



This is a peer-reviewed, post-print (final draft post-refereeing) version of the following published document, This article is © Emerald Group Publishing and permission has been granted for this version to appear here <http://eprints.glos.ac.uk/id/eprint/4646>. Emerald does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from Emerald Group Publishing Limited. and is licensed under Creative Commons: Attribution-Noncommercial 4.0 license:

**Mulà, Ingrid, Tilbury, Daniella, Ryan, Alex ORCID logoORCID:
<https://orcid.org/0000-0003-4316-311X>, Mader, Marlene,
Dlouhá, Jana, Mader, Clemens, Benayas, Javier, Dlouhý, Jiří and
Alba, David (2017) Catalysing Change in Higher Education for
Sustainable Development: A Review of Professional
Development Initiatives for University Educators.
International Journal of Sustainability in Higher Education, 18
(5). pp. 798-820. doi:10.1108/IJSHE-03-2017-0043**

Official URL: <https://doi.org/10.1108/IJSHE-03-2017-0043>

DOI: <http://dx.doi.org/10.1108/IJSHE-03-2017-0043>

EPrint URI: <https://eprints.glos.ac.uk/id/eprint/4646>

Disclaimer

The University of Gloucestershire has obtained warranties from all depositors as to their title in the material deposited and as to their right to deposit such material.

The University of Gloucestershire makes no representation or warranties of commercial utility, title, or fitness for a particular purpose or any other warranty, express or implied in respect of any material deposited.

The University of Gloucestershire makes no representation that the use of the materials will not infringe any patent, copyright, trademark or other property or proprietary rights.

The University of Gloucestershire accepts no liability for any infringement of intellectual property rights in any material deposited but will remove such material from public view pending investigation in the event of an allegation of any such infringement.

PLEASE SCROLL DOWN FOR TEXT.

Catalysing Change in Higher Education for Sustainable Development: A Review of Professional Development Initiatives for University Educators

Journal:	<i>International Journal of Sustainability in Higher Education</i>
Manuscript ID	IJSHE-03-2017-0043
Manuscript Type:	Editorial
Keywords:	

Catalysing Change in Higher Education for Sustainable Development: A Review of Professional Development Initiatives for University Educators

Mulà, I.¹, Tilbury, D.², Ryan, A.³, Mader, M.⁴, Dlouhá, J.⁵, Mader, C.⁶, Benayas, J.⁷, Dlouhý, J.⁸, and Alba, D.⁹.

Purpose

The world is shaped by an education system that reinforces unsustainable thinking and practice. Efforts to transform our societies must thus prioritise the education of educators - building their understanding of sustainability as well as their ability to transform curriculum and wider learning opportunities. This paper focuses on university educators and critically reviews the professional development and policy landscape challenges that influence their effective engagement with Education for Sustainable Development.

The article is informed by a pan-European collaboration involving 33 countries that identified emerging scholarship and practice in this area and assessed the lessons learned from ESD professional development initiatives. It sets the context to a special issue entitled "*Professional Development in Higher Education for Sustainable Development*" that draws together a collection of articles focusing on professional development of university educators across the world.

Design/methodology/approach

This paper provides a critical review of existing practice, international policy frameworks and literature relating to ESD, professional development and higher education. It examines innovative initiatives worldwide that seek to improve the capability of educators in higher education to integrate ESD into academic practice at individual, disciplinary and institutional levels. A rigorous process of selection was applied and overseen by an international expert group. This ensured that the initiatives sought educational change in ESD and not simply the embedding of content about sustainability into learning opportunities. It also assured that the initiatives had a clear and intentional professional learning process to underpin the engagement of participants with ESD.

Findings

ESD has grown in visibility and status worldwide, with a clear increase of activity in higher education. The sector is viewed as a significant force for change in societies, through the education provision it offers to future professionals and leaders in all sectors. However, universities currently lack capacity to integrate ESD effectively into mainstream teaching practices and the training they provide for academic staff, or to integrate ESD into their institutional teaching and learning priorities. Many ESD activities remain focused on teaching issues arising in sustainable development research and delivering specialist modules or courses in sustainability. Very few countries and institutions have significant staff development programmes to enhance the ESD competences of university educators and build their

¹ Dr Ingrid Mulà, University of Gloucestershire, Cheltenham, UK

² Prof Daniella Tilbury, University of Gibraltar, Gibraltar

³ Dr Alex Ryan, University of Gloucestershire, Cheltenham, UK

⁴ Marlene Mader, Leuphana University of Lüneburg, Lüneburg, Germany

⁵ Dr Jana Dlouhá, Charles University in Prague, Prague, Czech Republic

⁶ Dr Clemens Mader, University of Zurich, Zurich and Empa - Swiss Federal Laboratories for Material Science and Technology, St. Gallen, Switzerland

⁷ Prof Javier Benayas, Universidad Autónoma de Madrid, Madrid, Spain

⁸ Dr Jiri Dlouhý, Charles University in Prague, Prague, Czech Republic

⁹ Dr David Alba, Universidad Autónoma de Madrid, Madrid, Spain

academic leadership capabilities for ESD. The contributions to this special issue demonstrate the need for greater understanding of the multi-level task of integrating ESD into professional development activities not just for individual impact in the classroom but to advance institutional change and decisively influence the teaching and learning discourse of higher education.

Originality/value

There are few research studies and documented activities on ESD professional development in higher education available in the literature. This paper attempts to explore what ESD professional development involves and describes its complexity within the higher education sector. The special issue provides a collection of innovative research and practical initiatives that can help those involved in education and learning to develop ESD as a priority for future university innovative pathways.

1. Introduction

The global call for initiatives that support the re-orientation of the higher education curriculum towards sustainability is echoed across national strategies and policies, as well as in international sustainable development dialogues (Corcoran and Wals, 2004; Lozano *et al.*, 2013; Mader *et al.*, 2013; Tilbury, 2014). However, the literature continues to show that higher education institutions (HEIs) do not fully understand the true nature of this challenge (COPERNICUS Alliance, 2012; GUNi, 2012; Sterling, 2014; UNESCO, 2014a). The dominant focus has been on integrating content relevant to sustainability into the curriculum of different subject areas, or developing specialist courses on sustainable development, especially for those interested in pursuing defined careers in this area (Tilbury, 2014). While this trend continues, students are assuming responsibilities in societies, having been educated in ways that perpetuate the cultural assumptions and professional practices that exploit people and planet. Their university experiences may offer insights into sustainability but they avoid deeper challenges to unsustainable practices (UE4SD, 2013). The higher education curriculum continues to be engineered and delivered without this questioning or seeking to influence the future capabilities of people to create change towards more sustainable patterns of living (Ryan and Tilbury, 2013a).

Underpinning ESD, is a commitment to reorienting the learning experiences of students so that they understand their professional responsibilities, capabilities as well as personal motivations. The aim of this type of education is to enable them to act in support of more sustainable ways of life not just in the domestic sphere, but by influencing change within their professions, industries and wider business environments. The focus of ESD is therefore in pedagogy, as it seeks not just to 'teach about' sustainable development and transmit expert knowledge in this area, but to equip people to respond to the complexities and uncertainties of the future (Mader and Mader, 2012; Ryan and Tilbury, 2013b; Sterling 2011; Tilbury, 2011, 1995). It prioritises the use of both established and less well known pedagogical approaches, such as futures thinking, learning to change, systems thinking, stakeholder engagement, critically reflective thinking, and engaged and participatory learning (Cotton and Winter, 2010; Tilbury, 1995, 2011; Tilbury and Wortman, 2004). This implies change at two interconnected levels of pedagogy; to develop new classroom practices and rethink curriculum design, but also to shift the education priorities of the higher education system at all levels. Effective ESD in higher education requires different learning dynamics and also seeks to influence education practices more widely, altering the ways that academic staff and education providers view as 'excellence' and 'quality' in the learning experiences they offer.

