Reshaping Transport Design Challenge built on the momentum of the previous activities, functioning as a programme to apply knowledge and creativity to solve transport-specific issues.

This keystone challenge brought together interdisciplinary teams to address real-world transport problems through challenge-driven innovation. By focusing on practical, scalable solutions, it encouraged participants to consider equity, inclusion, and environmental sustainability in their designs.

This method cultivates agency and leadership, providing a platform for learners and professionals to experiment with ideas, and design solutions that lean into globally responsible practice and a focus on the needs of the global majority.

Playbook Version 2

Playbook Version 2 has an advanced, refined methodology incorporating feedback, learning, and outcomes from earlier activities. It built on the foundation of Version 1 and provided enhanced tools and resources that reflect real-world applications, best practices, and participant experiences. It offered deeper insights into implementing sustainable mobility projects, with additional case studies, contextual guidance, and evaluation frameworks.

Version 2 of the Playbook emphasised continuous improvement, showcasing how iterative development can ensure tools remain responsive, relevant, and impactful. As a living resource, it equips educators, practitioners and others, with a more robust framework to explore sustainable mobility in practise, reinforcing the project's overarching aims.

2. Activities and Insights

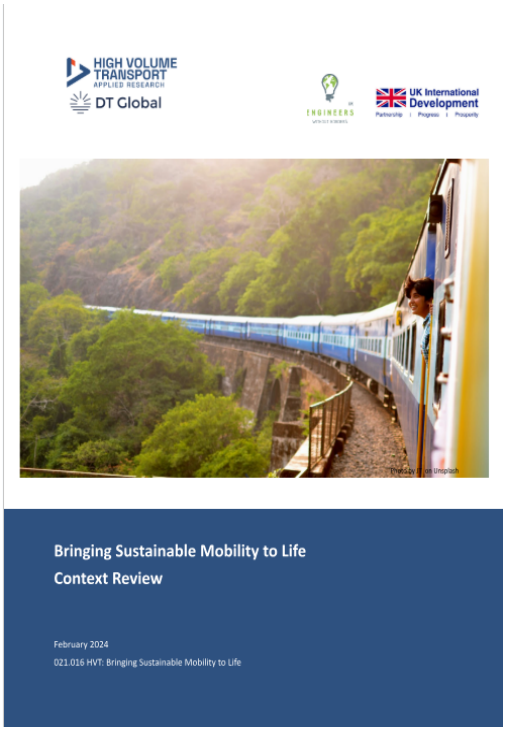
2.1 Context Review

Bringing Sustainable Mobility to Life: Context Review 2024, serves as a comprehensive contextual analysis supporting the development of sustainable transport initiatives in the Global South. The review focuses on synthesising research outputs, tools, and resources to inform the development of a Playbook and a Design Challenge activity for engineering educators and learners globally.

EwB UK was given access to over 150 pieces of research output as source material for the review, including summaries of 40 selected HVT projects amongst other collateral.

Central to this review was understanding how transportation affects people and the planet. Also, the key factors that shape the experiences, types and levels of impact, and how globally responsible design and practice can help mitigate these and drive forward more sustainable transport pathways.

Each section in the review provides context on a thematic area that is mainly drawn from the HVT research. It also includes some brief reflections on the research provided related to that particular area of focus. Research references are linked back (predominantly) to where they can be found on the HVT website, in several different formats.



Content Structure

Sustainable Mobility and High-Volume Transport defined sustainable mobility in the context of high-volume transportation and its significance in addressing environmental, social, and economic challenges.

Regional Focus on Africa and South Asia explored the unique challenges and opportunities in transport systems within these regions, highlighting infrastructural disparities, urbanisation pressures, and social inequities.

Ecosystem and Stakeholders discussed the roles of engineers, planners, policymakers, community and other stakeholders in creating sustainable transport systems.

Inclusion and Equity analysed the impacts of transport on marginalised groups, including women, youth, and people with disabilities, offering strategies for fostering inclusivity.

Planet and Climate Response addressed the environmental impacts of high-volume transport and proposed climate-responsive interventions such as electric mobility and decarbonisation.

Principles and Design Themes introduced guidelines and thematic areas that drive globally responsible design and innovation in transport systems.

Tools and Resources highlighted existing resources, case studies, and research findings that could be utilised in developing educational and practical outputs.

2.1.1 Key Insights

1. Regional Nuances in Transport Development

- **South Asia**. This region has seen significant investment in infrastructure, such as extensive railway and road systems, particularly in countries like India. However, challenges persist in integrating sustainability and inclusivity into these systems.

- **Africa**. Transport systems in Africa face more pronounced disparities, with some countries showing progress in urban infrastructure while others grapple with underdeveloped or non-existent networks. Issues such as low railway density, inadequate public transport systems, and a reliance on informal modes of transport are common. Geographical barriers and financial constraints further complicate progress.
- **Cross-regional challenges**. Both regions struggle with urban congestion, air pollution, and the need for greater multimodal connectivity, especially for underserved rural and peri-urban populations. Road safety issues were increasing in both regions.
- **Emphasising local context and lived experience.** Transport solutions should avoid a one-size-fits-all approach that may be heavily influenced by studies in the Global North. A greater emphasis on those with local lived experience, ensures designs are culturally relevant, sustainable, and better address the unique needs of local communities.

2. The Role of Inclusion and Equity

- **Women and gender sensitivity**. Gender-based barriers in transport systems are widespread, including safety concerns such as harassment in public spaces and transport, affordability challenges, and a lack of gender-sensitive planning. Addressing these issues is critical to empowering women, enabling economic participation, and improving overall social equity.
- **People with disabilities**. Accessibility remains a major challenge. Public transport in many LMICs lacks features such as ramps, accessible vehicles, and clear signage, further isolating individuals with disabilities. Improving accessibility is essential for promoting social inclusion and economic empowerment.
- **Youth engagement**. Youth populations in LMICs are often excluded from transport planning despite being major users and innovators. Their aspirations, particularly for safer, affordable, and technology-driven transport systems, highlight the need for youth-focused policy and engagement.
- **Marginalised groups**. Older adults, low-income populations, and other vulnerable groups often face exclusion from transportation systems due to affordability, safety, or physical barriers. Ensuring equitable access for these groups is a cornerstone of sustainable mobility.

3. Environmental and Climate Challenges

- High-volume transport in LMICs is a significant contributor to global greenhouse gas emissions and local air pollution. Urban areas, in particular, suffer from deteriorating air quality, impacting public health.
- The adoption of electric and renewable energy-powered vehicles is a key strategy for reducing emissions. However, implementation remains limited due to inconsistent electricity supply and inadequate infrastructure.
- Opportunities such as electric two- and three-wheelers in rural and urban areas could serve as low-cost, sustainable options to address last-mile connectivity and reduce dependence on fossil fuels.

4. The Importance of Multidisciplinary Collaboration

- Creating sustainable transport systems requires the integration of engineering, urban planning, economics, social sciences, environmental expertise and others. Collaboration among disciplines ensures that solutions are innovative, cost-effective, and socially inclusive.
- Community stakeholders bring invaluable insights into local needs and cultural dynamics. Their involvement in co-design and decision-making processes ensures that transportation projects are context-specific and equitable.

5. Leveraging Technology and Data

- Digital tools and data analytics offer transformative potential for transport planning. Technologies such as GPS tracking, ride-hailing platforms, and real-time information systems improve efficiency and user experience.

- The integration of technology must be paired with education and capacity-building to ensure equitable access and meaningful utilisation, especially in resource-constrained settings.

6. The Power of Education and Advocacy

- The Playbook and Design Challenge represent innovative approaches to raising awareness and building capabilities in sustainable transport. They focus on equipping educators, learners and others with practical tools and frameworks to understand and address transport challenges.
- Education initiatives emphasise the need for systems thinking and globally responsible design, fostering a new generation of professionals committed to sustainable mobility.

2.2 Reshaping Engineering

Reshaping Engineering 2024 was a month-long virtual design challenge led by Engineers without Borders UK with programme partner Azuko, with the sponsorship of Jacobs and the High Volume Applied Transport Research Programme and the support of CrowdSolve. It began at the end of January and concluded on 7 March 2024.

The programme invited student and professional participants from around the world to design solutions that could reshape how engineering is taught and practised, to ensure a safe and just future for all.

