
Foreword

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This special issue explores the evolution of an innovative, integrative approach to climate change through collaborative production of an interdisciplinary education curriculum incorporating student mobility. It draws on the authors' involvement in a European Union Erasmus project, 'The lived experience of climate change: e-learning and virtual mobility', which brings together eight universities plus an umbrella association across six countries. The project has developed a set of postgraduate curriculum resources on climate change that will become globally accessible. It has recently piloted them to 25 students drawn from these universities. See Box 1 for a summary description of the project.

The papers that follow draw together key challenges that the project has had to confront, including working across disciplinary boundaries, diverse nations in the European Union, and different views concerning sustainable development. In this Foreword, the guest editors identify six underlying messages from the consideration of these challenges.

The first such message is to recognise the value of key disciplinary contributions to knowledge of climate change, and to build on these contributions to create an interdisciplinary inquiry. This is part of the broader challenge of communicating science and other specialist understandings to non-specialists. In his paper, Fairén takes up both the broader challenge and the specific needs of an effective communication of climate change science. Another challenge concerns what constitute the appropriate disciplines in climate change education. The paper by Breitmeier and Otto argues strongly for an analytical contribution from political science in order to complement normative narratives about what should be done with a narrative about how political agreement on climate change is reached, or not reached, in practice.

Breitmeier and Otto locate their argument for greater inclusion of political science within an interdisciplinary paradigm for climate change knowledge, but it is the following paper by Willems et al. which demonstrates one way of bringing the disciplines together through case studies and developing competences in natural resource management. Thus, bringing the disciplines together in a more holistic inquiry is the second underlying message. Natural resources are essential for human survival but their availability and access are likely to be critically affected by climate change. The paper demonstrates how both knowledge of technical aspects and decentralised approaches to management are essential.

In this issue, and in the project itself, the team argues strongly for an interdisciplinary approach to the complexities of climate change education. This is because we are dealing with a real world problem and such problems do not fall neatly within disciplinary boundaries. The paper by Wilson makes this case, but also argues that such a formulation of interdisciplinarity, as knowledge gained at the interfaces of academic disciplines, is not enough. We need to know also how citizens and groups interpret the messages conveyed by the academic disciplines whether singly or in combination. This interpretation is through our 'lived experience'. It adds a rather different and difficult knowledge to the mix because of the tacit (not easily codified) nature of lived experience, and the sense that it is an epistemological opposite of knowledge derived through scientific disciplines. Above all, the LEChE project attempts to integrate complementary knowledge of lived experience, and to assess its potential to inform policy and practice. This is the third message of the special issue.

The content of climate change education thus concerns both conveying diverse knowledges and simultaneously learning about knowledge, and its potential production out of diversity. The fourth message of this special issue, therefore, concerns the productive use of diverse knowledges. Putting diverse knowledges to productive use, however, requires development of particular competences. These are the abilities to engage in social learning across knowledge boundaries, across the scientific disciplines and across context-bound lived experiences of people and groups from every walk of life. The paper by Pérez Salgado et al. develops this argument into the concept of transboundary and intervention competences, generated and practised within higher education through structured student engagements that are facilitated by virtual mobility arrangements.

All of the above suggests ideas of communicative engagement as developed by Habermas (1990). Yet they also indicate a non-elitist and collaborationist view of education that can harness a diverse range of students and their experiences as a further resource in the knowledge generation process. This is the fifth underlying message. Here, the paper by Teixeira et al. promotes e-learning and open educational resources (OER) as a way forward. E-learning and OER together have the potential to widen participation in climate change debates, which can also lead to a well-informed citizenry. Creative commons' licences are typically used to deal with intellectual property issues in OER. They allow free use of the OER for non-commercial purposes as long as such use is attributed. They also can contain a 'share-alike' clause where future updates and adaptations must be similarly placed as OER. 'Share-alike' helps assure the long-term sustainability of the OER as 'living' materials.