Interest in ESD has grown quickly over the past decade for what is a fairly new approach to learning, but its essential principles are not yet common practice in higher education. There are still large 'translation gaps' in applying an ESD pedagogy to different subjects so that it reaches across the whole course of study, rather than simply introducing specialist knowledge of sustainability in certain places. Ryan and Tilbury (2013a) remind us that although positive steps have been taken by discipline champions, the scale of this challenge is significant and little strategic progress or systemic change for ESD has occurred in universities and colleges, or at the sector level. Bringing these innovative and transformative ideas into higher education requires professional guidance and capacity building for staff who teach and those who support learning (Nomura and Abe, 2012; Ryan and Cotton, 2013).

Recognising this systemic complexity that bridges individual practice with the organisational setting, 53 organisations (mainly HEIs) in 33 European countries came together in 2013 with the aim of reorienting higher education towards ESD by improving professional development opportunities for academic staff. This initiative, entitled “University Educators for Sustainable Development (UE4SD)”, was funded by the European Commission and led by the University of Gloucestershire, UK, working with an expert steering group providing representation from four regional areas across Europe. The UE4SD partnership developed new resources and identified leading practices, whilst prompting discussions about the forms of professional development needed to advance ESD across different disciplines, types of institutions and national contexts. This large collaboration project sought to empower university educators to understand, interpret and engage with ESD approaches, focusing on effective ways to develop professional competence in this area and to influence wider organisational change.

This article provides a review of the key UE4SD outcomes, as well as an introduction to the special issue aiming to advance the conceptualisation, understanding and dissemination of new efforts in ESD professional development in higher education. It presents fresh perspectives and capacity building initiatives from the UE4SD project and from contributors across the globe, to help accelerate innovation for sustainability in higher education. Through describing the international policy landscape around ESD and defining the professional development challenges, the paper points to inherent weaknesses and opportunities for change. Next, it outlines developments in the scholarship resource base and highlights lessons identified during the implementation of the UE4SD project. Finally, it provides reflections on the contributions to this special issue and themes emerging across the articles, to highlight areas where progress is evident and where further consideration is needed.

2. ESD and higher education: The international policy landscape

Since 2005, and with the higher profile afforded by the UN Decade on Education for Sustainable Development (DESD, 2005-14), there has been significant activity in ESD across the globe. A global sustainability discourse has emerged with international agencies and national entities embracing the concept and terminology across their policy frameworks - with the higher education sector seen as a key player (Barth, 2013; Lozano *et al.*, 2013; Tilbury, 2014). International ESD initiatives have identified that the training of educators is the foundation for future professional development at all levels, recognising the need for educators as well as students to develop ESD transformative approaches in their own pedagogy and practice (Michelsen *et al.*, 2016). This is reflected in the Rio+20 negotiations and the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development, as well as in the role given to ESD in landmark agreements, such as the UN Framework Convention on Climate Change (UNFCCC) and Convention on Biodiversity. These negotiations have brought together higher education leaders, UN and government agencies, staff, students and networks to present a collective vision for universities and to advocate for new priorities related to education and learning, research and community engagement.

In higher education, key initiatives have helped to move this forward: the Higher Education Sustainability Initiative (HESI) and the Rio+20 Treaty on Higher Education were launched at Rio+20 and received signatories from over 300 and 100 institutions respectively, committing to integrate

sustainability principles into core university activities (COPERNICUS Alliance, 2012; HESI, 2012). This continues through the Global University Partnership on Environment for Sustainability (GUPES), which encourages an interaction between UNEP and universities worldwide (www.gupes.org), and the Global Alliance of higher education networks and associations for sustainability, which influenced negotiations in the lead up to the COP21 in Paris. The latter urged ministers and governments to acknowledge and strengthen research and education, confirming the role of higher education in climate change mitigation and adaptation (EAUC, GRI and HESI, 2015). Also of note, is the Higher Education and Research for Sustainable Development online platform, compiled by the International Association of Universities (www.iau-hesd.net) which facilitates knowledge exchange in this area. These initiatives call for a rethink of higher education and highlight the substantial need for staff development and capacity building to support ESD innovation within the curriculum across all parts of the sector.

The literature testifies to ESD becoming a central narrative in global education, with the Education 2030 Agenda and the Sustainable Development Goal 4 on Quality Education having a visible presence in mainstream discourses. Several commentators point to the momentum created by the UN DESD (Firth and Smith, 2013; Mulà and Tilbury, 2009; Pigozzi, 2010) and in providing a powerful vision and purpose for educational policy and practice (UNESCO, 2014a). The growing impetus and progress of ESD was captured at the UNESCO World Conferences on ESD in 2009 in Bonn, Germany, and in 2014 in Aichi-Nagoya, Japan (de Haan *et al.*, 2010; Dlouhá, 2014), where hundreds of stakeholders took stock of the DESD and developments in ESD practice. The positive impact of the DESD led to the Global Action Programme (GAP) on ESD, endorsed by UNESCO in recognition of the need to scale up ESD and connect into mainstream education arenas (Tilbury, 2014). Notably, the GAP has been widely supported by education stakeholders not previously engaged with ESD, as seen in the Incheon Declaration (UNESCO, 2015a). Adopted during the UNESCO World Education Forum in May 2015 in the Republic of Korea, the Incheon Declaration acknowledges that ESD and Global Citizenship Education represent a “crucial new transformative element in the global education agenda” and need to “go beyond issues related to access to education and make education relevant today in light of global challenges” (UNESCO, 2015b, p.15). More recently the first Global Education Monitoring (GEM) Report (UNESCO, 2016), building on the *Education For All* Global Monitoring Reports, presents compelling arguments and evidence for education that achieves the Sustainable Development Goals, warning that education needs to fundamentally change to respond effectively to the current sustainability challenges.

In the DESD final monitoring and evaluation report, progress in the higher education sector during 2005-2014 was identified as being stunted by various challenges (Tilbury, 2014). The UNESCO report points to leadership obstacles that restrict ESD initiatives to the margins and acknowledges the need to move away from ‘bolt-on’ approaches to more fundamental curriculum reorientation that ‘build in’ ESD in core provision (UNESCO, 2014a). The report also highlights the substantial need for staff development and capacity-building, to support ESD curriculum development and the associated academic change processes, as well as the importance of higher education institutional networks in progressing this agenda (Tilbury, 2014). The 2016 GEM Report also underlines the need to rethink the quality of teaching and learning and to integrate ESD in teacher education and capacity building processes (UNESCO, 2016).

In line with this focus on ESD professional development, the GAP identifies the need to increase the capacity of educators to scale up ESD efforts and impact (UNESCO, 2014b). The GAP documentation specifically calls for universities to integrate ESD into faculty training, and to improve the ability of academics to reorient their teaching practice towards sustainability (CEE, 2016; UNESCO, 2014b). This priority is mirrored in recently adopted regional policy documents, such as the *UNECE ESD Implementation Framework* (UNECE, 2016a); the *Batumi Ministerial Statement* (UNECE, 2016b) that strongly supports the continuation of the *UNECE Strategy for ESD* beyond the first decade (2005–2015); the *Mediterranean Strategy on Education for Sustainable Development* (2014) and its Action Plan (2016); the *Cartagena Declaration* signed by Latin American Environment ministers (Foro de Ministros del Medio Ambiente de América Latina y el Caribe, 2016); and the *African Environmental Education and Training Action Plan* (2015–2014) endorsed by African ministers (UNEP, 2015). The recently launched 2016 International Civic and Citizenship Education Study (ICCS) by UNESCO and the International Association for the Evaluation of Educational Achievement (IEA), will report on the embedding of civics and citizenship into education and will include indicators related to ESD. Its main target group is secondary education students; country coverage is limited and its measures rather reductionist. The results concern generic ESD competences that educators at all levels need to bring about change in the curriculum and ensure that students are equipped to contribute to a sustainable world.