Intended for those with and without engineering expertise, participants tackled a real-world brief to facilitate a deeper and broader understanding of the impacts of engineering and the approaches for putting global responsibility at the heart of all we do.

Dissemination activities

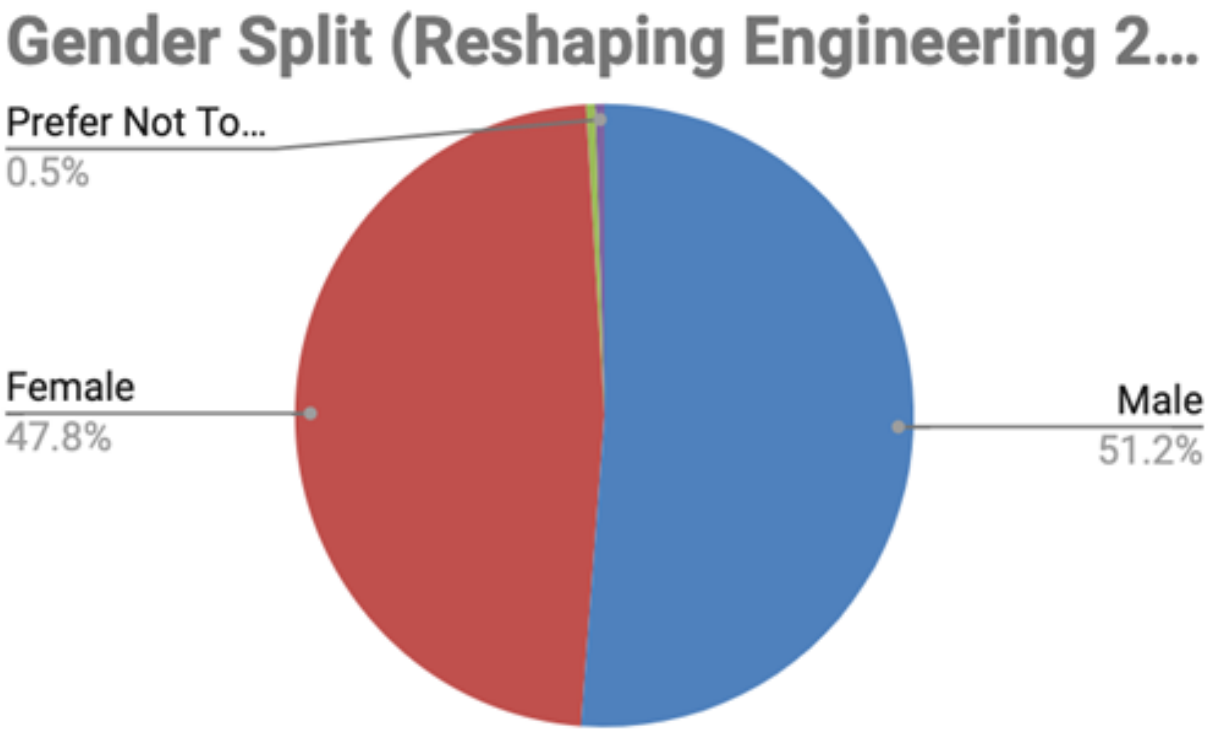
We held the following dissemination campaigns throughout the lifespan of the programme. Links to some of the activities are included below.

- Promotional campaign (including a YouTube launch video) Link to YouTube Video.
- Design Brief x 1 Link
- CrowdSolve platform x 1 (dedicated web platform throughout the lifespan of the programme) Link
- Weekly newsletters (x9) including knowledge sharing YouTube videos x 6 (Knowledge Sharing Videos)
- Launch event x 1 (over 100 registrants; over 80 attendees)
- Celebration event (over 70 attendees)
- Judging sessions x 2
- Promotion of people's vote (public vote - favourite project) - 175 public votes
- Cross-channel social media correspondence throughout the challenge
- Post-event survey to gauge learning journey and impact made (x 71 participants)
- Monitoring and Evaluation Report

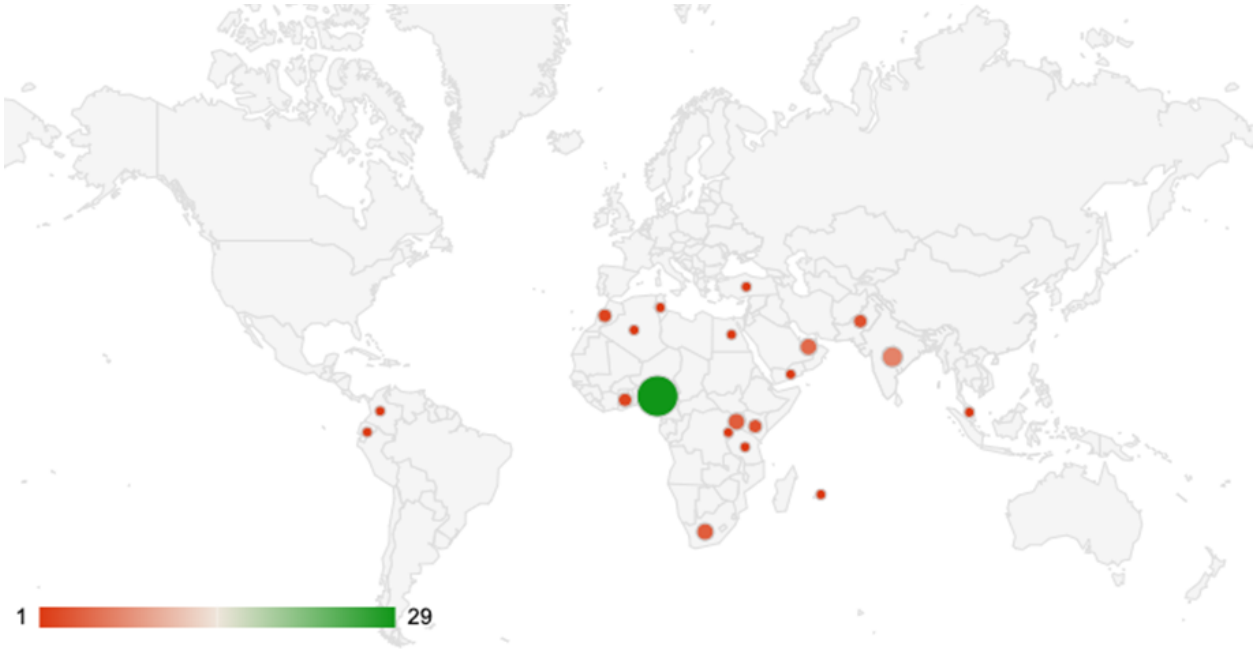
Insights

Number of participants engaged in Reshaping Engineering: 207

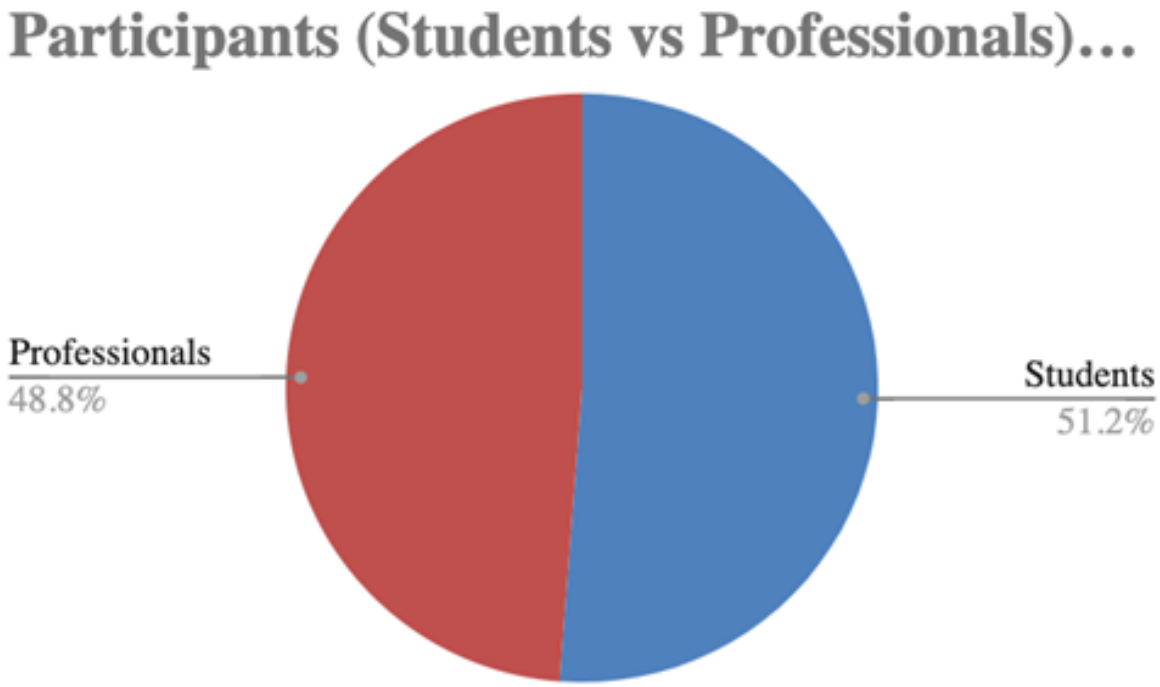
Gender split: The split was virtually 50/50, with just slightly more male-to-female ratio - 106/51.2% male; 99/47.8% female; 1/0.5% non-binary.



