

Efficiency for Access Design Challenge 2022-23 Globally Responsible Design



Tom Whitehead

EWBUK







Nidhi Pant

S4S Technologies





Dr Jonathan Truslove

EWBUK



Agenda

Engineers Without Borders UK

- The current global situation
- Your important role
- How to develop global responsibility

Nidhi Pant, S4S Technologies

- Globally responsible design in action
- Nidhi's learning journey







7

Image: United Nations



AFFORDABLE AND CLEAN ENERGY



The big picture

Photo by Francisco Moreno on Unsplash



People needs



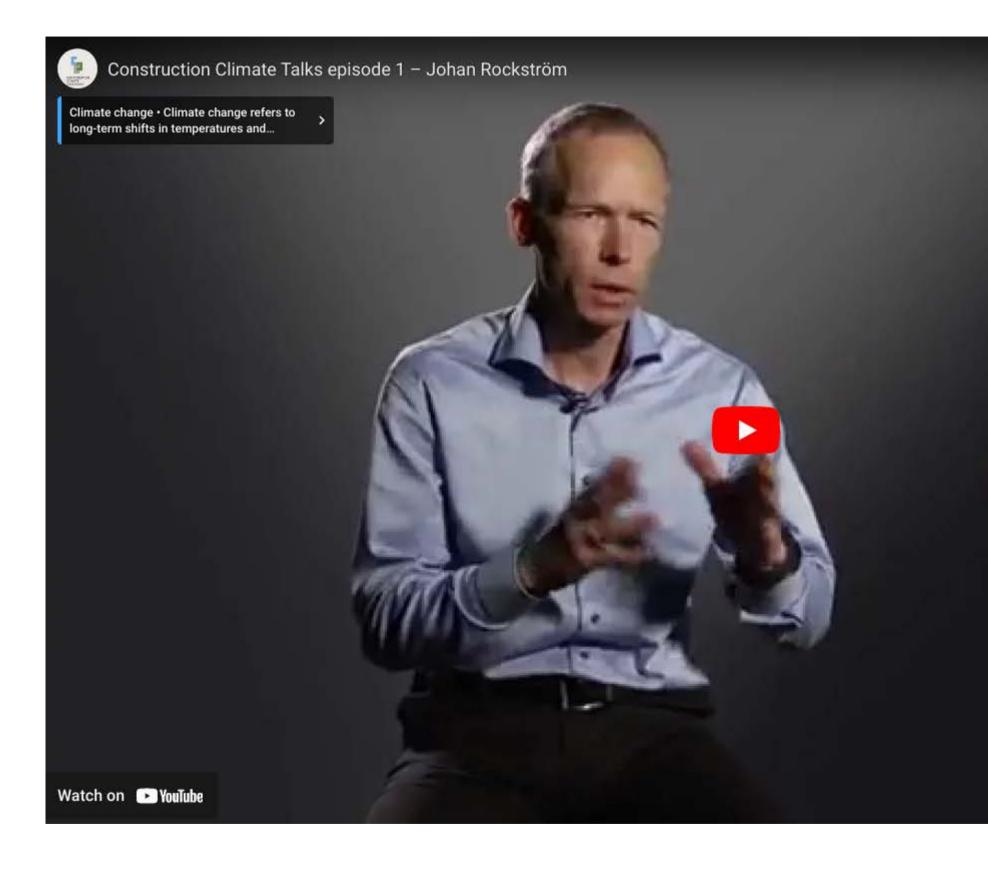
SUSTAINABLE GALS















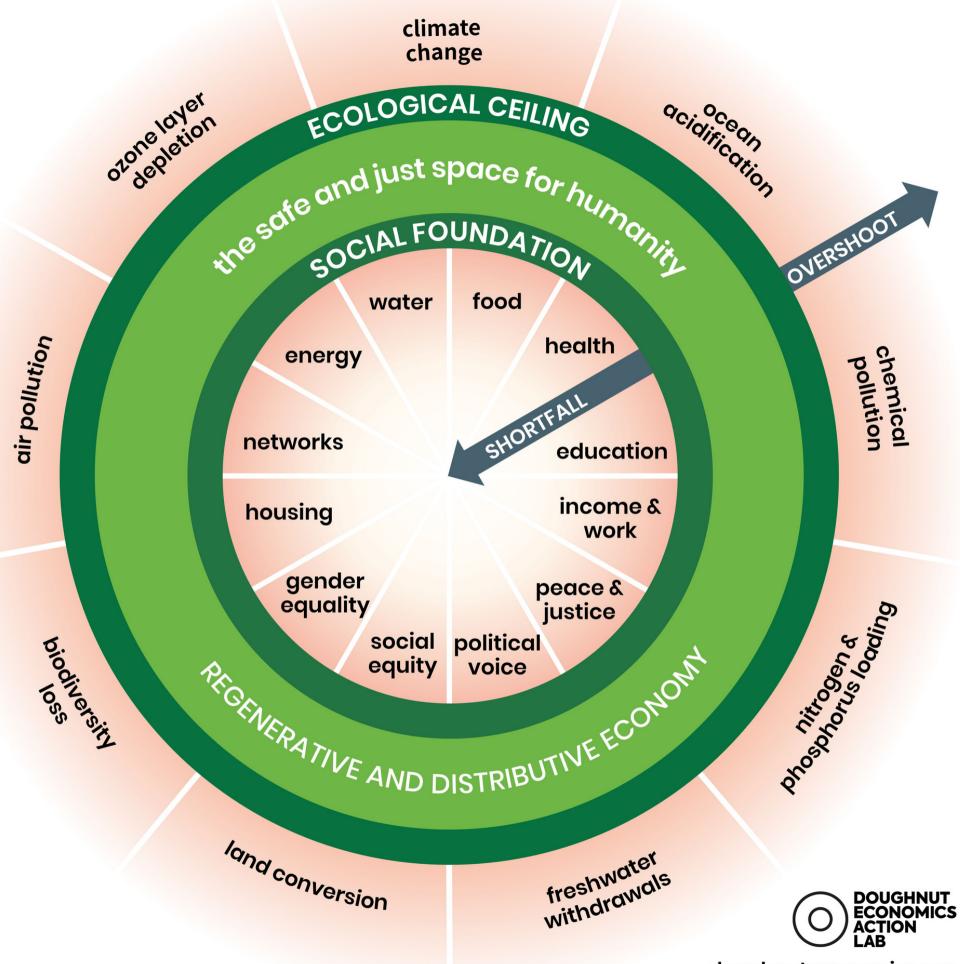


People and planet





People and planet





doughnuteconomics.org



The world has changed over the last ten years...



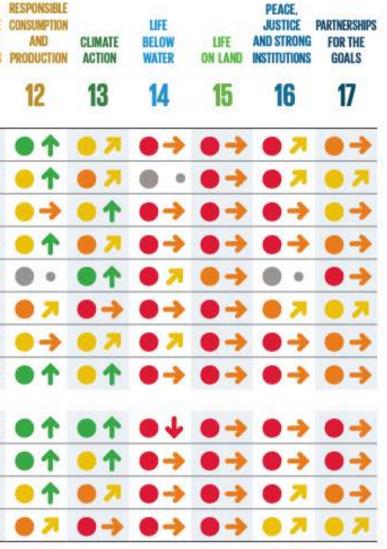
...or has it?