In addition to this positive ESD policy context, there is also an increase in student attention to sustainability agendas and demand for ESD curriculum reorientation in countries as diverse as Australia, France, Zimbabwe and Colombia (Barth *et al.*, 2016; UE4SDa, 2016; UNESCO, 2014a). In the UK, for example, the National Union of Students (NUS) has published research annually between 2011 and 2016, in collaboration with the UK Higher Education Academy (HEA), showing an increasing demand for ESD in the higher education curriculum and the importance of this for graduate employment prospects. Its latest study shows that 80% of students want their university or college to be committed to sustainability, with over two-thirds wanting sustainability integrated into all university courses (Drayson, 2015a). In France, over 6,000 higher education students were surveyed in 2014, with 70% attesting that the sustainability actions and measures at their universities were insufficient (REFEDD, 2014). Equally in Germany, Greenpeace's latest study on the engagement of youth (15–24 years) in sustainability pointed to how active engagement is linked to the development of higher education capabilities (Michelsen *et al.*, 2016). The work of student associations and societies on campus, as well as sector-wide student networks, is growing in importance as a mechanism for supporting education change towards ESD (Tilbury, 2016). Student-led calls for ESD are also emerging at the international level within specific subject areas; for example, in the field of economics, an open letter demanding new educational responses to address global sustainable development challenges was released in 2014, signed by 65 associations across 30 countries, representing a worldwide call for change across the academic community steering the future of economics education (UE4SD, 2015a).

These calls from the ESD and sustainable development arena, and from the higher education student community, highlight the growing strength of the student position in demanding greater integration of sustainability principles into every aspect of university life. There is a visible increase in student networks and movements that are adding momentum to calls for professional training of university

educators in ESD (UE4SD, 2015a, 2016a). This push is supported by reports from future employers and agencies showing the need to build these approaches into the future graduate skills profile. The latter they argue are necessary to address the challenges of sustainable development across economies, societies and environments (BITC, 2010; HEA and NUS, 2015). The key outcomes from the UE4SD project were intended to address this demand for greater understanding and capacity in ESD within the sector. These capacity building outcomes included:

- Development of an expert network of 53 European partners on ESD competences.
- Inquiry processes that informed a series of reports that mapped current expertise and recent experiments in ESD professional development across Europe.
- Sharing of experiences and reflection on selected projects and initiatives, to produce captured in a Leading Practice Publication of significant examples of ESD professional development.
- Initiation of a pilot programme of the UE4SD Academy, offering a model and set of real experiences with university teams developing their ESD competence.
- Engagement of a range of stakeholders with the issues of ESD professional development, including policy-makers, key agencies and leaders in the higher education sector.
- Synthesis of the findings and insights of the project, as well as notable examples of practice and the UE4SD Academy products, into an online resource platform.

These efforts sought to identify the strategic influences and implementation insights that are needed to proceed effectively in bringing ESD onto the radar of those responsible for the professional development of university educators, both within institutions and in relevant sector bodies.

3. Higher Education and Professional development in ESD

Embedding sustainability in higher education requires policy shifts and institutional incentives to support sustainability principles and practice, but also university educators capable of shaping learning experiences and providing the professional development graduates need to address the sustainability challenge (UE4SD, 2013). There is fresh attention to the need for training university academics and researchers in ESD, but in practice there is still insufficient clarity about the forms of professional development that best serve to change higher education curricula and learning frameworks towards sustainability (Holdsworth *et al.*, 2008; Tilbury, 2016; UE4SD, 2014, 2015b).

Professional development recognises that change is a constant feature of life. It addresses the need for continual learning and conscious reflection to respond effectively to changes and contemporary issues that may influence professional practice (UE4SD, 2016b). This can be supported through informal or formal activities, such as training, mentoring, workshops, action learning sets, workplace projects and accreditation schemes. Recent sector literature has documented the professional development challenges facing universities that aim to provide a futures-oriented, socially-relevant and purposeful education to their students, in a climate of rapid technological change, globalisation of labour markets and increasing participation in higher education worldwide (Bell *et al.*, 2009; Lawton, 2013; Ryan and Tilbury 2013b). The requirement for regular, reflective and change-focused professional development support to the academic workforce is therefore increasingly necessary, as standard provision in any

university environment that seeks to operate with a culture of continual education enhancement (Bamber *et al.*, 2009; Ketteridge *et al.*, 2002).

However, professional development in teaching for academic staff has not traditionally been prioritised due to the dominant sector focus on research excellence. This historical imbalance now exists in the context of this global growth of demand for higher education and pressure on public finances to resource it, in an increasingly competitive environment that includes providers of online learning opportunities from outside the sector (Dlouhá, Glavič and Barton, 2016). This has meant that moves to professionalise higher education teaching have been gaining pace and in some countries, such as the UK, this has become an increasingly formal and recognised activity for university educators (Smith, 2005). University lecturers are not required to have accredited teaching qualifications in most countries (Parsons *et al.*, 2010), but in changing economic, social and knowledge contexts, they are dealing with more diverse student cohorts and taking on new roles and agendas which go beyond teaching specific discipline-focused subjects (Brew, 2007). This has led to growing activity in promoting and delivering staff development strategies in universities (Parsons *et al.*, 2012) as well as a growing scholarly inquiry aimed at measuring the influence of professional development programmes in teaching, learning and the broader student experience (Brew, 2007; Devlin, 2008; Kneale *et al.*, 2016).

To date most higher education professional development interventions have aimed only at improving teaching practice, not at questioning the core goals of academic training or shifting the strategic focus of the academic system. However, there is evidence that some countries and institutions are engaging in more complex and sophisticated approaches which move their focus from individual capacity-building to organisational learning and change (Bamber, *et al.*, 2009; Gibbs, 2013). This broader perspective is embraced by ESD, which seeks to provide the kind of professional development that invites university educators not just to embed new elements into the existing system, but to alter that system. It encourages them to reflect on, rethink and reframe their own approaches and priorities in teaching, as well as facilitate academic change processes at a programme, departmental and/or institutional level (Hoffner and Tilbury, 2013; Ryan and Cotton, 2013; Sterling, 2011; Ryan and Tilbury, 2013a; UNESCO, 2014a). This brings complexity to the professional challenges involved, which can be unpacked into components such as (UE4SD, 2016b):

- Understanding how new pedagogies could be applied in different professional areas/disciplines.
- Linking ESD pedagogies with specialist content taught.
- Reframing what quality learning outcomes might look like through an ESD lens.
- Rethinking assessment of student progress and achievements.
- Challenging power relationships in learning and engaging students at all levels of the learning dynamic.
- Digesting how sustainability thinking and practice articulates in different industries/professions.
- Learning more about how to achieve educational change in institutions.

The emergence of dialogue around the competences relevant to sustainability reflects the need to grasp this complex professional development challenge. Support is needed for academics to take on these ESD challenges, to absorb new ideas and find space to reshape their own practices and plans, as well as to

influence the ideas of others and achieve wider effects in their institutions. Gradually, new frameworks and resources are appearing that seek to improve the ability of educators to deliver ESD (see table 1), leading to a clearer understanding of how university educators can provide these higher education experiences. However, this is new territory and as such there is little evidence as yet about how these tools are being used in professional development programmes in higher education.

