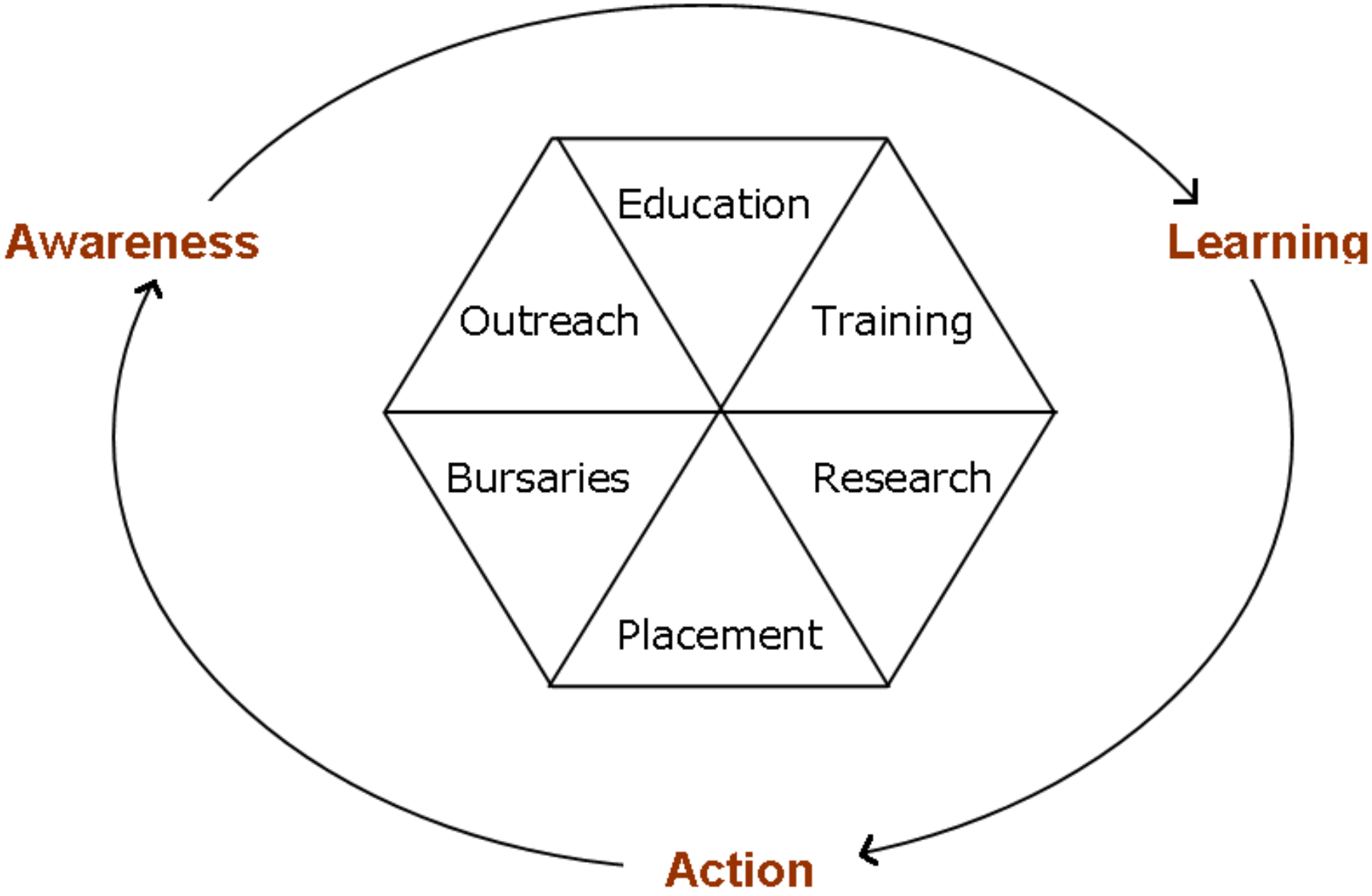
engineers without borders uk

Engineers Without Borders UK

Andrew Lamb, Chief Executive

Engineering Professors' Council Congress
17th & 18th April 2012
University of Leicester


Awareness
Learning
Action
Education
Outreach
Training
Bursaries
Research
Placement

Aston
Bath
Birmingham
Bristol
Brunel
Cambridge
Cardiff
City
Coventry
Cranfield
Durham
Edinburgh
Exeter
Glasgow
Guildford
Heriot-Watt
Highlands & Islands
Imperial
Loughborough
Manchester
Newcastle
Nottingham
Oxford
Plymouth
Sheffield
Sheffield Hallam
Strathclyde
Swansea
Tesside
UCL
UWE
Warwick
Bradford
Brighton
Queens, Belfast
Leicester
Liverpool
Portsmouth
South Bank
Southampton
Teeside
Ulster

PARTNER OF THE MONTH

Virgin flyingclub

Greetings from

Virgin Galactic

GALACTIC

Dear Andrew,

Virgin Galactic is delighted to announce a new destination...space. Climb to 360,000ft. at a cruising speed of almost three times the speed of sound, in unprecedented levels of safety and comfort. See our beautiful planet from 63 miles up and experience the magic of weightlessness.