	NO Poverty	ZERÐ HUNGER	GOOD HEALTH And Well-Being	QUALITY Education	GENDER	CLEAN WATER And Sanitation	AFFORDABLE AND CLEAN ENERGY	DECENT WORK AND ECONOMIC GROWTH	INDUSTRY, INNOVATION AND INFRASTRUCTURE	REDUCED Inequalities	SUSTAINABLE Cities and Communities	
	1	2	3	4	5	6	7	8	9	10	11	
East and South Asia		• ->	• 7		• -	• 1					$\bullet \rightarrow$	
Eastern Europe and Central Asia	• 1	$\bullet \rightarrow$					$\bullet \rightarrow$			• >	$\bullet \rightarrow$	
Latin America and the Caribbean	•+	• -	• 7	. 7			• 1	$\bullet \rightarrow$				-
Middle East and North Africa	• >	• ->	• 7	$\bullet \rightarrow$	• >	• 1	• 7				$\bullet \rightarrow$	
Oceania	$\bullet \rightarrow$	•+	$\bullet \rightarrow$	• ->	• ->			•	• ->		$\bullet \rightarrow$	
OECD Countries	• 1			• 1		• 1	07	. 7	• 1	• -		[
Small Island Developing States	$\bullet \rightarrow$	• ->	• -	$\bullet \rightarrow$			$\bullet \rightarrow$		$\bullet \rightarrow$	•->	$\bullet \rightarrow$	
Sub-Saharan Africa	$\bullet \rightarrow$	• ->	•	• >	• ->	•->	• ->	• 7	• ->	•	•	
Low-income Countries	$\bullet \rightarrow$	• ->	•-		• ->	•-	• ->		• ->		• ->	
Lower-middle-income Countries		• ->	$\bullet \rightarrow$	$\bullet \rightarrow$	$\bullet \rightarrow$	• 7	• 7	• 7	• 7		$\bullet \rightarrow$	
Upper-middle-income Countries	$\bullet \rightarrow$. 7	• 1	• 7	$\bullet \rightarrow$	• 1			
High-income Countries	• 1	• 7	8 7	• 1	. 7	• 1		. 7	•1	• >	• 7	
		G achiev i track	/ement	,		nges rem rately Inc			Significar Stagnati		nges rem	a

Note: Excluding OECD specific indicators. Population-weighted averages. Source: Authors' analysis

Sachs, J., Lafortune, G., Kroll, C., Fuller, G., Woelm, F. (2022). From Crisis to Sustainable Development: the SDGs as Roadmap to 2030 and Beyond. Sustainable Development Report 2022. Cambridge: Cambridge University Press.







Major challenges remain



Data not available



No country is on track...

