Title: **Learning to achieve professional, research and employability skills**

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Abstract:

Session Learning Outcomes

By the end of this session, delegates will be able to:

- Reflect on the purposes of higher education and how the narrowing down of the curriculum has run counter to the need to develop skills of creative thinking, critical review and a systemic approach to problems [1,2,3];
- Reflect on the diverse skills needed for employability and how these relate to 'graduateness';
- Reflect on the nature of 'wicked problems' [4];
- Understand how an inter-disciplinary, problem-based approach can foster research and employability skills;
- Understand how to apply the approaches to their own situations.

Session Outline

Key issues to be addressed are:

This workshop arises from a series of projects undertaken at the University of Manchester aimed at an inter-disciplinary and problem-based approach to issues of global societal responsibility. Some of the earlier work has been extensively reported [5,6] but this workshop will bring together existing threads, including work currently being undertaken in conjunction with the University of Keele[7] on an NTFS-funded project. Using two key precepts, that of the 'wicked problem' and also the educational maturation induced by problem-based learning, the workshop will actively explore the approach and feed back student responses as well as other evaluation data, including those derived from nominal group sessions[8]. Building on an initial concern for issues of sustainable development, including the results of a Delphi consultation[9], the workshop will go on to illustrate how this is part of a wider issue of global societal responsibility and instance how this relates to issues of disaster relief and humanitarian aid.
Serendipity can play a part in the development of a student's skills, with this aspect of development 'bolted-on' as an afterthought. The need to embed the design of skills development through the maturation process is key.
Although focussing on issues of global society, the approaches are capable of being used to consider issues in a more local context; one of the authors has been engaged is transferring the approaches for use by Masters students considering issues in eastern Finland. This session

is intended to challenge 'teachers' to consider how this educational approach can be used in other contexts and other disciplines.

Session Activities and Approximate Timings

There will be a brief (c 15 minutes) presentation followed by an experiential session (c 40 minutes) where participants get the opportunity to try a 'wicked problem' in small groups. This will be followed by the drawing out of lessons learned from the experience (c 20 minutes) and a brief time for questions (c 15 minutes).

Key questions could potentially include:

Is this approach resource-intensive? Can it be used with large groups?
How can employability skills be built in?
How can the skills and attitudes best be assessed?
How does this approach develop transformative learning and enhanced research and professional skills?
How do I translate the approach to my own situation?
How are 'wicked problems' crafted? [10]

References

1. Engel C, Tomkinson B and Warner R (2004), "The Ultimate Challenge: higher education, globalisation and change", *EDiNEB International Conference*. Maastricht, Holland, 2004.

2. Christobal F, Engel C and Talati J (2009), "The Ultimate Challenge? Higher Education for Adapting to Change and Participating in Managing Change", *Education for Health,* 22(3), 2009. Available online at
http://educationforhealth.net/publishedarticles/article_print_419.pdf

3. Queis D (2007), "Education for Sustainable Development: Implications for Teaching in Higher Education", Paper given to 11th UNESCO-APEID Conference *Reinventing Higher Education: Toward Participatory and Sustainable Development*, Bangkok, 2007.

4. Rittel H and Webber M (1973), "Dilemmas in a General Theory of Planning", *Policy Sciences*, Vol. 4, pp 155-169, 1973.

5. Tomkinson B, Tomkinson R and Dobson H (2008), "Education for sustainable development – an inter-disciplinary pilot module for undergraduate engineers and scientists", International *Journal of Sustainable Engineering,* Vol. 1, No. 1, 2008.

6. Tomkinson B, Tomkinson R, Dobson H and Engel C(2007), "An Inter-Disciplinary, Problem-Based Approach to Educating Engineers in Sustainable Development", *International Conference on Engineering Education,* 2007, Coimbra, Portugal.

7. Tomkinson B and Hutt I (2011), "Online PBL: a route to sustainability education?" Paper presented to the *International Conference on Engineering Education*, Belfast, 2011.
8. Delbecq A, Van der Ven A and Gustafson D (1975), *Group techniques for program planning: A guide to nominal group and Delphi processes.* Scott Foresman, Glenview, 1975.

9.   Tomkinson R, Tomkinson B, Engel C and Lawson A (2008). *Education for Sustainable Development in Engineering: Report of a Delphi Consultation.* Loughborough, Engineering

Subject Centre. Available online at: http://www.engsc.ac.uk/downloads/scholarart/delphi-consultation.pdf

10. Dobson H and Tomkinson B (2010). "Creating Sustainable Development Change Agents through Problem Based Learning: From rearranging the deckchairs on the Titanic to inciting social revolution - where should student PBL projects be pitched?" Paper presented to the *Engineering Education in Sustainable Development Conference*, Gothenburg, September 2010.