Redeem 200,000 miles to receive 10% off the cost of a spaceflight, that's an incredible $20,000 saving!* Join our future astronauts and book your place in history.

OUR PARTNERSHIP WITH VIRGIN GALACTIC

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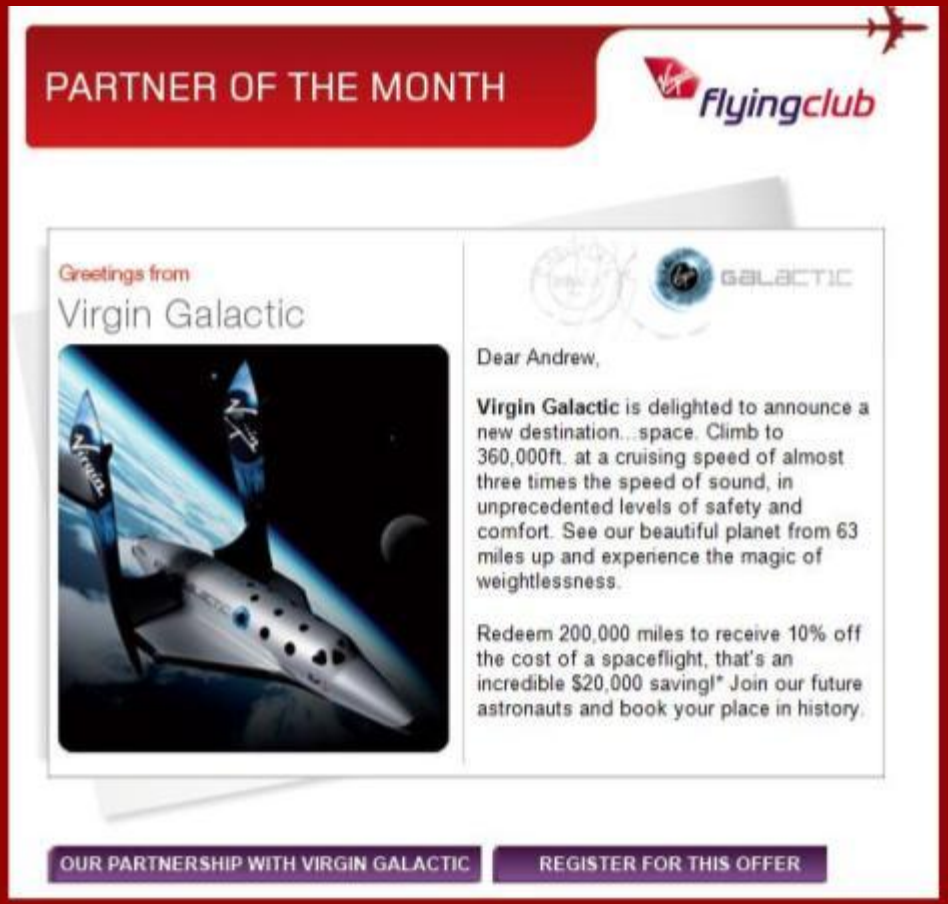
Terms & Conditions


200000

"A Zimbabwean beggar poses with wads of Z$200,000 notes in the capital, Harare, where on the black market Z$200,000 is worth one US cent."