	NO Poverty	ZER0 HUNGER	GOOD HEALTH And Well-Being	QUALITY	GENDER EQUALITY	CLEAN WATER And Sanitation	AFFORDABLE AND CLEAN ENERGY	DECENT WORK AND ECONOMIC GROWTH	INDUSTRY, INNOVATION AND INFRASTRUCTURE	REDUCED	SUSTAINABLE CITIES AND Communities	RESPONSIBLE CONSUMPTION AND PRODUCTION	CLIMATE ACTION	LIFE BELOW WATER	LIFE ON LAND	PEACE, JUSTICE And Strong Institutions	PARTNERSHIPS For the Goals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
East and South Asia		• >			• -	• 1					• >	• 1		•	• -		$\bullet \rightarrow$
Eastern Europe and Central Asia	• 1	• >					$\bullet \rightarrow$			$\bullet \rightarrow$	$\bullet \rightarrow$	• 1		•	$\bullet \rightarrow$	• 7	
Latin America and the Caribbean	•+	• >	• 7	. 7			• 1	• -				$\bullet \rightarrow$	• 1		$\bullet \rightarrow$	• •	$\bullet \rightarrow$
Middle East and North Africa	$\bullet \rightarrow$	• ->		$\bullet \rightarrow$	• >	• 1	• 7				$\bullet \rightarrow$	• 1		• ->	$\bullet \rightarrow$	• •	$\bullet \rightarrow$
Oceania	$\bullet \rightarrow$	•+	$\bullet \rightarrow$	$\bullet \rightarrow$	•	•	• ->	•	$\bullet \rightarrow$		$\bullet \rightarrow$	•	• 1			•	$\bullet \rightarrow$
OECD Countries	• 1			• 1		• 1		. 7	• 1	• -			$\bullet \rightarrow$	•	• -		
Small Island Developing States	$\bullet \rightarrow$	• ->	$\bullet \rightarrow$	$\bullet \rightarrow$		• >	$\bullet \rightarrow$		$\bullet \rightarrow$	• >	$\bullet \rightarrow$	$\bullet \rightarrow$. 7	$\bullet \rightarrow$	• •	$\bullet \rightarrow$
Sub-Saharan Africa	$\bullet \rightarrow$	• >	•>	• >	• -	•>	$\bullet \rightarrow$	• 7	$\bullet \rightarrow$	•	•	• 1	• 1	•	• -	• • •	$\bullet \rightarrow$
Low-income Countries	• +	• ->	• >		•-	• -	• ->		• -	• •	• >	• 1	• 1	•+	•-	• -	• ->
Lower-middle-income Countries		• ->	• ->	$\bullet \rightarrow$	• >	• 7	• 7		• 7		$\bullet \rightarrow$	• 1	• 1	• ->	• -	• •	$\bullet \rightarrow$
Upper-middle-income Countries	$\bullet \rightarrow$					• 1		0->	• 1			• 1		•	•-	. 7	$\bullet \rightarrow$
High-income Countries	• 1	• 7		• 1	. 7	• 1	• 7	. 7	•1	• ->	• 7		• ->	•->	• -		. 7
	SDC	5 achiev	ement		Challer	nges rem	ain		Significar	nt challer	ides rem	ain	Maio	or challer	naes ren	nain	
		track		7		ately Inc			Stagnatii					reasing			available

Note: Excluding OECD specific indicators. Population-weighted averages. Source: Authors' analysis

Sachs, J., Lafortune, G., Kroll, C., Fuller, G., Woelm, F. (2022). From Crisis to Sustainable Development: the SDGs as Roadmap to 2030 and Beyond. Sustainable Development Report 2022. Cambridge: Cambridge University Press.







Global risk horizon

Economic	Environmental Geopolitical	Societal	Technological					
		% of respondents						
0–2 years	Extreme weather	31.1%						
	Livelihood crises	30.4%						
	Climate action failure	27.5%						
	Social cohesion erosion	27.5%						
	Infectious diseases	26.4%						
	Mental health deterioration	26.1%						
	Cybersecurity failure	19.5%						
	Debt crises	19.3%						
	Digital inequality	18.2%						
	Asset bubble burst	14.2%						



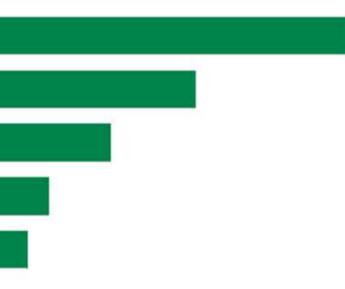




Global risk horizon

Economi	c Environmental Geopolitical	Societal	Technological
	Climate action failure	42.1%	
5–10 years	Extreme weather	32.4%	
	Biodiversity loss	27.0%	
	Natural resource crises	23.0%	
	Human environmental damage	21.7%	
	Social cohesion erosion	19.1%	
	Involuntary migration	15.0%	
	Adverse tech advances	14.9%	
	Geoeconomic confrontations	14.1%	
	Geopolitical resource contestation	13.5%	