Geographical location of Reshaping Engineering participants: Just over one-third of participants (34.0%) were based in Global South countries. Just under two-thirds were from the Global North (64.6%) and the remaining 1.4% did not specify their location.



Students and Professionals: Similarly to gender, we almost had a 50/50 split for students versus professional participants with 106 students (51.2%) and 101 professionals. When putting teams together, unless teams specified that they wanted to work together, we aimed to ensure a mix of students and professionals, with an emphasis where possible, on international teams across appropriate time zones



Number of institutions engaged
Universities - 30 Companies - 73

Industry participants engaged in mentoring/ assessment roles

We were fortunate to call on 36 volunteers in the mentoring and assessment stages of the programme with engineering experts from across our networks, including representatives from industry and academia.

We had **18 reviewers** who supported teams in guiding their concept note submissions and provided a steer in advance of final submissions. We had **13 shortlisting judges** who worked with us in providing qualitative feedback and a score to the final submissions to help us whittle down 19 final team submissions to a top 6. We had **5 judges** who helped decide the top teams including the winner and runner-up.

Qualitative Feedback

We also invited participants to provide qualitative feedback as part of the process. This is a selection of comments from the final survey, showcasing the impact that the programme has had on participants.

Liked Most	Suggested Improvements
"During the challenge I had an amazing opportunity to engage with people from all over the UK, deeply reflecting on social, environmental and economic challenges of today's planet." "I also learned about Globally Responsible Engineering principles: responsible, purposeful, inclusive, and regenerative. I have learned to consider the impact of my work and ensure that it benefits society and the planet." "An opportunity to grow and learn from others, exercise critical thinking to make informed decisions about our surroundings." "Very useful experience. Having the resources to read and learn from was very helpful. The challenge was strategically designed to have the correct pace and length. Very pleased."	"I feel we did not have enough time between the submission of the concept note and final submission to fully establish our project proposal." "It would have been better to have a mentor at the first session just to get us off on the right track as the brief could have been interpreted in so many different ways. Maybe this was partly the point but the whole thing felt very rushed and like we had no time to properly consider a problem/solution." "Would have loved to hear more personalised feedback following the judges' decisions." "I would like the organisers to consider the option of allowing individual participation for people who may not be able to collaborate in a team because of timezone challenges or due to dropout of fellow participants" "improve the user experience of the platform"

2.3 The Reshaping Transport Design Challenge

The Reshaping Transport 2024 challenge is a global design initiative that invited students and professionals from around the world to address pressing transport issues. The challenge aimed to foster creative solutions that promote sustainability, inclusion, and efficiency in the transport sector, particularly focused on the global majority.

Participants, with or without transport or engineering expertise, were encouraged to collaborate on real-world transport issues, applying innovative thinking to help shape the future of transportation.

The following activities were conducted during the challenge:

- Launch event participation from over 220 registrants
- Team Matching
- Mentor feedback with 25 mentors
- Assessment and shortlisting by 19 judges
- Decision-making with 4 judges
- Announcement Celebration event

Key Outputs

Reshaping Transport Design Brief, CrowdSolve Platform, Weekly Guidance Videos, Weekly newsletters, Global Responsibility Compass, Mentors and Judges Guidance Brief- slides and videos.

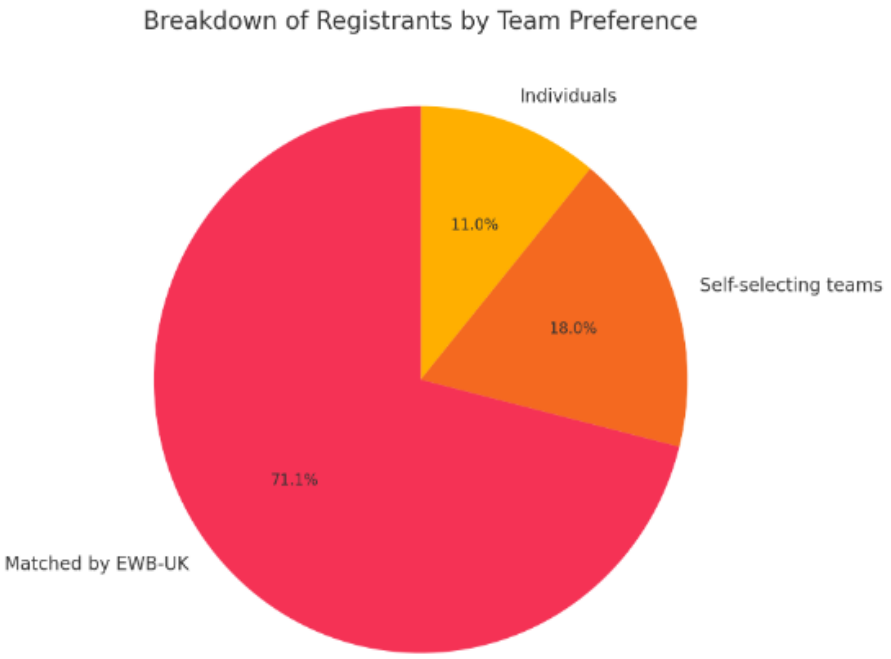
Participants

Reshaping Transport Design Challenge 2024: 228 registered, 209 participated.

This pie chart represents the breakdown of registrants by team preference, with 25 opting to take part as individuals, 41 self-selecting teams, and 162 wanting to be matched.

Participants have varied motivations for their approach to team selection. Those working individually often seek autonomy, valuing control over decisions, flexibility in managing their time, and the chance to test their skills for personal growth. Conversely, participants self-selecting teams typically leverage existing networks to build on trust, synergy, and complementary skills, aiming to enhance performance.

The majority, however, opted to be matched by Engineers Without Borders UK, reflecting a preference for diverse collaboration and confidence in the organisation's ability to form balanced teams. This route offers participants exposure to new perspectives, reduced pressure in team formation, and structured support for effective collaboration.