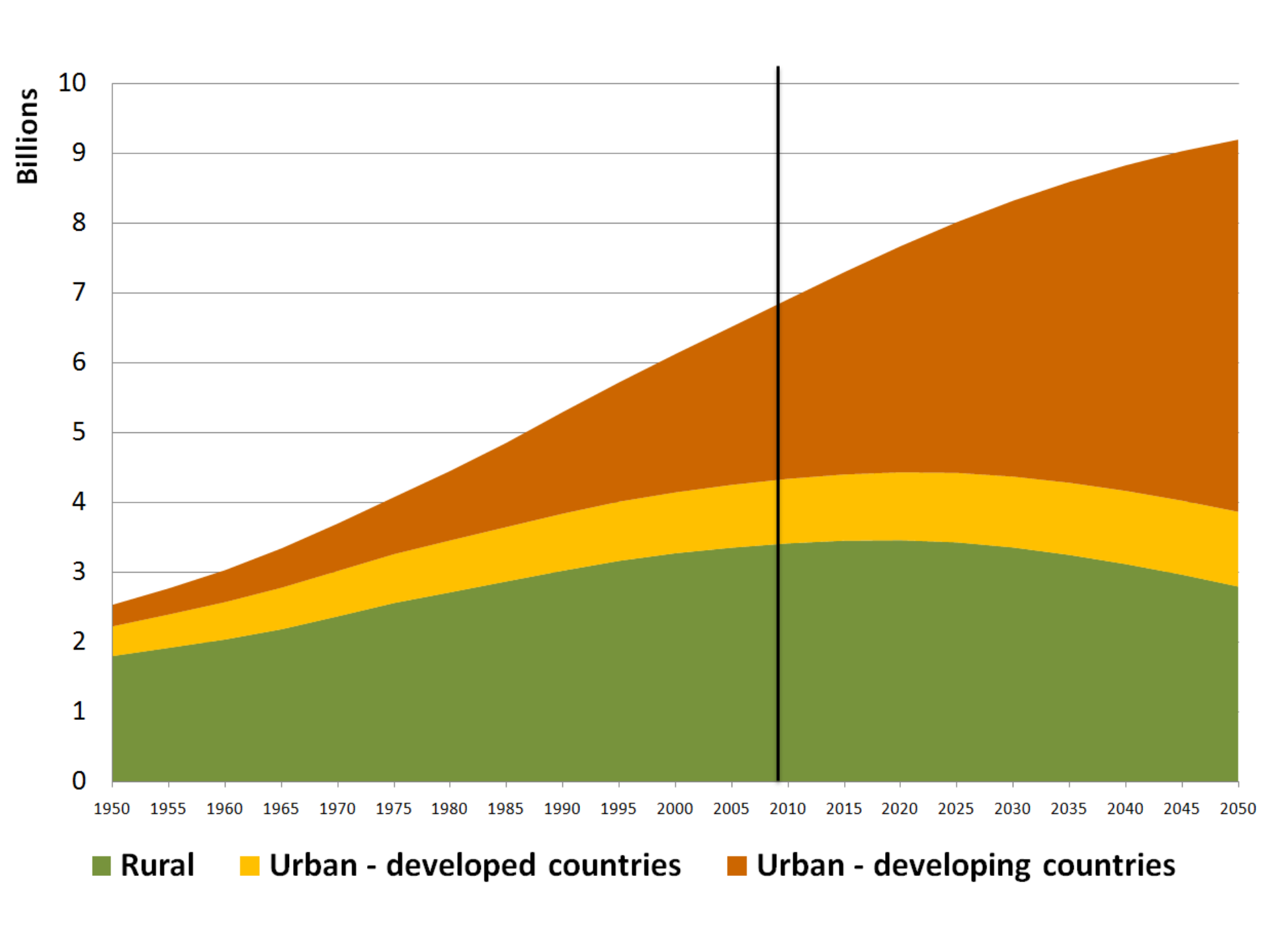
– taken from BBC News website 28 / 2 / 8



An email received from Virgin Atlantic's frequent flyer miles club announcing a special offer of 10% off of a US$200,000 space flight

– taken from my inbox 28 / 2 / 8

- 850,000,000 people lack access to safe drinking water
- 820,000,000 people are under-nourished, 1.1billion are over-fed
- 29,000 children die every day from poverty-related causes
- Fewer than 1 engineer per 100,000 in Africa c.f.: up to 500 in Europe
- 1 billion people living in slums
- 99.4% of the urban population of Ethiopia lives in slums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Urban - developed countries
Urban - developing countries


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WENGER


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LEATHERMAN
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Consultants
of the Year 2012

Sam Williamson

2009

Sam didn't know about EWB-UK throughout his undergraduate years at **Cranfield University**, where he studied aircraft engineering. He joined a consultancy and a little later started planning a sabbatical in Nepal, after enjoying some travelling there. He was working for a development organisation when he met some EWB-UK placement volunteers and offered to help them with their work, with sorting out visas and with getting to know Kathmandu and the local language. Sam knew a little about what they were trying to achieve because his sister, Mary, had just begun an EWB-UK placement on wind turbines in the Philippines.

Whilst in Nepal, Sam learned about the benefits of **pico-hydropower** and decided to take a career change. He discovered that the **University of Bristol** was offering a **PhD research** position in partnership with EWB-UK and **Renishaw PLC** on the design and manufacture of pico-hydro devices. He applied straight away, and did a telephone interview from Nepal.

"I found out I had been offered the PhD whilst visiting a cluster of pico-hydro turbines in rural Nepal. I was really excited as this would let me study something that I really cared about and, with the involvement of EWB-UK, I knew I would have the opportunity to put the research into practice."

Sam started the PhD in October 2009 on his return to the UK. For the first year he looked at the current technology available for pico-hydro turbines, developed a specification for a system and selected an appropriate turbine. Last year, Sam designed and built an experimental test rig for low-head pico hydro turbines as well as developing some theoretical models to predict the turbine behaviour.

"The day the turbine went in the experimental rig span was fantastic – I had spent six months designing and building the rig as well as modifying the hydro lab to install the rig. The hour and a half cleaning up all the spilt water was definitely worth it! The rig proved that our concept could work."