Title	Description
UE4SD Leading Practice Publication (UE4SD, 2015b) and Online Platform of Resources (UE4SD, 2016b)	<p>The Leading Practice Publication provides an overview of 13 selected best practice examples of ESD professional development opportunities from Europe for university educators. It reviews approaches and priorities for how to implement ESD professional development at the higher education level, with information on the ways in which relevant professional development in ESD can be delivered, and what is needed at policy level to reach this transformation.</p> <p>http://www.ue4sd.eu/images/2015/UE4SD-Leading-Practice-PublicationBG.pdf</p> <p>The Online Platform contains the best practice resources identified and created through the UE4SD project from across Europe, as well as materials, tools, links and project outputs on ESD professional development. It draws on the practical experiences of UE4SD project partners and expert practitioners who have put ESD professional development into practice in various forms and contexts.</p> <p>http://platform.ue4sd.eu</p>
Mainstreaming Environment and Sustainability in African Universities (MESA)'s ESD Innovations Course Toolkit (UNEP, 2014)	<p>It presents the content for a short course on how to introduce ESD principles, concepts and methods to a university, with practical activities and case studies.</p> <p>The development of the innovations guidelines has involved a pilot process in African and Asian universities with over 200 participants, for UNEP's Global Universities Programme for Environment and Sustainability (GUPES).</p> <p>http://www.unep.org/Training/mesa/toolkit.asp</p>
Guide to Quality and Education for Sustainability (Tilbury and Ryan, 2013)	<p>Based on a UK higher education sector project aiming to influence mainstream higher education teaching and learning, this resource identifies ways that ESD connects with quality agendas and curriculum priorities. The resource is an interactive guide in short sections, with 'talking heads' video clips and downloadable materials and tools. It is designed for those exploring the landscape of ESD and quality in higher education, specifically focusing on institutional agendas and how to bridge the discourses of ESD and quality enhancement and assurance.</p> <p>http://efsandquality.glos.ac.uk/</p>
Turnaround Leadership for Sustainability in Higher Education (Scott <i>et al.</i> , 2012)	<p>An Australian government funded study that analysed the experiences of 188 higher education leaders from Asia-Pacific, North America and Europe seeking change for sustainability. The research highlights leadership and change competences needed to advance ESD and concludes that that building this</p>

	<p>type of leadership capability will be necessary to achieve systemic change across the higher education sector.</p> <p>http://platform.ue4sd.eu/downloads/TLSHE_Report_2012.pdf</p>
Future Fit Framework (Sterling, 2012)	<p>Practical professional guidance on ESD pedagogy to support course development and to enable university educators to build their own competence and understanding in this area. It includes tools and advice on how to develop ESD for higher education professionals and engage in organizational learning for sustainability. The resource was commissioned by the UK Higher Education Academy as part of its programme of research and development in ESD under the DESD.</p> <p>https://www.heacademy.ac.uk/system/files/future_fit_270412_1435.pdf</p>
UNECE ESD Competence Framework for Educators (UNECE, 2012)	<p>The framework supports institutions seeking to understand and develop ESD competences of their educators and enhance the quality and relevance of their professional development programmes. The competence framework has 3 key ESD principles: (i) a holistic approach; (ii) envisioning change; and, (iii) achieving transformation. The competences identified seek to improve the ability of educators to deliver ESD, but also help them bring wider changes into education thinking and practices. Implementation of the framework by member states has its challenges (Wals, 2013), but the development of the framework provided an important reference point for the UE4SD project and other international ESD professional development efforts.</p> <p>https://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf</p>
WWF professional development of teacher competences for learning for sustainability (Strachan, 2012)	<p>A professional development framework in ESD which can form the basis of teacher education courses and continuing professional development programmes for teachers. It was prepared by the World Wildlife Fund Scotland and includes a review of ESD frameworks for teacher education.</p> <p>http://platform.ue4sd.eu/downloads/WWF_PD_Framework_Teacher_Competences_2012.pdf</p>
Competencies for ESD teachers: A framework to integrate ESD in the curriculum of teacher training institutes (Sleurs, 2008)	<p>A framework developed as part of a Comenius-2-project, CSCT (Curriculum, Sustainable development, Competences, Teacher training) to meet the call of the UNECE ministers of the Environment to offer curriculum models to teacher training institutes which are searching for attainable possibilities to integrate ESD in their curricula. The framework is based on 3 overall competencies: teaching, reflecting / visioning and networking and presents 12 case study examples of teacher training universities/colleges/institutes.</p> <p>http://platform.ue4sd.eu/downloads/CSCT_Handbook_11_01_08.pdf</p>

Table 1. Examples of recent ESD professional development frameworks and resources

In mapping ESD professional development in higher education in Europe, the UE4SD project found that only a few countries and institutions have significant staff development initiatives to enhance ESD in both the academic practice and leadership capabilities of university educators (UE4SD, 2014). The report

emphasises that progress often depends on the interest and conviction of individual academics to develop in this new area. Existing activities are often driven largely by sustainable development research and the teaching of specialist topics in sustainability, rather than critically reflective and innovative pedagogies that extend capabilities of staff as well as students (UE4SD, 2014). Several ESD commentators have called for greater attention to the process of organisational learning to change university policies and structures and not just single courses and subjects (Sterling, Maxey and Luna, 2013; UE4SD, 2014; UNESCO, 2014a).

Most of the innovation and valuable developments in this area have been led by higher education networks, but also by some individual institutions concerned in the training of its educators (COPERNICUS Alliance, 2012; UE4SD, 2014). Whereas higher education groups are trying to address staff development needs through collective effort, learning and action (UNESCO, 2014a), the value of professional development opportunities offered by single institutions is that they address more efficiently the specific challenges that staff are facing and have a better integration into the institutional context. Table 2 showcases examples of ESD professional development identified during the UE4SD project in UE4SD country partners in Europe. It includes staff development initiatives developed by networks and HEIs, but also national programmes intending to address ESD training needs of university staff.

Title	Type/Scope	Focus	Pedagogical approach
Network of the Mediterranean Universities for Sustainable Development focusing on Education for Sustainable Development (MedUnNET)	International network	Network promoting ESD in university programmes, departments and facilities of the Mediterranean region.	<ul style="list-style-type: none"> Combination of theory and practice in a given structure: work in groups, theoretical lecture and discussion about integration in practice. Focus on development of UNECE ESD competences.
European Network of Organic Agriculture University Teachers (ENOAT)	International network	Workshops on innovative teaching methods held by the ENOAT network of university teachers in organic agriculture.	<ul style="list-style-type: none"> Focus on problem identification. Interactive teaching methods, discussion-based learning, team & group work. Learning process facilitated by mediators.
Reorient University Curricula to Address Sustainability (RUCAS)	International network	European project that established a consortium of 12 universities and 3 NGOs to support ESD and capacity building development in European HEIs, as well as those in Egypt, Jordan and Lebanon.	<ul style="list-style-type: none"> Active and participatory learning: group-work, critical self-reflection, peer discussions. Alternative assessment methods: performance tasks, data gathering assignments, research projects, oral presentations and portfolios.
Ecocampus	National programme	Programme helping HEIs in Flanders (Belgium) to structurally embed ESD in their mission statements, curricula and competence profiles.	<ul style="list-style-type: none"> Focus on problem and project-based learning. Interactive and participatory methodologies: group discussions, role plays, Socratic method. Research and action oriented methodologies: project weeks, internships, company visits, etc.
Green Academy	National programme	Change programme bringing together staff teams from different universities in the UK to plan, develop and implement ESD institution-wide change initiatives.	<ul style="list-style-type: none"> Use of team-based approaches; action planning and strategy development skills; experience in leadership and change; change agency skills. The professional development process is informed by principles such as distributed leadership, change management, action learning sets and peer-to-peer learning. The ESD framing of the programme is geared to 'whole institution' ESD development, including the formal curriculum and co-curriculum.
Conference of Spanish University Rectors –	National network	Spanish network supporting curriculum development	<ul style="list-style-type: none"> Focus on the development of cross-cutting skills-building in the attitudinal, methodological and cognitive