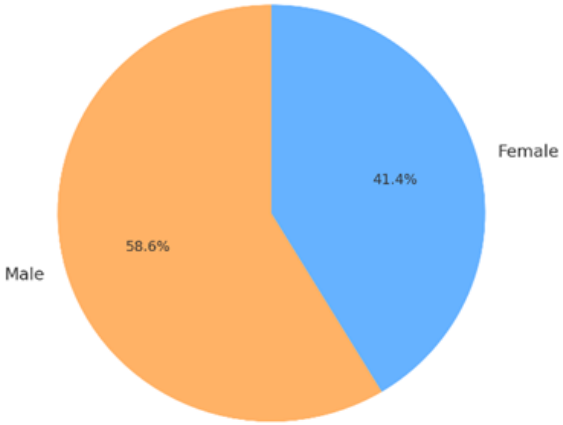


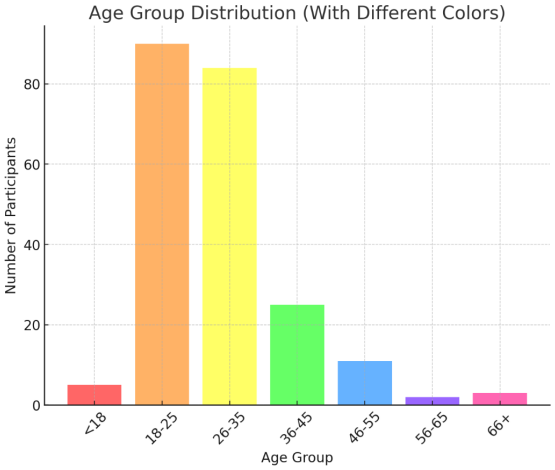
The gender breakdown among participants

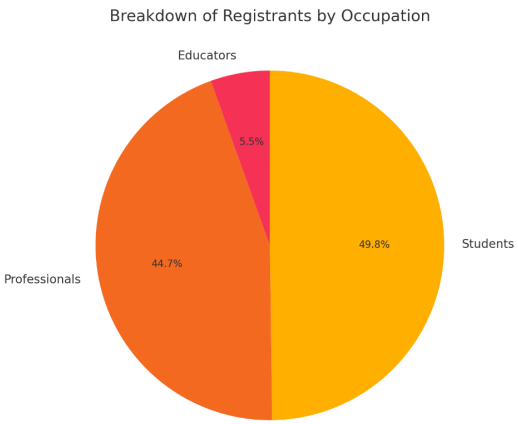
- Male: 58.6%
- Female: 41.4%

The gender split, showing a slight majority of male participants (59%) compared to female participants (41%), is understandable when considered within the context of engineering and participation in a transport design challenge.

The 41% female participation rate in this challenge highlights progress in addressing the gender imbalance in engineering, where women have historically been underrepresented, particularly in male-dominated fields like transport engineering. While this figure exceeds typical representation in the profession, it underscores the importance of continued efforts to promote gender diversity. Initiatives like this challenge empower women by providing visibility, opportunities to contribute unique perspectives, and inspiring future generations of female engineers. Increasing female participation not only helps shift perceptions of engineering as an inclusive field but also drives innovation and ensures transport systems are equitably designed for all users.





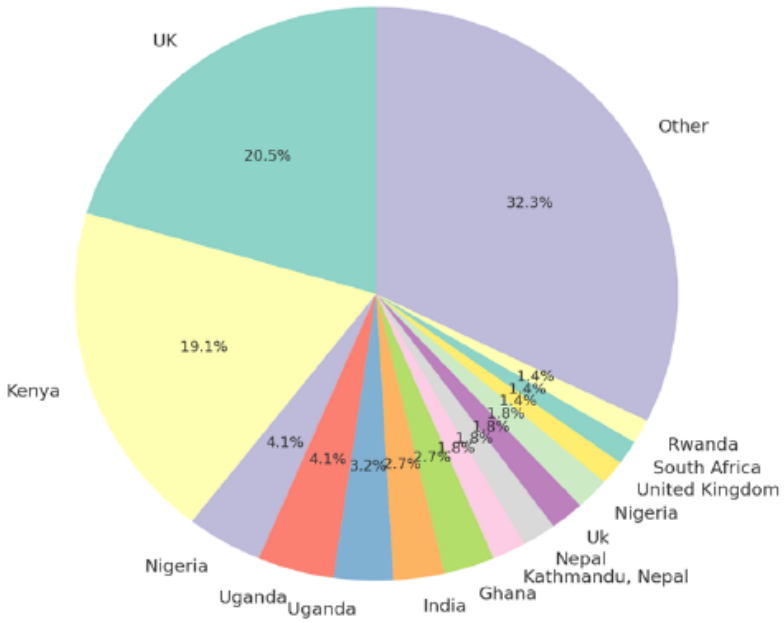


The majority of participants are aged 18-35, with the largest group being 18-25. This age range is drawn to engineering and design challenges due to their focus on innovation, creative problem-solving, and the opportunity to shape future-forward industries like transport. Younger participants, particularly recent graduates, bring fresh knowledge, openness to experimentation, and familiarity with the latest technologies. This stage of life often involves exploring career paths, building skills, and networking, making challenges like these an ideal platform for professional growth and exploration of engineering and transport design.

The participant group is composed of 49.8% students, 44.7% professionals, and 5.5% educators. Students are drawn to the challenge for its opportunity to apply academic knowledge and enhance career prospects, while professionals see it as a platform to contribute expertise, innovate, network, and expand their skills. Educators, though the smallest group, likely participate to share their expertise, mentor younger participants, and stay connected to industry trends and practical applications of their teaching.

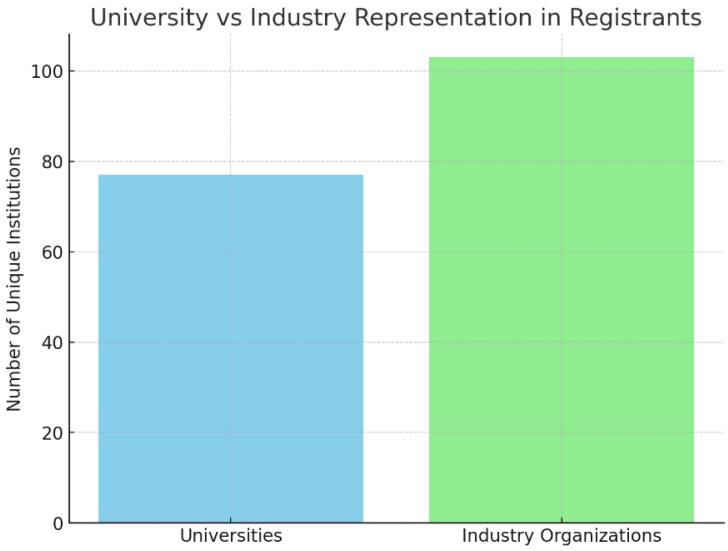
Global South Representation

Approximately 79.5% of Reshaping Transport participants were from Global South countries. The most represented countries include Kenya, Nigeria, Uganda, and Ghana.



Registrations indicate that participants represent a diverse set of institutions.

There were 77 unique universities listed. These include well-known global institutions such as Imperial College London, University of Warwick, University of Ghana, and several technical universities from various regions like Kenya, Uganda, and Nigeria. This broad representation suggests strong engagement from the academic community, particularly students and early-career professionals, across a range of countries.



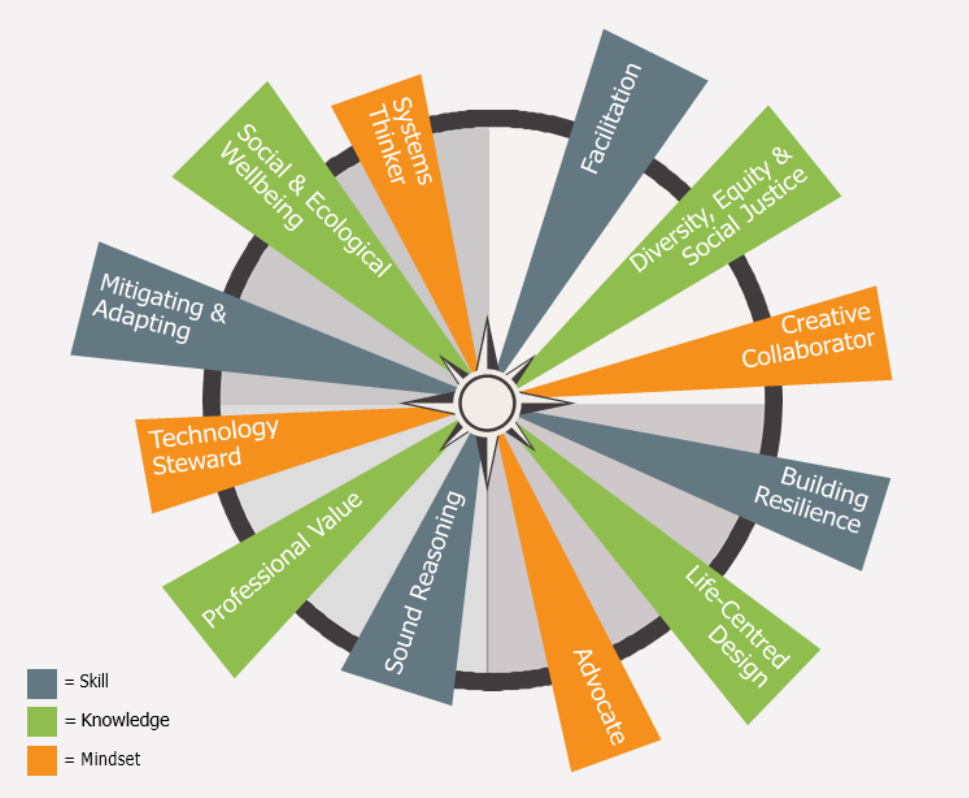
There were 103 unique organisations listed, spanning different sectors such as transportation, consultancy, government agencies, and private enterprises. Examples include Standard Chartered, Howden, Kampala Capital City Authority, and Kenya Airports Authority. The presence of various industry players highlights the professional interest in the challenge, particularly from sectors related to transportation, infrastructure, and urban planning.