He presented his research at the EWB-UK **Research Conference** in 2010 and in 2011, and helped the **Training Programme** by giving talks about his work – such as speaking to the local **Institution of Mechanical Engineers** branch. One significant achievement was being awarded the best paper prize at the **World Renewable Energy Congress** in Sweden, in the Hydropower Applications category.

Sam is continuing his PhD, having recently started his third year. He is now working on improving the turbine design as well as looking at the electrical system that will provide a plug-and-play capability so that a number of turbines can be connected together. Every now and again, he takes time out to attend other EWB-UK activities and events, such as the **Small is... Festival**. As part of the partnership agreement with EWB-UK, Renishaw PLC is providing Sam with funding for a number of field trips and/or related **Masters research projects**. The company specifically asked for EWB-UK to be involved in the research so that they could be sure that the engineering innovation would be relevant to developing communities.

"I know the next eighteen months are going to be really hard work, but I'm really looking forward to them, and hopefully I'll be able to test elements of the research in-situ."

Most memorable moment
"The moment the turbine first span on the experimental rig."

EWB-UK Annual Review 2011

Joanne Beale
2008

In 2008, Joanne was awarded an EWB-UK **bursary** in order to study rural waste management in Bhutan for three months, for her final year **research project** at **Cambridge University**. She then volunteered to chair a new bursary panel in Cambridge to assess future applications.

"The bursary gave me my first experience actually working overseas, and it was great to know my ideas had been endorsed. I wanted to help others do the same and, as a student, becoming a development donor on the panel was a really interesting experience. I thought a lot about what makes 'good' development."

Joanne also got involved in **EWB Cambridge**, and helped to organise water and sanitation events in partnership with **Mott MacDonald**. Another highlight was her 'Go Vegan' challenge in which 30 students adhered to a vegan diet for one month to raise awareness of land, food and resource issues – and **fundraised** over £3,000.

After finishing her Masters degree in engineering, Joanne volunteered for the role of **Bursaries Co-ordinator** on the **National Executive** of EWB-UK. Over the next two years she consolidated the scheme, creating new bursary panels and awarding seventy bursaries totalling over £20,000. She managed the team, plans and budget, oversaw the whole bursary process and reported to its main donors – the **Royal Commission for the Exhibition of 1851** and **Barclays Capital**. She helped to write EWB-UK's Good Practice Guidelines (now part of EWB-UK's strategy) and started developing ideas for a new 'Innovation Hub'.

"It was a privilege to be able to make a difference, to do something I feel passionate about, whilst learning so many new skills. It was a huge learning curve – management, public speaking, networking. In those two years I was also working in Mozambique and for RedR in London, and it was astonishing to find links with EWB-UK wherever I went."

Joanne started work at **Buro Happold** in September 2010 as a graduate in their sustainability team, and is currently part of a small team working on a **city-wide masterplan for Dar es Salaam** where she is responsible for water and sanitation aspects. Her experiences in development are invaluable in making the engineering relevant to the context of Tanzania, and make her a vital member of the company's team. She is also one of three engineers leading their **International Development Community**, providing staff with opportunities in development work and promoting the company's expertise. Joanne supports Buro Happold's work with the **RedR Future Relief Workers Scheme**, which helps staff to become relief workers by gaining field experience on EWB-UK placements.

*"I wanted to work for Buro Happold because of their support for EWB-UK and I think they appreciate the skills I bring from my involvement. I've become an **'EWB-UK Champion'**, a new EWB-UK scheme that helps the company and my colleagues engage more closely. I've also been asked to support the **Education Programme** by becoming a Royal Academy of Engineering visiting lecturer at **Coventry University**. The support network that I have gained through EWB-UK and the example of older members have been such an encouragement to me in getting to this stage of my career and I'm excited to see where it takes me next."*

Most memorable moment
"Setting up a water pump training course at Clare Farm in pouring rain with lots of mud, sledgehammers, tents, big holes and biscuits..."


An Engineer Without Borders
A great engineer
A Global Engineer
An ability to incorporate understanding into engineering practice and decision making
Confident to challenge the status quo and your comfort zone - a questioning attitude
Seeing and comprehend -ing the bigger picture
Understanding your role as an engineer, and particularly ethical responsibilities, in a global society
A good manager, then able to be a good leader
Explorering and learning constantly, particularly in unfamiliar situations
Humility
Passion and willingnes: personally engaged
A broad understanding of the human experience, leading to better design
Beginner's mind - fresh ideas, asking 'stupid' questions, innovation
An holistic systems thinker
Sharing, comfortable working with decentralised systems and knowledge ecologies
Thinking sustainably, in '4D', and able to define the real problem and constraints of solutions
Recognising the potential impacts of engineering practice
A sense of fun and a sense of justice
Incredibly creative and ingenious, in the small and large scales
Embracing systems view of life (concepts like networks, self-organisation and emergence), overcoming subtle cognitive barriers that prevent this – particularly the paradigm of reductionism
Combining neo-newtonian training with experience of adaptive pluralism
Ability to learn from mistakes and from other people's mistakes
Contextual listener, able to interpret meaning and to recognise context
Ability to reflect, perform critical analysis and evaluate decisions throughout engineering practice
Can connect conversations, seeking public discussion and linking issues together rather than seeking a settlement
Ability to synthesise, reflecting that tackling the biggest challenges means connecting many small decisions
An ability to understand both local and global context, its influence and limitations (a 'systems thinking approach to the global dimensions')


