
A Global Dimension for Engineering Education

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***Abstract:** Engineering education must develop to keep pace with global issues such as poverty, sustainability and climate change. Forward-thinking higher education institutions (HEIs) are adapting courses to equip students with the skills, knowledge and attitudes that are necessary to maximise the positive and far-reaching impact of engineering on society and the environment. But constraints exist that must be overcome if these improvements are to be scaled-up and sustained over time. Importantly, there is often a lack of knowledge of global issues amongst teaching staff and a resistance to what is seen by some as a 'dilution' of core engineering content.*

This workshop will explore what is meant by the global dimension in engineering education. It will draw on the experience of an ongoing project entitled 'A Global Dimension for Engineering Education' that is being implemented by Engineers Against Poverty in association with the Engineering Subject Centre, Engineering Council, Institute of Education and the Engineering Professors' Council. The workshop will be highly interactive and participants will:

- *Become familiar with what is meant by the global dimension in engineering education*
 - *Consider barriers to incorporating the global dimension into engineering education and identify strategies for overcoming them*
 - *Discuss examples of good practice in incorporating the global dimension into engineering education.*
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Background to project

Engineers Against Poverty (EAP) is implementing a project entitled 'A Global Dimension for Engineering Education' in association with Engineering Council, Engineering Subject Centre, Development Education Research Centre of the Institute of Education (IoE) and the Engineering Professors' Council. The project is funded by the Department for International Development and is of three years duration. The purpose of the project is 'To strengthen the commitment and capacity of UK HEI engineering faculties to embed global issues into the curriculum'. We are particularly interested in the role that engineering plays and can play at the global level including the social and environmental impact of engineering projects and systems (e.g. on poverty reduction and sustainability of resources). It will achieve this through working in partnership with seven UK based HEIs around a series of activities that include professional development seminars and curriculum development support.

The project builds on earlier work completed by EAP and IoE that held a series of roundtable meetings in UK based HEIs that were attended by academic staff and representatives of civil society and industry. The meetings discussed what is meant by 'Global Skills' within the education of engineers and sought to identify examples of good practice and barriers to sustaining and scaling-up that good practice. The knowledge generated was captured in a publication entitled 'The Global Engineer' (Bourn and Neal, 2009) which also related the global dimension to the existing Engineering Council UK Spec (2004).

The Global Engineer report identifies two principal barriers to incorporating a global dimension into engineering education; (1) a lack of knowledge of global issues amongst teaching staff and (2) concerns that attempts to introduce global issues into the curricula might dilute core engineering content. The current project responds directly to these issues and is designed to support the seven

participating HEIs in their attempts to overcome those barriers. Following workshops involving the seven UK HEIs and drawing on recent work related to engineering and globalisation, poverty reduction, sustainability and ethics, (Franklin, 1990, Baillie and Feinblatt, 2010, Baillie and Catalano, 2009, Catalano, 2006, DFID, 2005) a framework has been developed which presents a range of issues that are relevant to the global dimension under four main headings; (a) Diversity, Rights and Working with Conflict, (b) Sustainable Development, (c) Interdependence and Global Professionalism and (d) Social Justice, Values and Ethics. In this workshop, participants will be invited to explore the framework in the light of their own contexts and to begin to develop strategies for incorporating them into their curricula as well as identifying barriers that need to be overcome.

Learning outcomes of the workshop

The workshop will be structured around three learning outcomes:

1. On completion of the workshop participants will have become familiarised with what is meant by the global dimension in engineering education.
2. On completion of the workshop participants will be able to identify key barriers to incorporating global issues into the curriculum and have discussed strategies for overcoming them.
3. On completion of the workshop participants will have been exposed to a range of examples of good practice, where global issues have been successfully incorporated into the curriculum.

Activities to be included in the workshop

1. Introductions: Introductions, warm-up and brief overview to the global dimension framework created with the 7 HEIs to date. (15 minutes)

2. Strategies for incorporating the global dimension into engineering education:

- i) Participants will work in groups to explore one of the four sections of the framework and to create learning scenarios for students, designed to enhance the global dimension (35 min)
- ii) Scenarios will be shared and critiqued and issues of diversity considered, drawing on participants experiences. (15 min)

3. Feedback on the framework. Following the exercise, participants will be asked to reflect on the appropriateness and use of the framework using creative thinking techniques (20 minutes).

4. Conclusion: Summing up and next steps (5 min)

Notes: Detailed notes of the discussion will be taken and used to develop the global dimension framework. The knowledge generated will be used to inform the project and where appropriate, incorporated into published outputs. No reference will be made to individual participants unless they give their permission.

[Note: It would be an advantage if participants could read the global dimension framework prior to the workshop. A PDF version can be made available to the EE2010 organisers for distribution to the participants or a web link can be provided to where it can be viewed online.]

Workshop facilitator

Professor Caroline Baillie Chair of Engineering Education for the Faculty of Engineering, Computing and Mathematics at the University of Western Australia (UWA). Before taking up her current position, Caroline was Chair of Engineering Education Research and Development at Queens University, Kingston, Ontario, where she was also cross appointed into Chemical Engineering, Sociology and Women's studies. Formerly she was lecturer at Imperial College, UK and the University of Sydney, as well as Deputy Director of the Materials Subject centre, part of the Learning and Teaching Support Network in the UK. Caroline founded the 'Engineering, Social Justice and Peace network' (esjp.org) and the not-for-profit 'Waste for Life' (wasteforlife.org). She is the author of over 180 publications including 19 books.

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