The Global Risks Report 2022 25



The role of engineering

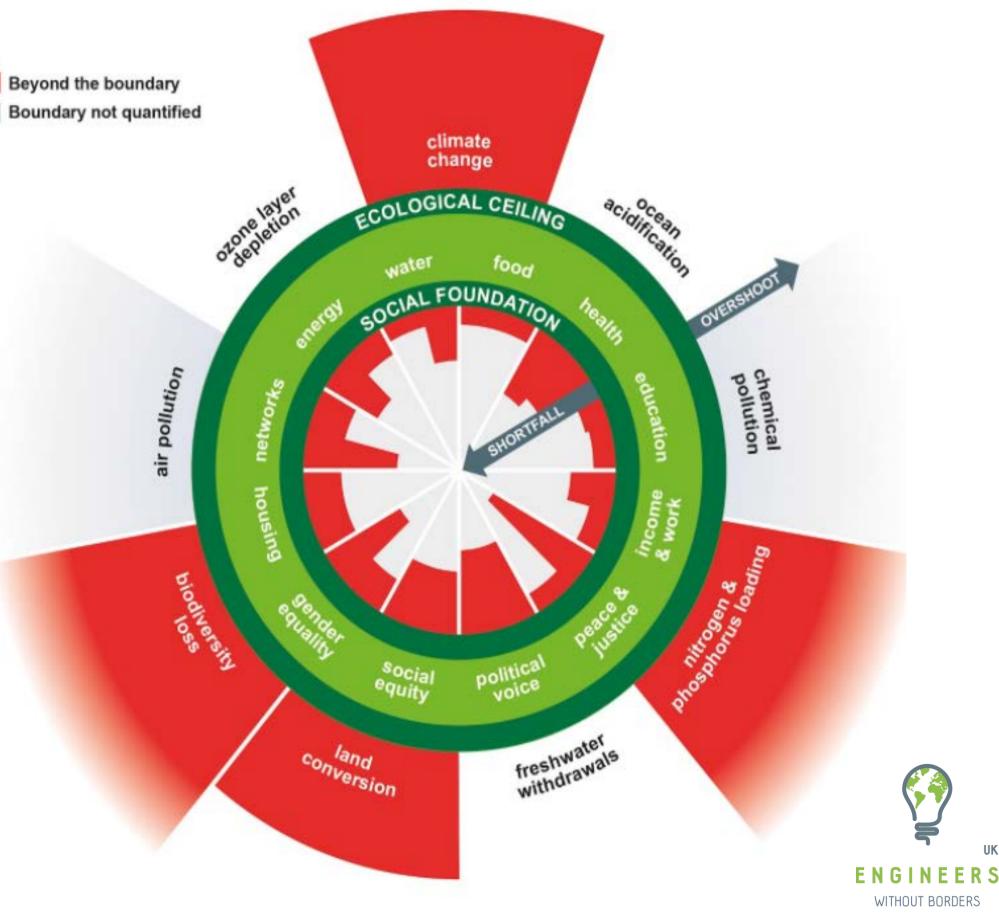
Photo by ThisisEngineering RAEng on Unsplash



Engineering has played a significant role

Both good and bad in getting humankind and the planet to where they are today.

Boundary not quantified





Responsibility

- 3 million tonnes of contaminated soil discovered in West Gate Tunnel
- Local communities left out of the conversation

Failure to:

Provide appropriate information and opportunities for communities to participate



WITHOUT BORDERS

Are we preparing future engineers with the skills to meet 2030...what about the following ten years?



66

The UK could be sleep-walking towards a net zero skills shortage."

Engineering UK Report 2022

93% of UK engineering companies with a sustainability strategy do not have staff with the skills to fulfil it."

Institute of Engineering Technology



Top 10 skills for 2025



Type of skill



- Self-management
- Working with people
- Technology use and development



Analytical thinking and innovation



Active learning and learning strategies



Complex problem-solving



Critical thinking and analysis



Creativity, originality and initiative



Leadership and social influence





Technology design and programming





Reasoning, problem-solving and ideation

Source: Future of Jobs Report 2020, World Economic Forum.



Technology use, monitoring and control

Resilience, stress tolerance and flexibility



What does change look like?