To design innovative sustainable solutions for a remote community living in Southern India
THE EWB Challenge
* Cut to remove borders

India

- Population of 1.1 billion.
- 25% living in poverty in 2007.
- 75% of poor in rural areas.
- Poverty levels have been exacerbated by the Global Financial Crisis

Living in Devikulam

- Approx 90 families
- Most work in agriculture
- Poor sanitation
- Low levels of education

Pitchandikulam Forest

Pitchandikulam Forest is an organisation dedicated to the preservation and restoration of the native Tropical Dry Evergreen Forest in the Auroville region, to which Devikulam belongs. Pitchandikulam Forest provides education in sustainable ecological practices, through a focus on community outreach programs.

Pitchandikulam Forest are active in 25 villages and have, so far, successfully restored over 70 acres of Tropical Dry Evergreen Forest. As well as successfully monetising their forest restoration program through the cultivation of medicinal plant species.

EWB Challenge: Eight Design Themes

Waste Management

Housing

Industry Development

Water and Sanitation

EWB Challenge: Eight Design Themes cont*

Transportation

Energy

ICTs for Education

Building Construction

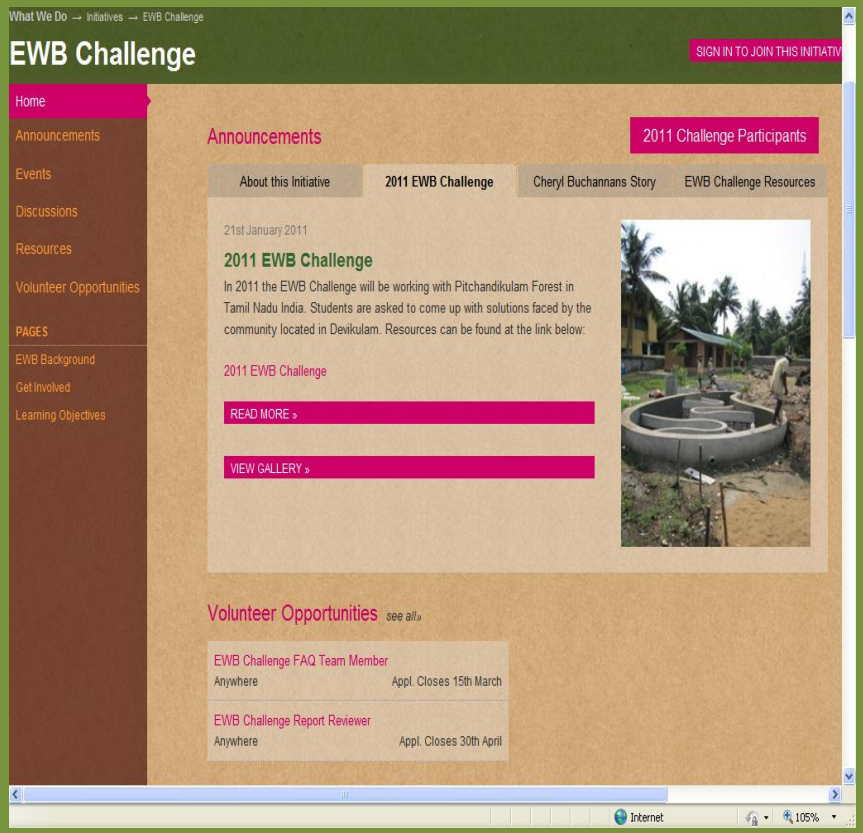
EWB Challenge: Website and Forum

http://www.ewb.org.au/explore/initiatives/2011ewbchallenge

http://www.ewb.org.au/2011participants

http://www.ewb-uk.org/ewbchallenge

- FAQ Forum
- Maps
- Videos
- Online Resources



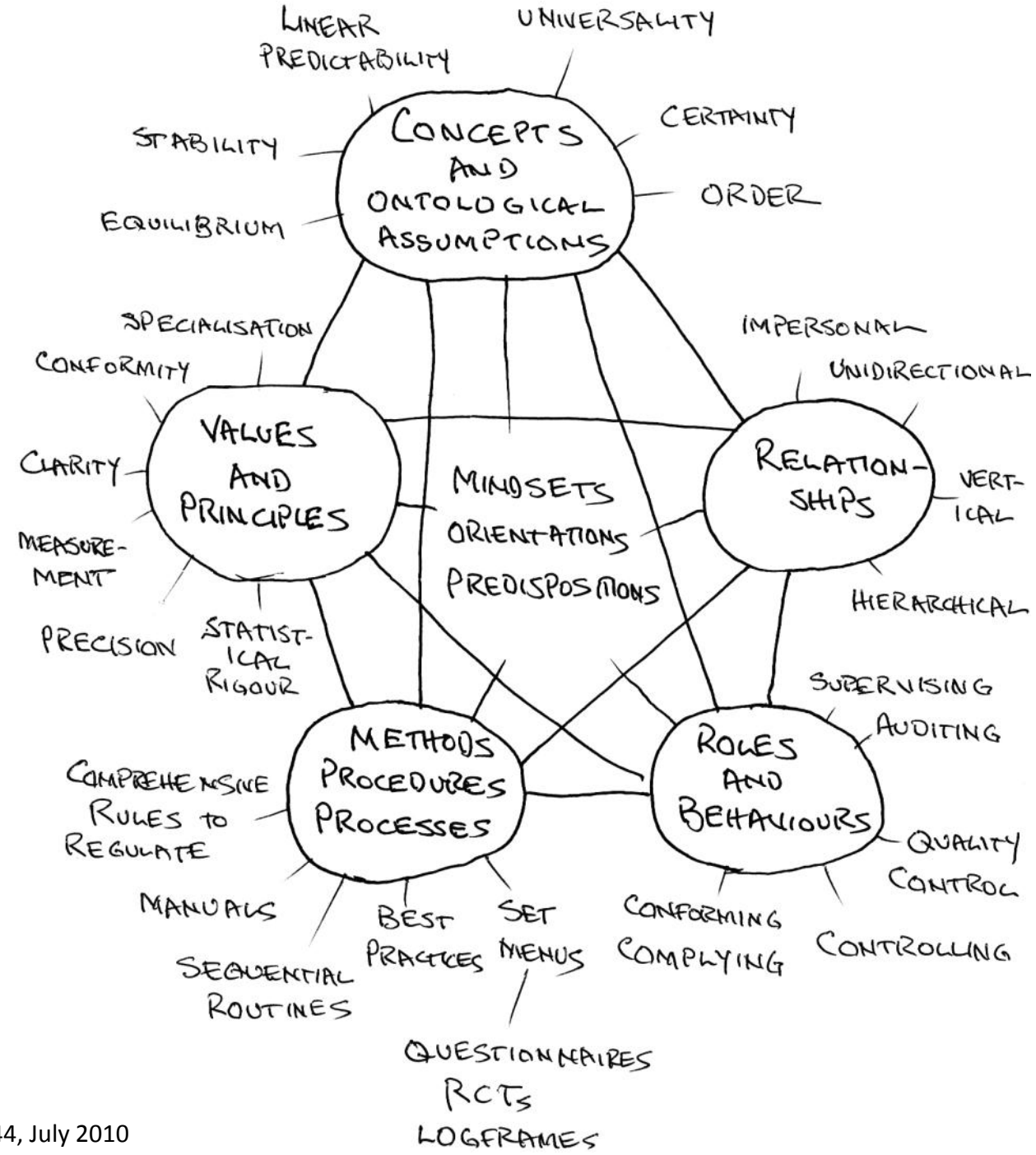
UK-SPEC learning outcome	Our variation/addition
Understanding of the need for a high level of professional and ethical conduct in engineering	No variation