In the final paper, Abbott provides yet another cut on the complementary value of academic diversity, interdisciplinarity and collaborative knowledge production, through engagement between conventional face-to-face universities and distance learning

universities in the LEChE project. She adds, however, a salutary note to engagement and collaboration which forms the sixth underlying message. It is never easy, and the day-to-day exigencies, especially on teaching staff in conventional universities, to act largely instrumentally suggest that embedding sustainability principles throughout education is a long haul.

Bringing these papers together into a special issue adds, through analysis of a grounded project, to the ongoing discussion regarding the United Nations Decade of Education for Sustainable Development (2005–2014) and its legacy. The editors have in this Foreword highlighted six fundamental messages from the papers, not only regarding climate change education, but climate change knowledge in general. As is usually the case with respect to a complex, real-world challenge such as climate change (and by extension sustainable development), these messages are of course inter-linked. The special issue, therefore, reinforces the key and well-known aspect of meeting the challenge of sustainable development: it requires an interdisciplinary, collaborative effort to deliver a higher level of knowledge.

References

Habermas, J. (1990) *Moral Consciousness and Communicative Action*, Polity Press, Cambridge.

Box 1

The lived experience of climate change: e-learning and virtual mobility (LEChE)

This project has created postgraduate curriculum and virtual learning communities in relation to climate change. It aims to:

- a contribute to an informed, active European citizenry and the United Nations Decade on Education for Sustainable Development
- b inform European Union policy.

The project focuses on the lived experiences of climate change – how individuals, communities and organisations conceive and respond to its perceived local impacts (e.g., extreme weather, biodiversity changes). It involves collaboration between eight universities plus the umbrella European Association of Distance Teaching Universities, and is funded by the European Union Erasmus Programme.

The educational level of the project is postgraduate Masters. A key feature is that the curriculum complements existing and proposed Masters programmes in the area, rather than attempts to create a parallel programme. Once it becomes open educational resource at the project end in April 2012, consortium members and indeed any university anywhere in the world are free to use or adapt the content within their own programmes, through their normal accreditation processes. The teaching modules that the project has created can be used flexibly by students: as available educational resources without assessment or accreditation to enhance their studies, or as conventional modules with assessment and accreditation.

Based on a virtual learning space, the main phases of the project have been:

- 1 Development of the overall design of the curriculum, the virtual learning communities and virtual mobility for students. A comprehensive competence-based approach was adopted, which allows development of the required integrative attitude and provides the links with real-life performance. Transboundary and intervention competences are defined as key competences and implemented in the curriculum.
- 2 Collaborative creation of the curriculum and associated virtual learning communities among the partner universities. This phase involved development of:
 - a Three teaching modules:
 - 1 introduction to climate change in the context of sustainable development
 - 2 the lived experience of climate change
 - 3 interdisciplinary research methods for investigating the lived experience of climate change.
 - b A Masters dissertation package based on the virtual learning space which contains:
 - 1 a repository of suggested dissertation topics
 - 2 hyperlinks to existing local, national and regional projects on climate change and their databases, and to lectures and other resources
 - 3 a repository of Masters dissertations in the area.
 - c A virtual mobility package which supports two kinds of learning community:
 - 1 for students and tutors/supervisors on any of the modules described above and on student dissertation topics
 - 2 a moderated e-learning community which expands access to organisations who might be the subject of dissertation projects, allowing for a dialogue on climate change between policy makers and academia.
- 3 Pilot delivery where students from the participating universities have benefited from the educational resources, learning communities and virtual mobility offered. In this, they were guided by institutional staff who also acted as learning community moderators. The student experience of this pilot delivery is being evaluated and the teaching modules are to be adapted accordingly before becoming available as open educational resources.
- 4 Ongoing phases throughout the project have involved quality assurance and enhancement (through peer review processes and external assessors), dissemination and long-term exploitation/sustainability.