Sustainability Commission (CRUE-Sustainability)		processes and innovative teaching projects for sustainability skills development.	<p>spheres.</p> <ul style="list-style-type: none">• Engagement of members in community processes that foster sustainability.• Application of ethical principles related to sustainability values in professional practice and personal life.
Learning for Sustainable Futures (LSF)	Institutional programme	Institutional capacity building programme at the University of Gloucestershire (UK) providing professional development in ESD for both teaching staff and staff who support student learning.	<ul style="list-style-type: none">• Pedagogical inquiry and development projects with an action learning focus; not about researching ESD, but bringing ESD into the thinking and practice of teaching teams and professional departments.• Seed funding with 1:1 mentoring tailored to the individual and setting, to develop ESD competence and the ability to influence curriculum change within teams and across the organisation.• Bespoke advice that links ESD principles with the specialist area and helps to develop wider institutional community of practice in ESD.
Initiative for Sustainable Development Education (ISDE)	Institutional network	Informal teachers' network at the University of Architecture, Civil Engineering and Geodesy (Bulgaria) providing mutual support for university teachers in educating students and self-educating themselves in the ESD field.	<ul style="list-style-type: none">• Based on principles of creative thinking, self-education, and mutual support of university educators.• Interaction and continual dialogue (among educators and between educators and students).• Linking teaching to research and to real-life professional practice.• Space for critical debates and supportive environment, collaborative and synergetic.
Leuphana Semester: ESD professional development module on Responsibility and Sustainability	Institutional workshop	A three-day workshop for lecturers at Leuphana University (Germany) held once a year to help prepare teaching staff for ESD challenges.	<ul style="list-style-type: none">• Project-based seminars; shift from educator-centred to learner-centred approaches.• Cooperation and work in small groups. Focus on a special problem within the wider context of ESD.• Discussions, expert input, world café dialogues and cooperative consulting.
Innovation Projects for Sustainability	Institutional grant scheme	Grant scheme offered by the University of Basque Country (Spain) for developing the capacity of people for	<ul style="list-style-type: none">• Critical thought, collaborative and participatory learning of students and academic staff.• Stimulating creativity and envisaging different alternatives for the future.

		transforming educational change for sustainability via practical projects.	
Institute of Sustainable Education (ISE) action research	Institutional educational approach	Development of theoretical foundations and practical experience in action research for reforming teacher training towards ESD at Daugavpils University (Latvia).	<ul style="list-style-type: none"> • Participatory action research as a transformative tool for learning in diverse educational contexts. • Affirming educators' right and ability to have a say in matters which affect them.
INDUCTION project	Institutional induction programme	Induction programme at Frederick University (Cyprus) for novice lecturers as part of ESD in relation to quality education, systemic and critical thinking, and use of variety of teaching techniques.	<ul style="list-style-type: none"> • Flexible mentoring system • Collaboration, collegiality, solidarity, reflection, critical thinking, values and action orientation. • Formation of professional communities of learning for peer interaction in the field of ESD.
Innovation in Teacher Education – Education for Sustainable Development (BINE)	National course	Professional development course on innovation in teaching and ESD for higher education educators in Austria.	<p>Writing case research based studies based on:</p> <ul style="list-style-type: none"> • Equal emphasis on theoretical-methodical foundation and learning from one's own practical experiences/projects. • Active participation of the educators in developing contents and methodology. • Systematic reflection on actual teaching practice (action research). • The goal is to enable a learning community.
ELTT - Enabling Leadership for Transformative Teaching and Learning for Sustainable Development	Institutional programme	Professional training programme targeting university educators, to support capacity building for ESD leadership in higher education. Pilot programme at University of Zurich (Switzerland)	<p>Blended learning format based upon:</p> <ul style="list-style-type: none"> • Eight interactive workshops focusing on whole institution approaches for ESD • Webinars involving international experts through controversial debates on ESD • Handouts providing literature inputs on conceptual backgrounds of ESD, competences, global ESD policies and institutional change practices. <p>Participants come from a variety of disciplinary and institutional backgrounds.</p>

Table 2. Examples of ESD professional development initiatives identified in the UE4SD project (modified and updated from UE4SD, 2015b).

4. Lessons learned in ESD professional development

The UE4SD experience has encouraged ESD practitioners and policy-makers to recognise and reflect on different approaches to pedagogical practice and start to understand how professional development in ESD can happen. The project has offered opportunities to think through how to work for change in different higher education systems and engage colleagues, students and professional partners with ESD.

Several key lessons on ESD professional development have emerged during the 3-year project implementation. First, there is a need to recognise that ESD is associated with a unique set of 'competences' or 'capabilities' that emphasise the need for thinking holistically, envisioning change and transforming learning systems (UNECE, 2012). Professional development in ESD should be informed and shaped by these competences and support educators to develop, practice and assess them. This implies designing professional development activities that will not just seek to improve the ability of educators to deliver ESD, but will also help them to bring wider changes into education thinking and practices. Capacity building processes therefore should be built upon critical reflection and participatory, action and transformative learning pedagogical strategies. They should evaluate participant satisfaction but more importantly professional learning and change in practice. This process will require time, resources, supportive structures and incentives.

Second, ESD professional development is a long-term practice which is best co-developed in collaboration with stakeholders within universities and the higher education sector, experts and newcomers from different disciplines and with different academic interests. Staff development initiatives in this area should be continuous and ongoing, requiring active engagement by the educator to connect with the sustainability thinking and develop change competences for sustainability. This requires close guidance and mentoring as part of the professional learning cycle as well as providing platforms for collaboration, networking, academic exchange, shared pedagogical inquiry and peer learning. Critical to the professional development journey is the need to organise follow-up and further learning opportunities so that educators can keep engaged in the learning process and involved in forward planning. Consequently, ESD professional development needs to be institutionalized sector-wide and must move from being marginal or pilot initiatives to be embedded as core provision.

Third and finally, professional development strategies should reflect an institution-wide, systemic approach that engage educators to influence practice across all higher education programmes as a learning objective and an institutional teaching and learning priority. This implies not just developing and enhancing academic practice in ESD, but also developing leadership capabilities to ensure institutional development in this area. Professional learning therefore should connect staff learning in ESD with sector initiatives and institutional change processes. It also requires providing training in ESD for those in management and leadership positions within universities as this can prove catalytic in the process of embedding change for sustainability in HEIs (Scott *et al.*, 2012).

Table 3 summarises the lessons learned pointed above in terms of the overall focus UE4SD has established as important for effective ESD professional development in higher education.