Demonstration of personal commitment to professional standards, recognising obligations to society, the profession and the environment	Demonstration of personal commitment to professional standards, recognising ethical obligations to our global society, the profession and the environment
Understanding of and ability to apply a systems approach to engineering problems	Understanding of and ability to apply a systems thinking approach to engineering problems
Appreciation of the social, environmental, ethical, economic and commercial considerations affecting the exercise of the engineering judgment	No variation
Ability to comprehend the broad picture and thus work with an appropriate level of detail	Ability to comprehend the broad picture, in both the local and global contexts, and thus work with an appropriate level of detail
Demonstrates creative and innovative ability in the synthesis of solutions and in formulating designs	Demonstrates creative ,innovative , exploratory and ingenious ability in the synthesis of solutions and in formulating designs
Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues	Investigate and define a problem identifying constraints including environmental and sustainability limitations, health, safety and risk assessment issues and the potential impacts of any solutions
The ability to develop, monitor and update a plan, to reflect a changing operating environment	The ability to develop, monitor and update a plan, to reflect a changing operating environment and to analyse and reflect on engineering practice
Ability to work with technical uncertainty	The Global Engineer Report interprets this as ‘The ability to learn new theories, concepts, methods etc in unfamiliar situations’, Does this relate to our ‘Ability to work outside of one’s own comfort zone’?