Projects

36 innovative projects were submitted that aimed at reshaping transport globally, particularly focused on the global majority. These can loosely be categorised as:

1. Electric and solar-powered vehicles: Projects like Gham Boda in Kenya, electric three-wheelers in Busia, and solar mini buses on campuses.
2. Accessibility: Innovations to improve transport for people with disabilities, including ride-sharing apps and smart hubs in Ghana.
3. Public transport enhancements: Proposals like dedicated bike lanes, congestion pricing, and revitalisation of railway infrastructure in Nairobi.
4. Sustainability and safety: Using AI for traffic control, weatherproof bicycle covers, and solid-state wind energy for EV batteries.

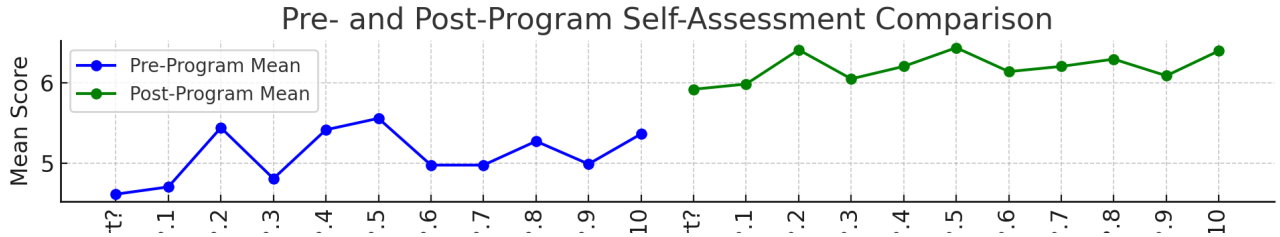
Learning Journey

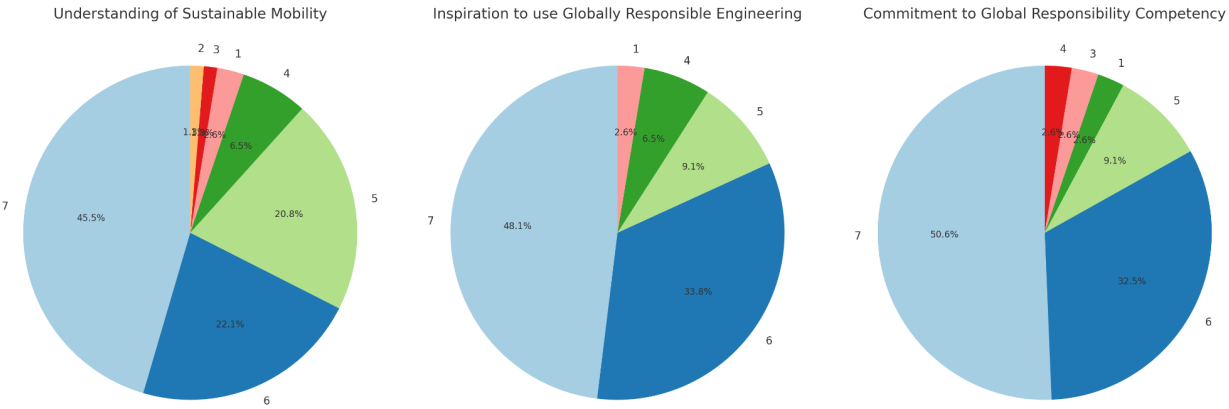


Reshaping Transport is a learning opportunity for participants that is rooted in Engineers Without Borders UK's Global Responsibility Competency Compass. Through participating, it enabled an exploration of how to make the mobility and transport sector more globally responsible.

The design challenge was focused on 3 key learning outcomes.

Competencies	Learning outcomes	In the Assessment Framework
Become a **Technology Steward**	Demonstrate ability to critically reflect on complex relationships and tensions to ensure sustainable and equitable results in your solution.	Critical reflection on decisions demonstrated throughout the design of your solution. Show commitment to learning through SMART objectives.
Strengthen your understanding of **Life-Centred Design**	Apply knowledge of sustainable mobility and transport to prioritise people and planet in your solution.	Demonstrate effective communication of this knowledge by prioritising all people and the planet in your solution.
Develop your **Sound Reasoning** skills	Design solutions that uphold global responsibility across their life cycle by interrogating the role of engineering for people and planet.	Practise designing for positive change in the mobility and transport sector.





Understanding of 'Sustainable Mobility and Transport- Most participants reported significant improvement in their understanding, with a high percentage rating 7 (strong agreement).

Inspiration to Use Principles of Globally Responsible Engineering - The majority felt inspired to apply these principles, with many rating 6 or 7.

Commitment to Developing Competency in Global Responsibility - Most participants strongly committed to developing their competency, with ratings of 6 and 7 dominating.

Other participants

25 Mentors from across a range of industries representing a diverse range of global representation

There were 19 Shortlisting judges including experienced professionals from various disciplines including sustainable transport, urban planning, transport engineering, social science, health and mobility innovation. They bring a wealth of knowledge from regions including Africa, Europe, and Asia. Their focus areas include electric mobility, public health, road safety, and climate change. Profiles of judges can be found here

There were 4 Lead Judges who undertook final deliberations to select the award winners. The lead judges, Charlène Kouassi, Bronwen Thornton, Neil Ebenezer and Charles Anum-Adams, are renowned figures in transport mobility, walkable cities, and transport research in Africa, South Asia, and globally. Profiles of judges can be found here.

UNESCO, as part of their 10th UNESCO Africa Engineering Week provided financial and non-financial support to Reshaping Transport. Their contribution financially was $5,700 for engagement in their Africa Engineering Week activity. Their non-financial support included shortlisting judges, speaker at final event, distribution of this information sheet about the Reshaping Transport Finalists and distribution of information about the People's Prize vote.

Summarised Feedback

What Worked Well	What could be improved
• **Diverse collaboration.** Participants appreciated the opportunity to work with individuals from different backgrounds, fostering creativity and innovation. • **Learning resources.** The educational content and guidance provided, such as weekly videos and newsletters, were highly valued. • **Focus on sustainability.** Participants enjoyed rethinking transport systems with an emphasis on social and environmental impacts. • **Team-based approach.** The collaborative structure encouraged sharing insights and diverse problem-solving approaches. • **Mentor support.** Mentorship feedback and guidance were appreciated for helping participants align with project goals and improve outcomes.	• **Extended project timeline**. Participants suggested more time between submission phases to develop their projects thoroughly. • **Early mentor involvement**. Participants recommended involving mentors earlier to better align team efforts with project objectives. • **Platform Usability**. Issues with the Crowdsolve platform, including confusing notifications, were highlighted for improvement. • **Clearer submission guidelines**. A standardised structure or checklist for submissions was suggested to ensure clarity and consistency. • **Enhanced communication**. Participants noted the need for improved direct communication and better integration of feedback mechanisms.

2.3.1 Winners

"I think this is something that affects us every day when going to work and living. We're so happy that our design challenge won the competition and are actually hoping this is something that can be implemented to save not just us, but millions of Nairobians that commute every day."

Kelvin Solo, Team RT24-029S (Winning Team)

Overall Winner & 10th UNESCO Africa Engineering Week Award

Revamping Nairobi's Railways, by Team RT24-029S

Team RT24-029S took both the top prize and the prestigious 10th UNESCO Africa Engineering Week

Award with their visionary plan to revitalise Nairobi's railway infrastructure. Their project focuses on improving train schedules, upgrading existing trains, repairing critical rail infrastructure, and expanding routes to enhance the efficiency and sustainability of public transit in the Kenyan capital. By tackling road congestion, reducing carbon emissions, and shortening travel times, this ambitious proposal stands out for its potential to transform urban mobility in Nairobi.