Changes from...	To...
One-shot professional development workshops in ESD	Ongoing professional development opportunities and mentoring support that actively engages the educator in critical reflection and action
Methods based on individual and personal change	Methods that support social learning and change
Targeting university educators only	Targeting senior and middle managers too
Developing specialist knowledge in sustainable development	Building academic leadership skills and transformative capabilities
Building disciplinary expertise in ESD	Transcending specialist expertise by crossing disciplinary boundaries and working with others
Strengthening academic identities	Developing new academic identities
Integrating ESD in the curriculum	Driving innovation in the curriculum
Transforming the teaching practice	Engaging in whole-institutional changes and organisational learning
Enhancing student learning and experience	Empowering learning at all institutional levels

Table 3. Lessons learned in ESD professional development in higher education

These principles of change are built on profound discussions within the academic, as well as policy discourse: professional development as a prerequisite for curricular change and development of educators' leadership and transformative capabilities (Barth and Rieckmann, 2012; Scott *et al.*, 2012); social learning as a necessary condition for participatory involvement and critical dialogue (Barth and Michelsen, 2013; Dlouhá *et al.*, 2012; Fadeeva *et al.*, 2010; Wals, 2011). Transdisciplinary and systemic thinking is a key ESD principle (Tilbury and Mulà, 2009) and a whole-institutional approach is the first priority action area of the UNECE Strategy for ESD future implementation framework (UNECE, 2016a). The overview of leading practices in ESD selected from across Europe (UE4SD, 2015b) has however demonstrated that these challenges have already been raised by some of the university programs in practice, and relevant innovation/transformation processes are ongoing. This resource describes concrete tools to achieve change in different cultural and policy contexts.

5. This special issue

This special issue includes pioneering experiences across the world in the training of higher education academics in ESD. The articles that follow showcase good practice and illuminate pathways to address some of the current ESD staff development challenges mentioned above. Some authors have considered common questions related to the development of professional capabilities or competences for educators, in order to advance ESD; others have centred their analysis on methods and approaches that support critical reflection and individual change; and, finally, some contributions provide evidence of professional development strategies that support the development of academic leadership skills and institutional change and learning.

All articles present a series of important developments and innovative approaches. Di Giulio and Defila present a case study at the University of Bern that supported academics strengthening student inter- and transdisciplinary capabilities. Lambrechts, Verhulst and Rymenams provide insights in the relationship between professional development and organisational change processes towards sustainability within the Flanders (Belgium) context, with a specific focus on empowerment. Warr

Pedersen examines how collaborative peer learning at the University of Tasmania (Australia) can sustain and promote continued professional development for staff in higher education who are committed to ESD as an educational paradigm. Meyer, Mader, Zimmermann and Cabiri reflect on the potential of professional development to address key sustainability challenges in Albania and Kosovo, and propose a series of ESD competences for university academics based on transdisciplinary collaboration in teaching and research. De Kraker, Dlouhá, Macháčková Henderson and Kapitulčinová assess the value and potential of a specific virtual collaboration environment to enhance professional development in ESD in HEIs. Amado, Dalelo, Adomßent and Fischer describe a case study from a pilot professional development programme carried out in Colleges of Teacher Education and Theological Colleges in Ethiopia, and present a training curriculum based on whole-institution approaches. Avery and Nordén provide a conceptual map on how to mediate between sustainability theory and practice in universities in Denmark and Sweden. Garcia, Junyent and Fonolleda propose a framework to assess the development of professional competences in ESD of educators, from a complexity perspective. Finally, Restrepo, Mercedes, Blanco-Portela, Ladino-Ospina, Tuay Sigua and Ochoa consider and analyse different pedagogical styles of educators in order to enhance a professional development programme in Colombia aimed at building staff competences in ESD.

The collection of papers enables valuable comparisons on a number of issues in the planning, delivery and assessment of ESD professional development strategies and programmes. Almost all papers demonstrate their research findings through case studies. Five out of the nine papers (Di Giulio and Defila, Lambrechts *et al.*, Warr Pedersen, Avery and Nordén, and Restrepo *et al.*) are based on institutional cases, where professional development processes and initiatives at HEIs are described. They range from very clear and focused professional development programs for educators addressing inter- and transdisciplinary teaching to a series of ESD initiatives, where the training of educators is part of a holistic sustainability transformation of the university (see Lambrechts *et al.*). The idea is that educators are empowered to support organisational change processes towards sustainable development. On the other hand, there are contributions where professional development can be seen as a result of ESD approaches – e.g. Warr Pedersen suggests that peer-learning in a community of practice approach at the university can lead to the development of ESD competences of educators; de Kraker *et al.* describe the professional development opportunity through moderated teaching in a virtual seminar on sustainability issues, whilst Restrepo *et al.* study how educators learn through self-analysing their personal pedagogical styles. Besides institutional cases, two contributions (Amado *et al.*, and Meyer *et al.*) deal with national experiences and one contribution (de Kraker *et al.*) addresses issues at regional and international levels.

Most of the contributions address competences for university educators as part of their research findings and several include competence framework for educators by UNECE (2012), which provides the basis for an assessment framework of professional competences from the perspective of complexity. Competences needed for teaching in inter- and transdisciplinary settings are also dealt with.

To provide a wide range of perspectives and consider diverse cultural contexts, the contributions for this special issue come from different parts of the world; including six contributions from Europe (by authors from twelve countries) and one contribution from Africa, Australia and South America.

6. Concluding remarks

The direction of global dialogues and plans, for ESD and professional development, will be an important strategic point of focus for higher education worldwide. Higher education student and employer demands for ESD are also providing important contexts to frame and focus the kind of professional development needed for higher education staff. Little is known about the type of capacity building processes that are contributing to changing teaching and learning cultures in higher education, and more scholarly work and practice is needed to understand how university educators develop ESD competences through professional development, what strategic concerns they have in relation to ESD, or what ESD means in relation to quality (UE4SD, 2013).

This introduction paper to the special issue has attempted to provide insights into ESD and its relationship to professional development as well as raise the level of discussion in these areas among ESD practitioners. It does this against a context where there is a vacuum of empirical studies – comparative, longitudinal or meta studies are absent. The UE4SD project has collected leading practice in this area and has provided a platform to reflect on our understanding of how professional development happens. Finally, the articles that follow can illuminate future pathways on how we might work for change in current higher education systems and inspire studies in this area.

Acknowledgements

The authors and members of the UE4SD Steering Group would like to thank the European Commission (Erasmus+ Programme) for its financial support which enabled this pan-European collaboration. It would be impossible to cite or reference all UE4SD colleagues from 53 universities and partner organisations, who have contributed to the thinking, framing of implementation of this project. We therefore take this opportunity to acknowledge their contribution. We also like to thank the reviewers of this special issue for their critical advice, constructive feedback and continuous efforts in improving the quality and significance of the papers. Our thanks also go Dana Kapitulčinová for her comments on an early draft of this paper and to Gerd Michelsen for contribution to project processes.

References

- Bamber, V., Trowler, P., Saunders, M., Knight, P. (2009), *“Enhancing Learning, Teaching, Assessment and Curriculum in Higher Education”*, Open University Press, Maidenhead.
- Barth, M. (2013), “Many roads lead to sustainability: a process-oriented analysis of change in higher education”, *International Journal of Sustainability in Higher Education*, Vol. 14 No. 2, pp. 160–175.
- Barth, M., Michelsen, G., Rieckmann, I. T. (eds.) (2016), *Routledge Handbook of Higher Education for Sustainable Development*, Routledge, London and New York.
- Barth, M., & Michelsen, G. (2013), Learning for change: an educational contribution to sustainability science. *Sustainability Science*, 8(1), 103–119.

Barth, M., Rieckmann, M. (2012), Academic staff development as a catalyst for curriculum change towards education for sustainable development: an output perspective. *Journal of Cleaner Production*, 26, 28–36.

Bell, L., Stevenson, H., Neary, M. (eds) (2009), *“The Future of Higher Education: Policy, Pedagogy and the Student Experience”*, Continuum, London.

Brew, A. (2007), “valuating academic development in a time of perplexity”, *International Journal for Academic Development*, Vol. 12, pp. 69–72.

Business in the Community (BITC) (2010), *Leadership Skills for a Sustainable Economy*, BITC, London, available at: http://www.bitc.org.uk/resources/publications/leadership_skills.html (accessed 4 January 2016).