Engineers are good at ***things***

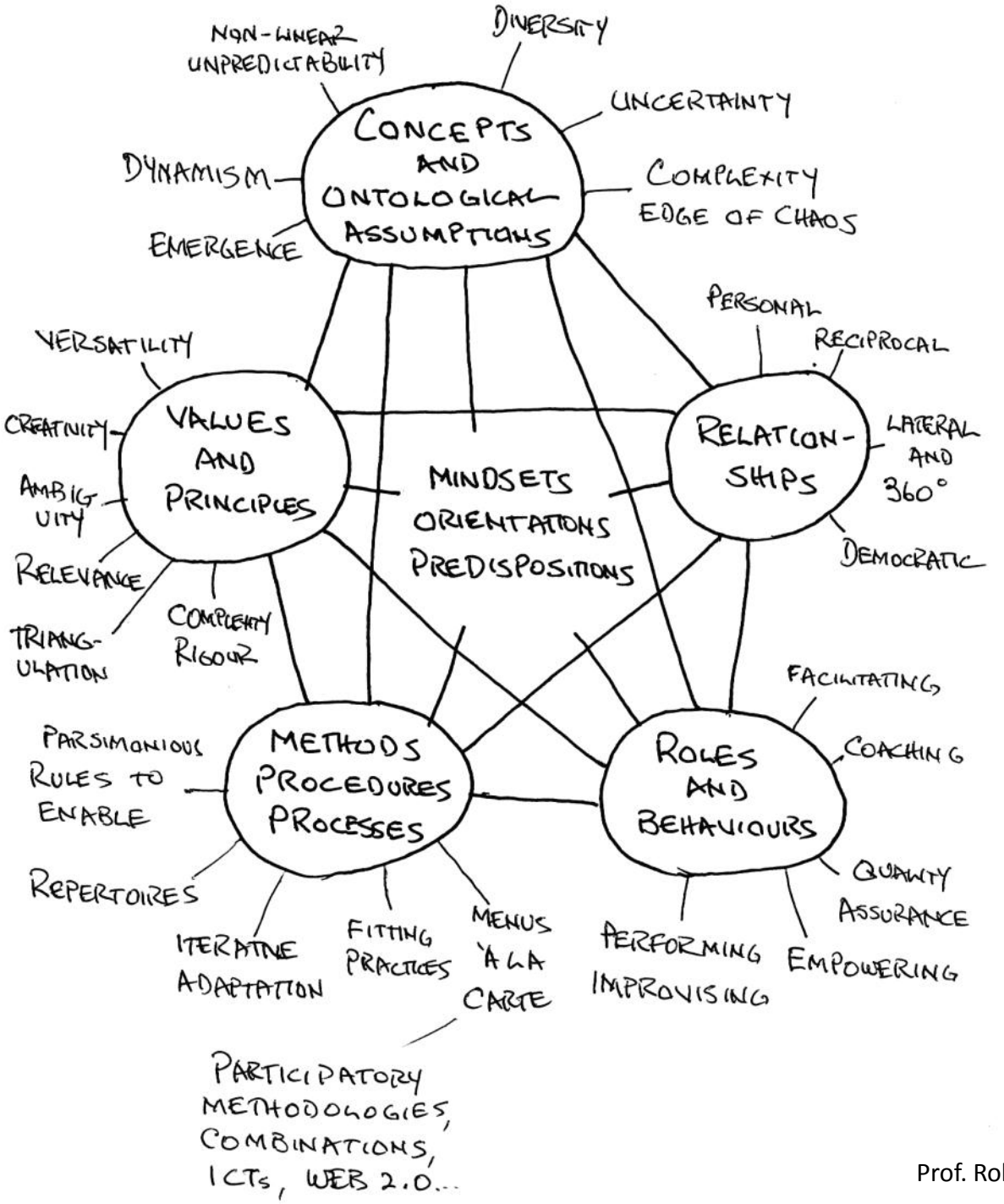
(hard vs. soft skills?)

Elements in a paradigm of neo-Newtonian practice

(things, the physical world)



Prof. Robert Chambers – IDS Working Paper 344, July 2010



Elements in a paradigm of adaptive pluralism

(people, the social world)

Prof. Robert Chambers – IDS Working Paper 344, July 2010

A survey… so far

- 90% of EWBers have gone into or intend to go into engineering (34% national average)
- 75% of whom at least partially attributed their involvement with EWB to their decision to remain in engineering
- When asked to compare the skills they gained from their involvement with EWB with the skills provided by their degree programmes, nearly 100% selected each of the following:
  - greater understanding of global issues
  - multi-disciplinary working experience
  - hands-on skills training
  - broader understanding of engineering's role in society
- 47% of the respondents were female
- 100% said they joined EWB because it was an 'inspiring subject area'

79% of employers say knowledge and awareness of the world is important, whereas 74% say degree classification is important

The Global Skills Gap: Preparing young people for the new global economy. Think Global & British Council. 2011.