Change in mindset

SIMPLE

Known knowns Facts Right Answer Domain of best practice, rules and regulators

COMPLICATED

Known unknowns Facts Maybe more than one right answer Domain of experts

How-and-When mindset

Rational problem solving Deep disciplinary knowledge Analysis, optimisation Understanding certainty Developing order Anticipation

COMPLEX

CHAOTIC



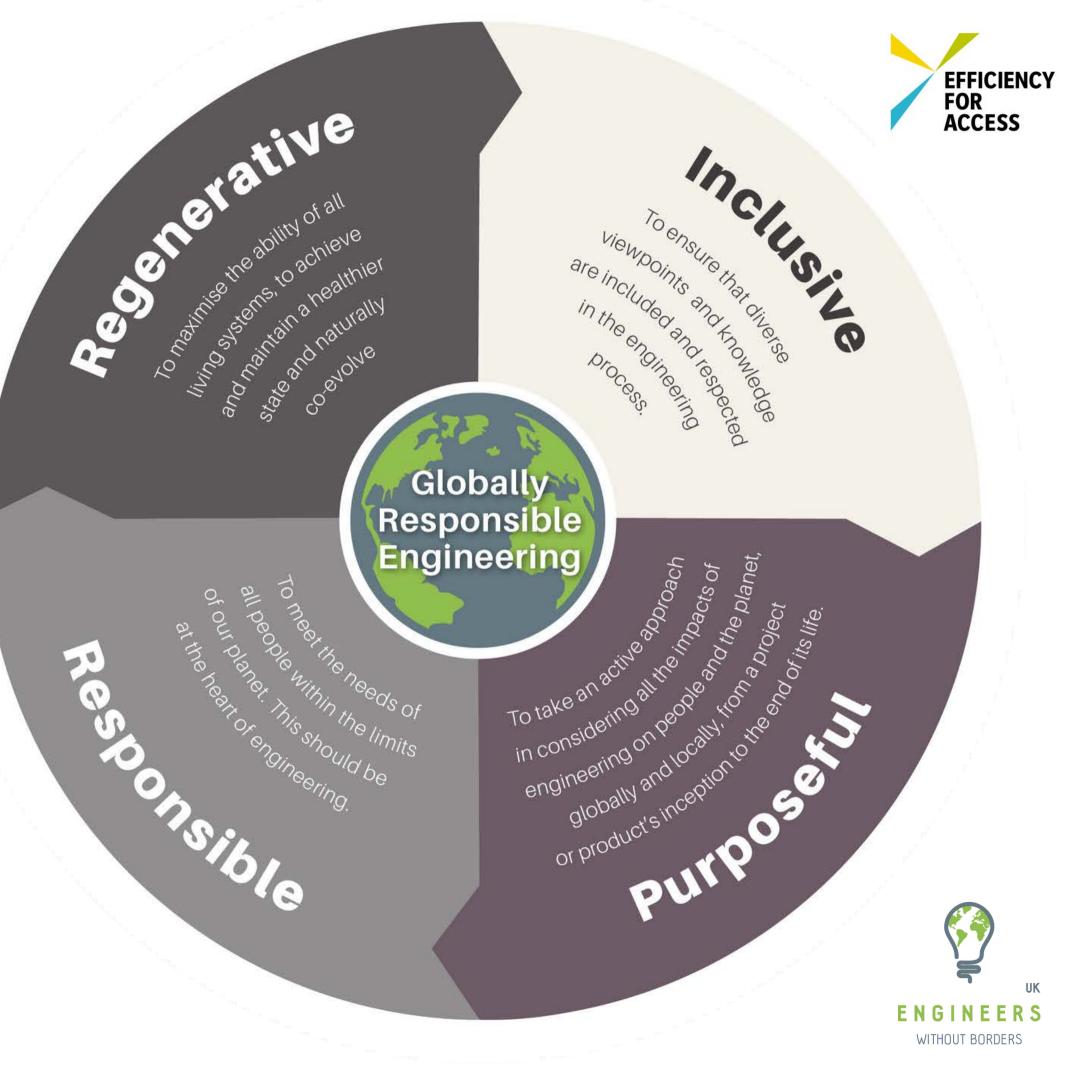
Unknown unknowns Patterns (not facts) Many competing ideas Domain of emergence Unknownables High turbulence No right answers No time to think Patterns Domain of rapid response