Centre for Environmental Education (2016). “Workshop Recommendations: Goal 4.3 – Higher Education and TVET: Addressing pedagogy, curriculum, research and spaces of learning”, International Conference Education as a Driver for Sustainable Development Goals, 11-13 January 2016, Ahmedabad, India, available at <http://ceeindia.org/esdg/Goal%204.3.html> (accessed 29 July 2017).

COPERNICUS Alliance (2012), The Rio+20 Treaty on Higher Education, available at <http://www.copernicus-alliance.org/about-ca/rio-20-treaty> (accessed on 20 December 2016).

Corcoran, P.B. and Wals, A.E. (Eds.) (2004), *Higher Education and the Challenge of Sustainability: Problematics, Promise, and Practice*, Kluwer Academic Publishers, Dordrecht, Boston and London.

Cotton, D.R.E. and Winter, J. (2010), “It’s not just bits of paper and light bulbs: A review of sustainability pedagogies and their potential use in higher education”, in Jones, P., Selby, D. and Sterling, S. (Eds.), *Sustainability Education: Perspectives and Practice Across Higher Education*, Earthscan, London, pp.39-54.

De Hann, G., Bormann, I. and Leicht, A. (2010), “The midway point of the UN Decade of Education for Sustainable Development: Current research and practice in ESD”, *International Review of Education*, Vol. 56 No. 2, pp.199-206.

Devlin, M. (2008), “Research challenges inherent in determining improvement in university teaching”, *Issues in Educational Research*, Vol. 18, pp. 12-25.

Dlouhá, J., Barton, A., Janoušková, S., Dlouhý, J. (2012), Social learning indicators in sustainability-oriented regional learning networks. *Journal of Cleaner Production*.

Dlouhá, J. (2014), “A Report on the Results of the World Conference on Education for Sustainable Development Organized at the End of the UNESCO Decade for ESD”, *Envigogika*, Vol. 9 No.2.

Dlouhá, J., Glavič, P., & Barton, A. (2016). “Higher education in Central European countries –Critical factors for sustainability transition”, *Journal of Cleaner Production*. DOI: <http://dx.doi.org/10.1016/j.jclepro.2016.08.022>

Drayson, R. (2015a), “*Student Attitudes towards and Skills for Sustainable Development, Executive Summary: Employers*”, The Higher Education Academy and the National Union of Students, available at <https://www.heacademy.ac.uk/system/files/executive-summary-employers.pdf> (accessed on 21 December 2016).

Drayson, R. (2015b), “*Student Attitudes towards and Skills for Sustainable Development, Executive Summary: Students*”, The Higher Education Academy and the National Union of Students, available at <https://www.heacademy.ac.uk/system/files/executive-summary-students.pdf> (accessed on 21 December 2016).

Global Alliance (2015), Open Letter to the Governments on behalf of the world’s Universities, Colleges and Students, available at <http://cop21.grli.org/> (accessed 29 July 2016).

EAUC, GRLI and HESI (2015), An Open Letter to COP21 Ministers and Governments on Behalf of a Global Alliance of Tertiary, Higher Education and Student Sustainability Networks, Associations and Institutions, available at <http://cop21.grli.org/> (accessed on 20 December 2016).

Fadeeva, Z., Mochizuki, Y., Wals, A. E. (2010), Mirroring, Gestaltswitching and transformative social learning: Stepping stones for developing sustainability competence. *International Journal of Sustainability in Higher Education*, 11(4), 380–390.

Firth, R. and Smith, M. (2013), “As the UN Decade of Education for Sustainable Development comes to an end: What has it achieved and what are the ways forward?”, *Curriculum Journal*, Vol. 24 No.2, pp. 169-180.

Foro de Ministros del Medio Ambiente de América Latina y el Caribe (2016), “*Cartagena Declaration*”, XX Meeting of the Forum of Ministers of Environment of Latin America and the Caribbean, Cartagena, 23-27 May 2016, available at: http://www.pnuma.org/forodeminstros/20-colombia/documentos/Adopted_FINAL_EN_Cartagena_Declaration_2016.doc (accessed on 21 December 2016).

Gibbs, G. (2013), “Reflections on the changing nature of educational development”, *International Journal for Academic Development*, Vol. 18 No. 1, available at: <http://www.tandfonline.com/doi/full/10.1080/1360144X.2013.751691?scroll=top&needAccess=true> (accessed 6 January 2017).

GUNi (2012), *Higher Education in the World 4. Higher Education’s Commitment to Sustainability: From Understanding to Action*, Palgrave Macmillan, Basingstoke.

Higher Education Academy (HEA) and National Union of Students (NUS) (2015) *Student Attitudes Towards, and Skills for, Sustainable Development*, York, HEA.

HESI (2012), Higher Education for Sustainability Initiative, available at <https://sustainabledevelopment.un.org/sdinaction/hesi> (accessed 20 December 2016).

Hoffner, S. and Tilbury, D. (2013), *Towards a post-United Nations Decade of Education for Sustainable Development (DESD) Framework*, UNECE Regional Consultation on DESD, Geneva 21-22 March 2013, UNECE, Geneva.

Holdsworth, S., Wyborn, C., Bekessy, S. and Thomas, I. (2008), "Professional Development for Education for Sustainability: How Advanced Are Australian Universities?", *International Journal of Sustainability in Higher Education*, Vol. 9 No.2, pp. 131-146.

Horizon 2020 (2014), *Mediterranean Strategy on Education for Sustainable Development*, available at: <http://ufmsecretariat.org/wp-content/uploads/2014/05/Mediterranean-Strategy-on-Education-for-sustainable-development-.pdf> (accessed on 21 December 2016).

Horizon 2020 (2016), *Zero Draft of the Action Plan of the Mediterranean Strategy on Education for Sustainable Development*, available at: http://www.esdmedcyprus.pi.ac.cy/files/zero_action_plan_for_esd_in_med_region.pdf (accessed on 21 December 2016).

Ketteridge, S., Marshall, S., and Fry, H. (2002), *The Effective Academic: a Handbook for Enhanced Academic Practice*, Kogan Page Limited, London.

Kneale, P., Winter, J., Turner, R., Spowart, L., Hughes, J., McKenna, C., and Muneer, R. (2016), *"Evaluating teaching development in higher education. Towards impact assessment: Literature review"*. Higher Education Academy, York, available at https://www.heacademy.ac.uk/system/files/evaluating_teaching_development_in_he_-_literature_review1_1.pdf (accessed 5 January 2016).

Lawton, W. et al. (2013), *Horizon Scanning: what will higher education look like in 2020?* London: Observatory on Borderless Higher Education, UK HE International Unit, Leadership Foundation for Higher Education.

Lotz-Sisitka, H., Hlengwa, A., Ward, M., Salami, A., Ogbuigwe, A., Pradhan, M., Neeser, M. and Lauriks, S. (Eds.)(2015), *Mainstreaming Environment and Sustainability in African Universities: Stories of Change*, Rhodes University Environmental Learning Research Centre, Grahamstown, available at: http://wedocs.unep.org/bitstream/handle/20.500.11822/11265/Mainstreaming_Environment_and_Sustainability_in_African_Universities_Stories_of_Change_2015.pdf?sequence=1&isAllowed=y (accessed on 10 January 2017).

Lotz-Sisitka, H. and Hlengwa, A. (2012), *'Seeding Change', 2011 International Training Programme: Education for Sustainable Development in Higher Education: Africa Regional Support Processes and Outcomes*, Report to NATURA, June 2012.

Lozano, R., Lozano, F. J., Mulder, K., Huisinigh, D., and Waas, T. (2013), "Advancing higher education for sustainable development: international insights and critical reflections", *Journal of Cleaner Production*, Vol. 48, pp. 3–9.