More international students enrolled on UK courses are based overseas than in the UK

International Skills - speech Secretary of State for Business, Innovation & Skills, 8 Dec 2011, British Council, London. BIS. 2011.

87% of young people agree they want careers that add purpose to their lives but only 35% believe this happens in reality, leaving 59% searching for something more from their jobs

Searching for Something: Exploring the career traps and ambitions of young people, a research report by Common Purpose. Common Purpose. 2004.

Problem	Solution
Students need work experience	They run EWB branch at their university or volunteer with us during holidays
Understand basic engineering principles	Working in resource-constrained contexts
Working across engineering disciplines	We can't organise our work by discipline because everything we do is multi-disciplinary e.g.: wind turbines
Not enough young people choosing engineering degrees	Our outreach programme shows attractive people-sized engineering, and we are regularly featured in prospectuses
Not enough graduates staying in engineering	Almost all our 'graduates' go into engineering, whether for a firm, an NGO or governmental agency
Sometimes weak communications and management skills	EWB-UK provides a great place to develop and put these skills into practice
Enthusiasm for engineering	Our members are engineering evangelists as well as drivers of change on poverty, and their work attracts public interest

So… EWB-UK thinks that if we can help

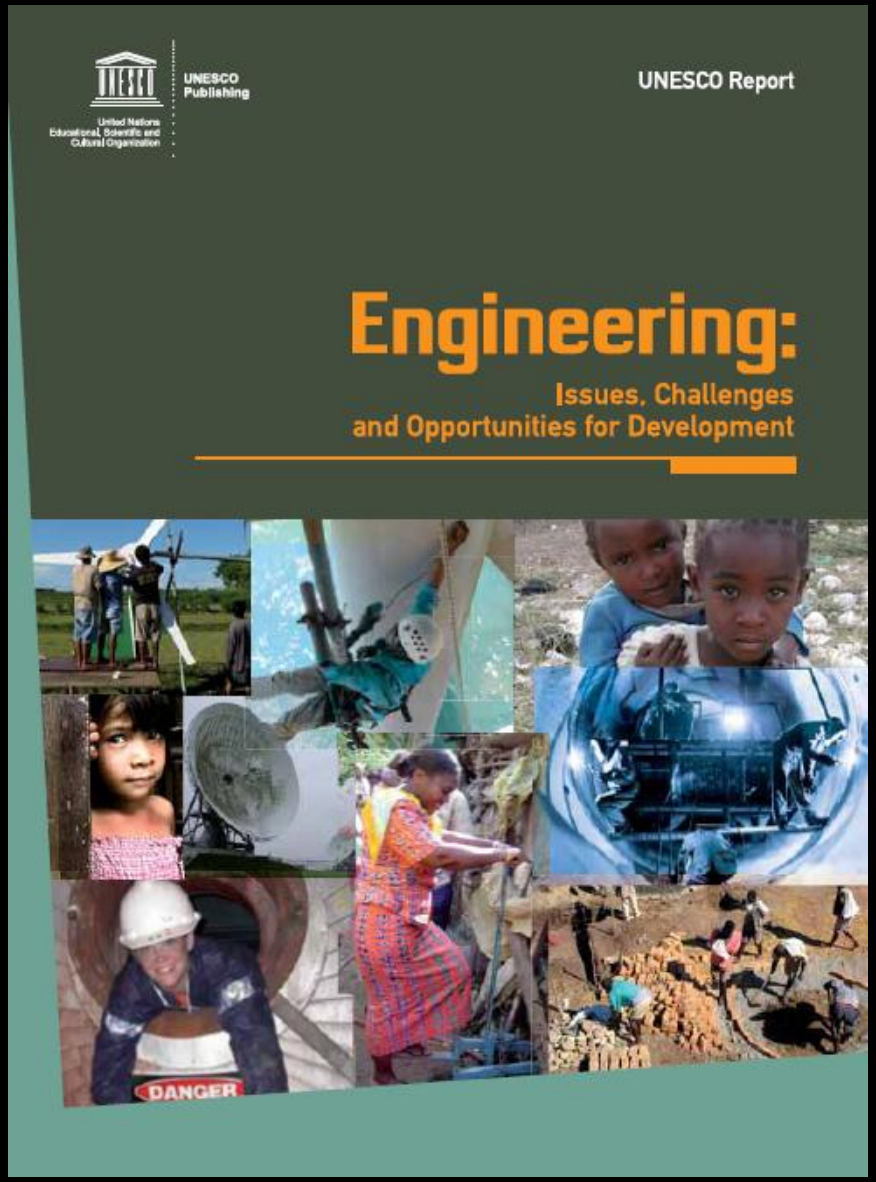
solve the problems of engineering
(and engineering education)

then we can better
solve the problems of the world


BRINDLEY
SMEATON


cold climates

UNESCO report – CDs available



Thank you!

www.ewb-uk.org

www.twitter.com/ewbuk

education@ewb-uk.org
andrew.lamb@ewb-uk.org