Why-and-What mindset

Problem definition Holistic thinking Initiative taking Self-reliance Creativity Handling ambiguity Correlating chaos Lifelong learning Agility



Global responsibility

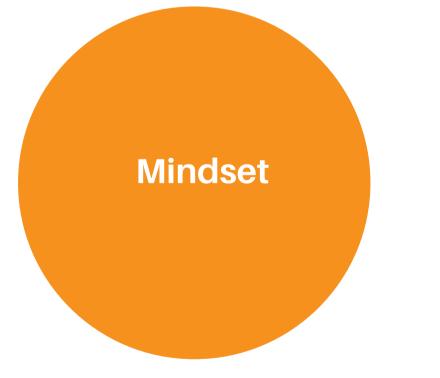


What are the competencies?

Knowledge









Competencies of global responsibility

For example, during the Efficiency for Access Design Challenge:

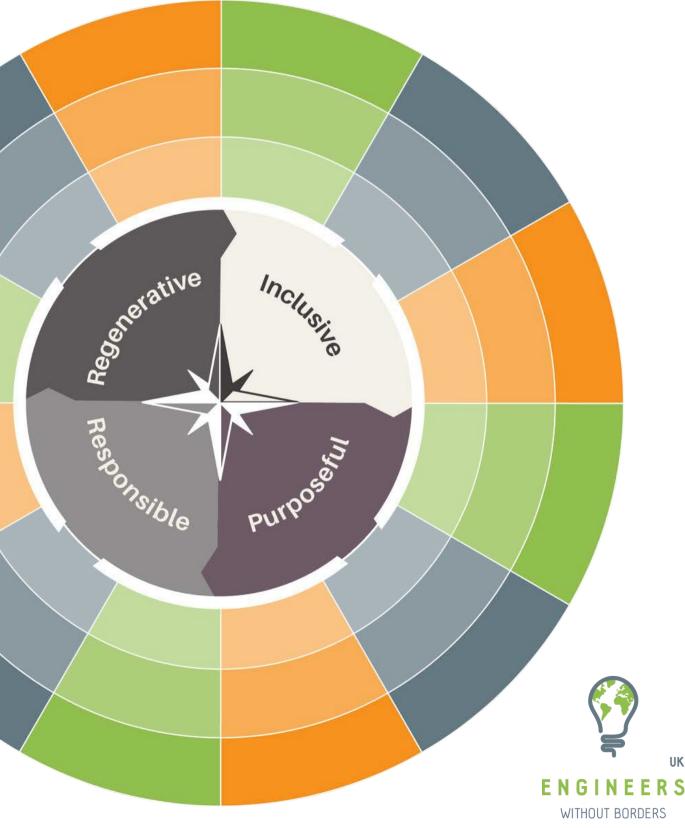
What are you learning about diversity, equity and social justice?

Where are you navigating complexity and uncertainty?

Are you approaching teamwork in a creative and collaborative way?







Next steps

- Re-read the globally responsible design chapter in the design brief
- Apply the four principles of global responsibility throughout your design
- Work through our Globally Responsible Engineering programme on Forage





Any questions?









Efficiency for Access Design Challenge 2022-23 Globally Responsible Design



Tom Whitehead

EWBUK







Nidhi Pant

S4S Technologies





Dr Jonathan Truslove

EWBUK



Any questions for Nidhi?







Feedback



bit.ly/eforwebinarfeedback22-23





Thank you

Find out more at www.ewb-uk.org