Runner-Up & People's Prize (public vote) Winner

SkyLog: A Green Public Transport System in Mumbai, by Team RT24-033S

Team RT24-033S earned the first runner-up spot and the People's Prize, awarded through a public vote, for their project that aims to create a green public transport system in Mumbai. Their solution seeks to connect both urban and rural areas, ensuring that essential services are accessible to everyone, while also reducing the environmental footprint of transport in one of India's most densely populated cities.

Runner-Up

EV Emergency Pod, by Team RT24-027S

The second runner-up, Team RT24-027S, proposed an innovative emergency vehicle concept. The "EV Emergency Pod" is a self-driving, electric-powered vehicle designed to reach emergencies faster than conventional ambulances. Compact yet fully equipped like an ambulance, this pod-like design aims to cut response times and save lives in congested urban environments.

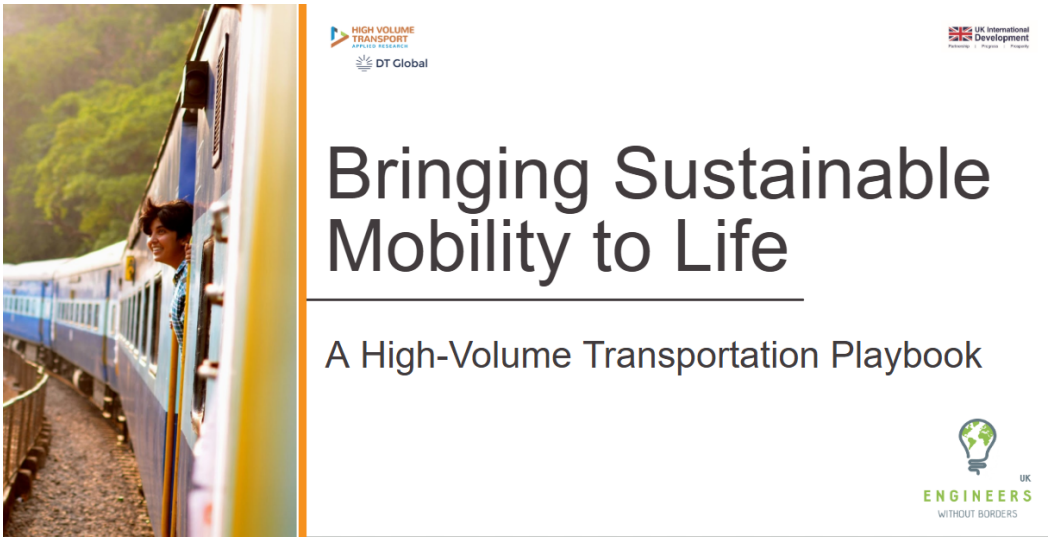
2.4 Reshaping Transport Playbook

The **Playbook** is a guide designed to support the integration of sustainable mobility principles into engineering education, particularly in regions facing significant transportation challenges like low- and middle-income countries (LMICs). It emphasises the urgency of embedding sustainability, equity, inclusivity and ethics into engineering practices to address pressing global issues such as climate change, social inequities, and inadequate infrastructure. By providing a structured framework, the playbook aims to prepare future engineers and others to create transport solutions that are not only efficient but also inclusive, resilient, and environmentally conscious.

The primary audiences for the Playbook are higher education faculty teaching engineering, urban planning, and sustainable development, as well as vocational educators training future transport professionals. However, due to the design of the playbook it could also be of use in secondary schools and organisations keen to improve the knowledge of sustainable transport or its workforce and others.

2.4.1 Playbook Version 1

Engineers without Borders UK created an initial version of the Playbook to test with a wide range of stakeholder including educators and professionals on whether it would be a useful tool to support building awareness about issues related to designs for sustainable transport.



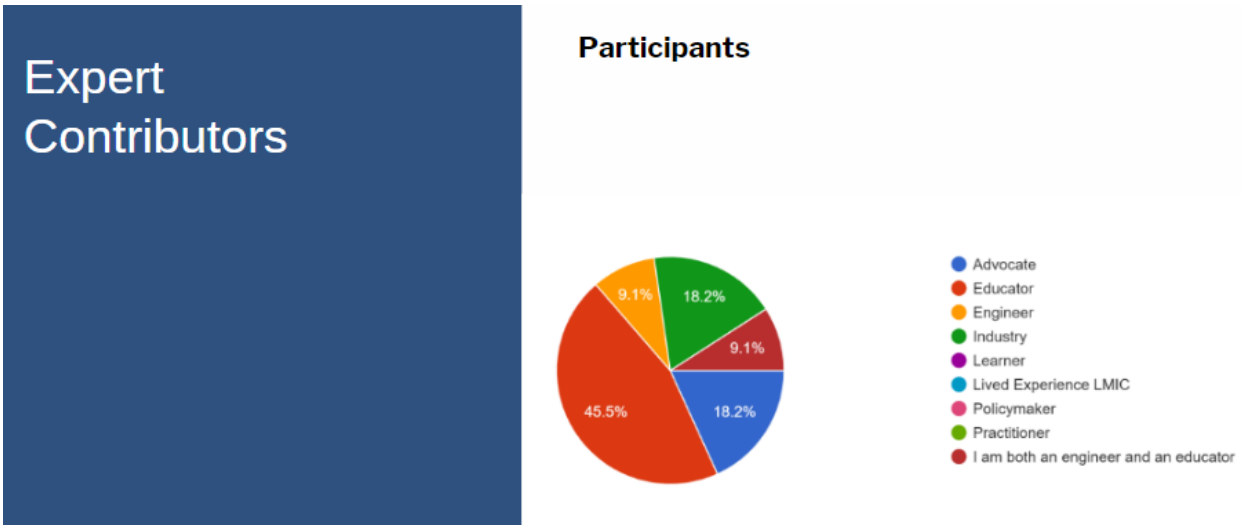
The playbook offered a range of tools and resources, including case studies, worksheets, and learning outcomes, to promote interdisciplinary collaboration and experiential learning. It encouraged educators, learners and others to explore practical applications of sustainable mobility concepts, develop critical skills, and understand the interconnectedness of engineering solutions with societal and environmental impacts. Through themes like electrification, urban planning, and social equity, it fostered a systems-thinking approach to transport challenges, highlighting the need for innovative and holistic solutions.

The playbook served as a call to action, urging educators and learners to champion sustainable mobility in their communities. It invited them to actively engage in creating transformative solutions while reflecting on the broader implications of their work. By cultivating globally responsible engineering practices, the playbook envisions a future where transport systems support both people and the planet, addressing present challenges and anticipating future needs.

2.4.2 Consultations

We engaged in several consultations to inform the Reshaping Transport Playbook, which included virtual sessions, interviews, workshops and focus group activities.

Online Sandpit February 2024



Data collected from 45% of participants indicate a diverse range of expertise and lived experience.

We facilitated a virtual online sandpit. The aim was to crowdsource content from global experts in sustainable mobility and high-volume transportation to highlight key trends, priorities and factors affecting high-volume transport to inform the development of the playbook and design challenge

- 32 registrations, 24 participants, 45% participants from global south geographical locations.

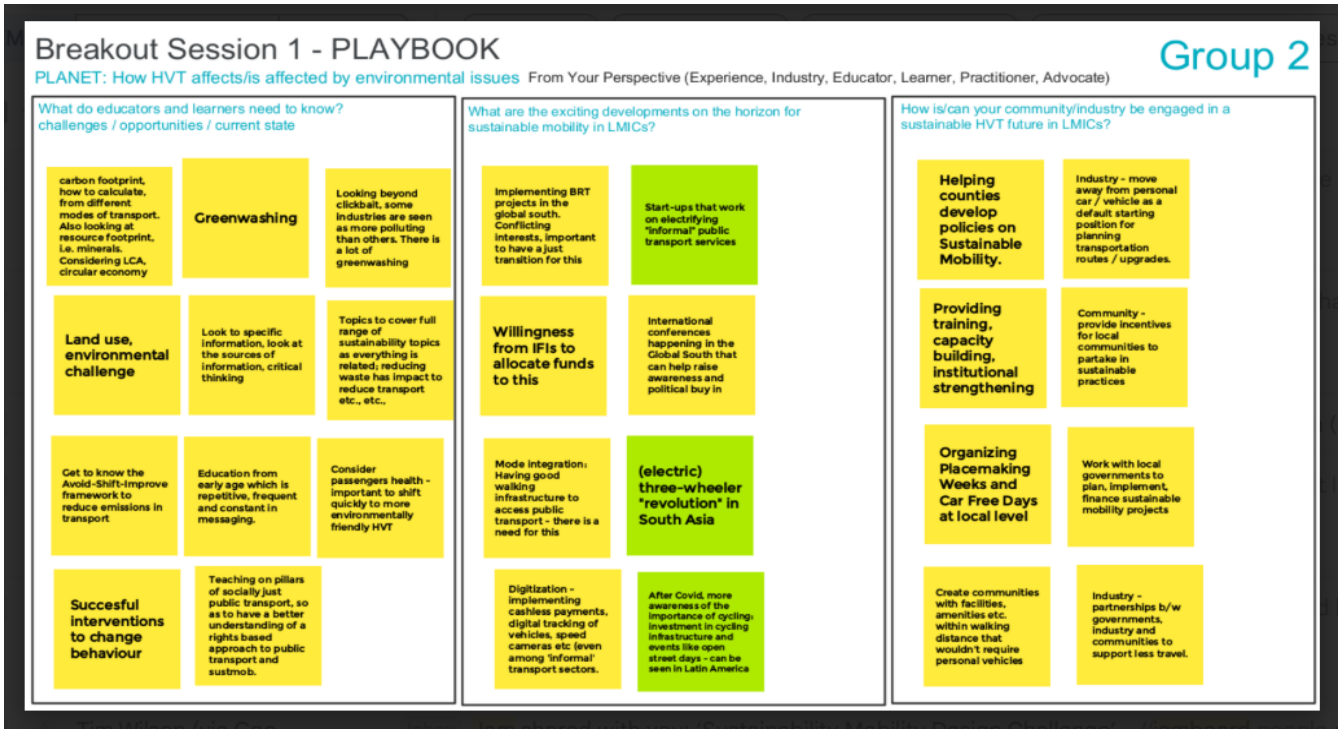
The event focused on two key areas in breakout sessions

Playbook (3 groups with a focus on people and planet and interventions) discussed

What do educators and learners need to know; What are the exciting developments on the horizon for sustainable mobility in LMICs?; How can/is your community engaged in a sustainable HVT Future.

Design Month (3 groups focused on the same 4 questions)

What design challenge questions would they ask?; What skill sets do they think need to be developed?; What tools and resources are required?; What case studies and stories should be highlighted?



- People coming together from different backgrounds and perspectives. More global south representation would always be good, and facilitation to put their voices first."
- "The need for the challenge not to just be engineering focused. Also that what EWB bring is the process skills and you be guided by transport expertise too."
- "How big the problem is and how many people need to be involved in finding solutions, sharing and then financing those solutions. And then there is the education piece which is so very difficult!"
- "The inclusion of diverse expertises in building and strengthening sustainable mobility processes and practices."

Educator Workshop June 2023

One workshop was undertaken with 8 educators that attended the Engineering for People Grand Finals event on 21 June 2024. The purpose was to test the first iteration of the Playbook.

The educators were asked three key questions:

- Is the Playbook a useful tool?

- What is the purpose of the playbook from your perspective?
- How can the worksheets be made more effective for use in your practice?

"This is already giving me lots of ideas about how I can get my learners to engage with the topic".

"I would like to be able to just lift the worksheet content and get my students to work through them. The only thing I would add is AHEP learning outcomes. And more worksheets".

Educators and Professionals Kenya and Uganda Workshop July 2024

A short workshop was conducted with representatives from Kenya and Uganda that explored three aspects of the playbook.

- How can the Playbook be a useful tool? What is the purpose of the playbook from your perspective?
- What is missing or could be added
- How can the worksheets be made more effective for use in your practice?

They agreed that the Playbook was a useful tool that was much needed. They felt that the Playbook should be a bridge for educators, learners and practitioners between the theory of sustainability and the practicalities of implementation of transport solutions. They were particularly interested in how the Playbook might be able to support the transition between academia and industry.

Interviews

Consultation took place with Charles Anum Adams, Associate Professor in Civil Engineering with a specialisation in Transportation Engineering at the Civil Engineering Department, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. Also David K. Nyante, Executive Director, Ghana Institution for Engineering.

The Playbook was disseminated directly to 50 postgraduate students and researchers and an additional 40 applied research Fellows educators affiliated with Kwame Nkrumah University, Ghana through their internal channels. No further information could be gathered on the gender split of the recipients by the disseminator, Dr Chales Anum Adams. They believed the Playbook was timely for their students and faculty as they were developing curricula for Sustainable Mobility and wanted it to be utilised straight away hence the broad dissemination

Dr Rachel Fisher is an Assistant Professor within the School of Engineering, working at the interface between academia and industry. Their research focuses on extreme weather hazards, transport infrastructure resilience and climate change adaptation. Dr fisher undertook a document review.

Main focus of the feedback: "Yes broadly I think it is a document that can be used by engineering educators. As a first introduction to the topic, I think it is well broken down and introduces the area well and provides a scaffolding for an educator to develop their practice within and on top of".

2.4.3 Playbook Version 2

The updated version of the playbook has undergone significant enhancements, transitioning from its earlier version to a more practical and action-oriented resource. The updates are rooted in extensive consultation and engagement with over 50 stakeholders, including educators, learners, and professionals, particularly from the Global South. Feedback from these stakeholders has shaped the playbook into a resource that directly addresses the challenges and opportunities faced in real-world contexts.

Key improvements include the introduction of five actionable "plays" that focus on specific aspects of sustainable mobility, such as ecosystem mapping, decision-making frameworks, and project-based learning. These plays are complemented by structured session plans, practical exercises, and case studies that provide educators and learners with step-by-step guidance to explore, design, and evaluate sustainable transport solutions. The playbook now emphasises interdisciplinary collaboration, community engagement, and systems thinking, enabling users to navigate the complexity of transport ecosystems effectively.

Additionally, the new version incorporates more detailed tools, such as the Global Responsibility Competency Compass and thematic areas tied to the Sustainable Development Goals (SDGs). It also offers enhanced resources like design briefs and case studies tested in real-world design challenges, ensuring its relevance and applicability. This iteration reflects a commitment to bridging gaps in education by providing globally relevant, culturally sensitive, and practical learning experiences that align with sustainability, equity, and innovation principles.

2.4.4 Dissemination of the Playbook

To maximise its impact, this dissemination plan outlines strategies to reach educators in higher education and vocational training institutions, particularly in Africa and Asia, where the need for globally responsible sustainable transport education is crucial for solutions to be led by the global majority. Reaching those who are responsible for curriculum development is also key.

The plan integrates communication strategies, distribution methods, and partnerships to ensure broad accessibility and adoption.

Goals

To raise awareness of the playbook among educators and institutions.

To facilitate easy access and use of the playbook’s resources.

To promote its integration into existing curricula and training programmes.

Communication Strategy

The dissemination plan prioritises digital outreach to ensure broad accessibility and effective utilisation of the playbook. A centralised platform will offer free digital downloads, making the resource readily available to educators and institutions worldwide.

Key Messages

- Emphasise the urgency of sustainable transport for societal progress.
- Highlight the playbook's practical tools for creating contextually relevant awareness of global majority sustainable transport needs, solutions and education.
- Showcase alignment with Sustainable Development Goals (SDGs).
- Stress its adaptability for diverse educational levels and settings.

Communication Channels

Digital Platforms

- Playbook will be placed with its resources on the Engineers Without Borders Website, which can be linked to a page on the HVT website, along with the other collateral related to Bringing Sustainable Mobility to Life: Reshaping Transport
- This will be highlighted at the 'Launch' on social media Engineers Without Borders UK social media channels on platforms like LinkedIn and Facebook.
- It will be included in Engineers Without Borders UK newsletters targeted at educators and institutions.

Digital/Print Media

- An article would likely be penned to see if it can be placed in education and engineering journals.

Webinars and Online Events

- There is an opportunity to host a virtual session demonstrating the playbook's use as part of a launch conversation or transport-related event.

Direct outreach

- Engineers Without Borders UK and HVT have an extensive network that can be reached out to directly to inform of the Playbook's availability and utility.

Engineers Without Borders UK networks

EWB International Organisations

- We are proud to be part of a global movement of over 30 Engineers Without Borders organisations united in our belief in engineering as a catalyst for positive change. This is a great network to share the playbook with, as they have access and relationships with educators across the globe.

EWB Movement

- We have a global movement of thousands of individuals who have been involved in our programmes as participants, mentors and judges. That network is constantly growing and we can target those within the network that are associated with sustainable mobility.

Participants in Design Challenge activities

- We run several design challenges where educators are involved and this is a good target audience to disseminate the playbook.
- Several stakeholders have been involved in the Reshaping Transport programme and it would be good to follow up with them on the development and utility of the playbook.

Universities

- We have strong relationships with a number of universities that could utilise the playbook as part of their curriculum. There was a new list of Global South universities compiled for outreach for the challenge. This can be developed with further contact details and utilised for direct outreach.

HVT networks

Researchers and Educators

- HVT's network of organisations and researchers includes educators from Low-and middle income countries, so utilising their network to disseminate the playbook would increase its reach, particularly as sustainable mobility is a key focus area.

Key Partnerships

Academic Institutions

- Collaborate with universities in Africa and Asia to integrate the playbook into curricula.
- Kwame Nkrumah University of Science and Technology is developing an MSC in Transport and has expressed an interest in using the Playbook as part of the cost.

Professional Networks

- It would be important to establish alliances with global and regional organisations like the African Network of Transport Education (ANTER) and the Asian Institute of Transport Development (AITD) as a means of feeding the playbook into

NGOs and International Bodies

- NGOs like UNESCO that have been involved with Reshaping Transport would be good to reconnect with as they may be supporting other programmes focused on sustainable mobility where the playbook could be of utility.

Other opportunities

To deepen understanding and application, train-the-trainer programmes could be organised. These workshops would provide an opportunity for educators to become familiar with the playbook's content and explore ways to integrate its tools and strategies into their teaching practices effectively.

Additionally, the playbook might be showcased at prominent global and regional events. Potential platforms include the Africa Transport Policy Programme (SSATP) events and the Asia-Pacific Urban Mobility Summit, offering a chance to engage a diverse audience of educators, policymakers, and practitioners committed to advancing sustainable transport education. However, this would be dependent on receiving additional funding.

2.4.5 Monitoring and Feedback

To evaluate the success of the dissemination plan, we can track key metrics such as the number of downloads of the playbook distributed to assess its reach. Additionally, we can try to monitor how many

institutions have utilised the playbook or integrated it into their curricula, reflecting its adoption and practical application. Participation levels in any webinars and workshops will also provide valuable insights into engagement with the playbook and its resources.

To gather feedback and refine the playbook, an online feedback form will be accessible through the playbook's web page, enabling users to share their experiences and suggestions easily.

Follow-up interviews with partner educators and institutions will provide in-depth insights into the playbook's impact and areas for improvement. Social media polls and discussions will further capture user perspectives, fostering a dynamic and inclusive feedback loop.

3. Impact Narrative

Reshaping Transport, as a portfolio of initiatives, represents a significant step in supporting educators to support students and others to address critical global transport challenges. By fostering engagement, innovation, and equity, this program has demonstrated measurable progress toward Engineers Without Borders UK's overarching goals of promoting globally responsible engineering and embedding sustainability into education and practice.

Achieving Goals and Measuring Success

The program's success is reflected in its ability to translate research insights into actionable solutions, particularly for the global majority. Participation in the design challenges and the integration of feedback into the Playbook have yielded tangible outcomes:

- **Capacity building -** Over 79.5% of Reshaping Transport participants were from the Global South, and nearly half were women, demonstrating a commitment to inclusivity. This exceeds industry norms and showcases progress in addressing gender disparities in engineering.
- **Education and innovation -** The Playbook version 2, is a useful tool for educators, bridging the gap between theory and practice. It empowers learners to adopt sustainable practices tailored to global majority needs.
- **Broad participation across demographics -** With participants from over 77 unique universities and 103 organisations worldwide, the initiative facilitated a vibrant exchange of ideas, bridging geographical and professional divides. This global collaboration underscores the program's reach and inclusivity.
- **Advancing practical solutions:** The submission of over 60 innovative projects during the challenges, ranging from electric vehicles to accessibility-enhancing technologies, highlights the program's focus on actionable, real-world solutions which have the potential for direct societal impact.
- **Youth and early career engagement -** The majority of participants were aged 18–35, a demographic critical for future innovation. Their involvement ensures that the next generation of engineers and planners are equipped to address global transportation challenges.
- **Mentorship and guidance -** The participation of over 60 professional mentors and judges provided interdisciplinary expertise, ensuring participants received comprehensive feedback. This mentorship model nurtures a culture of continuous learning and collaboration.
- **Integration of global south voices -** Nearly 80% of participants hailed from the Global South, and consultations included educators and professionals from Kenya, Uganda, Ghana and India. This ensured that the program's outcomes were deeply rooted in the priorities and realities of communities most impacted by transportation inequities.
- **Impact on educational practices -** Feedback from educators and institutions indicates that the Playbook is already being integrated into curricula. It has inspired new approaches to teaching sustainable transport, with specific interest in bridging the gap between academia and industry.
- **Recognition of excellence -** Award-winning projects, such as "Revamping Nairobi's Railways" and "SkyLog" in Mumbai, exemplify the program's ability to generate impactful solutions. These projects not only address local challenges but also serve as global models for innovation.
- **Commitment to gender equity -** While the engineering field traditionally sees lower female participation rates, the program achieved an almost 50/50 female participation rate across both challenges, a significant step toward breaking barriers and reshaping gender dynamics in the sector.
- **Efficacy of challenge-driven innovation -** The structured design challenges provided a platform for participants to tackle real-world problems collaboratively, resulting in highly innovative and practical solutions. By integrating mentorship, interdisciplinary teamwork, and a focus on global responsibility, the challenges demonstrated the power of hands-on, problem-based learning to drive meaningful change in sustainable transport systems. Participants reported significant improvement in their understanding of sustainable mobility and a strong commitment to applying globally responsible engineering principles in their future work.

Transforming Practice and Outcomes for the Global South

Participation in design challenges has equipped individuals with the skills and tools necessary to implement context-specific, sustainable transport solutions. Women participants, often underrepresented in engineering, have played a crucial role in shaping these outcomes. Their involvement not only challenges traditional gender norms but also fosters innovation by incorporating diverse perspectives. This is a call to expand programs that actively engage women engineers, ensuring that the transport systems of tomorrow are equitable and inclusive.

The Playbook's focus on the global south amplifies its long-term impact. By equipping educators and learners in resource-limited settings, it supports the creation of sustainable, inclusive transport systems. This aligns with Sustainable Development Goals (SDGs), particularly those addressing inequality, climate action, and sustainable cities.

Community Engagement and Its Importance

Community consultation has been integral to this program, ensuring that solutions are not only technically sound but also culturally relevant and socially inclusive. The online sandpit sessions and educator workshops brought together voices from diverse backgrounds, enabling co-creation of tools that reflect lived experiences and local priorities. This participatory approach fosters ownership and ensures that sustainable transport solutions resonate with those they aim to serve.

Sustained Impact Through the Playbook

The Playbook serves as a living document, capable of adapting to emerging challenges and opportunities. Its emphasis on systems thinking, inclusivity, equity, and interdisciplinary collaboration ensures it remains relevant for educators globally, particularly in the Global South. By fostering a new generation of engineers and planners who prioritise sustainability and inclusion, the Playbook’s influence extends far beyond the classroom or workplace.

Engineers Without Borders UK’s Vision

This initiative directly aligns with EWB UK’s vision of globally responsible engineering. By prioritising education, equity, and sustainability, it lays the foundation for systemic change in the transport sector. Programs like these enable EWB UK to lead the charge in addressing global mobility challenges, equipping communities with the knowledge and resources to build resilient, inclusive transport systems.

Engineers Without Borders UK
The Foundry
17 Oval Way
London
SE11 5RR
Tel: +44 (0)203 7525820
Email: tim.wilson@ewb-uk.org
Web: https://www.ewb-uk.org/

HIGH VOLUME TRANSPORT
APPLIED RESEARCH

UK International Development
Partnership | Progress | Prosperity