Mader, C. and Mader, M. (2012), "Innovative teaching for sustainable development - approaches and trends". 228-229. In: Global University Network for Innovation (ed.): *Higher Education in the World 4: Higher Education's Commitment to Sustainability: from Understanding to Action*. Palgrave Macmillan, GUN Series on the social commitment of universities.

Mader, C., Scott, G., and Razak, D. A., (2013) "Effective change management, governance and policy for sustainability transformation in higher education", *Sustainability Accounting, Management and Policy Journal*, Vol. 4. No.3, pp. 264-284.

Michelsen, G., Grunenberg, H., Mader, C., Barth, M., (2016) Greenpeace Nachhaltigkeitsbarometer 2015 – Nachhaltigkeit bewegt die jüngere Generation, VAS Verlag.

Mulà, I. and Tilbury, D. (2009), "A United Nations Decade of Education for Sustainable Development (2005-14): What Difference Will it Make?", *Journal of Education for Sustainable Development*, Vol. 3 No.1, pp. 87-98.

NIRAS (2015), *Final Results Report for the ITP ESD-HE*, NIRAS, Sweden.

Nomura, K. and Abe, O. (2012), "Sustainability in Higher Education in Asia and the Pacific", in GUNi (2012), *Higher Education in the World 4, Higher Education's Commitment to Sustainability: From Understanding to Action*, Palgrave Macmillan, Basingstoke, pp.84-95.

Parsons, D.J., Hughes, J. and Walsh, K. (2010), *Initial Training and Professional Development of Teachers and Trainers beyond Upper-secondary Education*, Publications Office of the European Union, Cedefop.

Parsons, D., Hill, I., Holland, J. and Willis, D. (2012), "Impact of teaching development programmes in higher education", Higher Education Academy, York, available at: https://www.heacademy.ac.uk/system/files/resources/hea_impact_teaching_development_prog.pdf (accessed 5 January 2016).

Pigozzi, M. J. (2010). "Implementing the UN Decade of Education for Sustainable Development (DESD): achievements, open questions and strategies for the way forward", *International Review of Education*. Internationale, Vol. 56 No. 2-3, pp. 255-269.

Réseau Française des Étudiants pour le Développement Durable (REFEDD) (2014), 3e Consultation Nationale Étudiant. Rapport, REDEDD, available at: <http://refedd.org/wp-content/uploads/2016/03/Rapport-Consultation-nationale-%C3%A9tudiante-REFEDD-2014.pdf> (accessed on 15 February 2017).

Ryan, A. and Cotton, D. (2013), "Times of change: Shifting pedagogy and curricula for future sustainability", in Sterling, S., Maxey, L. and Luna, H. (Eds.), *The sustainable university: Progress and prospects*, Routledge, Abingdon, pp. 151-167.

Ryan, A. and Tilbury, D. (2013a), "Uncharted waters: voyages for Education for Sustainable Development in the higher education curriculum", *Curriculum Journal*, Vol. 24 No. 2, pp. 272-294.

Ryan, A. and Tilbury, D. (2013b), *Flexible Pedagogies: New Pedagogical Ideas*, The Higher Education Academy, York, available at: <https://www.heacademy.ac.uk/flexible-pedagogies-new-pedagogical-ideas> (accessed on 30 January 2015).

Scott, G., Tilbury, D., Sharp, L. and Deane, E. (2012), *Turnaround Leadership for Sustainability in Higher Education*, Australian Office of Learning and Teaching, Sydney available at https://www.uws.edu.au/_data/assets/pdf_file/0018/411075/TLSHE_Final_Exec_Summary_HA_12_No_v_12_pdf_version.pdf (accessed on 15 February 2017).

Sleurs, W. (2008), "Competencies for ESD teachers: A framework to integrate ESD in the curriculum of teacher training institutes", available at: http://platform.ue4sd.eu/downloads/CSCT_Handbook_11_01_08.pdf (Accessed on 11 January 2017).

Smith, B. (2005), "The role of national UK organisations in enhancing the quality of teaching and learning", In K. Fraser (ed.), *Educational development and leadership in higher education: Developing an effective institutional strategy*, Routledge, London, pp 16-29.

Sterling, S., Maxey, L. and Luna, H. (2013), *The Sustainable University: Progress and Prospects*, Routledge/Earthscan, Abingdon.

Sterling, S (2009), "Towards Sustainable Education", *Environmental Scientist*, Vol. 18 No. 1, pp. 19-21.

Sterling, S (2011), "Transformative learning and sustainability: sketching the conceptual ground", *Learning and Teaching in Higher Education*, Issue 5, 2010 -11, pp. 17-33.

Strachan, G. (2012), *WWF professional development of teacher competences for learning for sustainability*, WWK-UK, available at: http://platform.ue4sd.eu/downloads/WWF_PD_Framework_Teacher_Competences_2012.pdf (accessed on 11 January 2017).

Tilbury, D. (2016), "Student Engagement and Leadership in Higher Education for Sustainability", in Barth, M., Michelsen, G. and Rieckmann, I. T. (eds.), *Routledge Handbook of Higher Education for Sustainable Development*, Routledge, London and New York, pp. 241-260.

Tilbury, D (2015) 'Higher Education for Sustainable Development 2005-2015: An evaluation of progress during the Decade of Education for Sustainable Development' report commissioned by UNESCO ESD. Paris: UNESCO, pp.42.

Tilbury, D. (2014), in UNESCO (2014), "Higher Education", *Shaping the Future We Want: UN Decade of Education for Sustainable Development Final Report*, UNESCO, Paris, pp.114-132, available at <http://unesdoc.unesco.org/images/0023/002303/230302e.pdf> (accessed 26 July 2016).

Tilbury, D. (2012), "Higher Education for Sustainability: A Global Overview of Commitment and Progress", in GUNi (2012), *Higher Education in the World 4. Higher Education's Commitment to Sustainability: From Understanding to Action*, Palgrave Macmillan, Basingstoke, pp.18-28.

Tilbury, D. (2011), *Education for Sustainable Development: An Expert Review of Processes and Learning*, UNESCO, Paris.

Tilbury, D., Mulà, I. (2009), *Review of education for sustainable development policies from a cultural diversity and intercultural dialogue: gaps and opportunities for future action*. Paris: UNESCO.

Tilbury, D. (1995), "Environmental Education for Sustainability: defining the new focus of environmental education in the 1990s", *Environmental Education Research*, Vol.1 No.2, pp. 195-212.

Tilbury, D. and Wortman, D. (2004), *Engaging People in Sustainability*. Commission on Education and Communication, IUCN, Gland, Switzerland and Cambridge, UK.

UE4SD (2013), Lifelong Learning Programme Application Form. 2013 Call for proposals. University Educators for Sustainable Development (UE4SD), unpublished.

UE4SD (2014), *Mapping opportunities for professional development of university educators in Education for Sustainable Development: A state of the art report across 33 UE4SD partner countries*. Authors: Mader, M., Tilbury, D., Dlouhá, J., Benayas, J., Michelsen, G., Mader, C., Burandt, S., Ryan, A., Mulà, I., Barton, A., Dlouhý, J., and Alba, D., University of Gloucestershire, Cheltenham, UK.

UE4SD (2015a), 2014 Innovation Report, UE4SD, Cheltenham, available at <http://ue4sd.eu/images/2014/InnRep2014.pdf> (accessed 28 July 2016).

UE4SD (2015b), *Leading Practice Publication: Professional development of university educators on Education for Sustainable Development in European countries*. Editors: Kapitulčinová, D., Dlouhá, J., Ryan, A., Dlouhý, J., Barton, A., Mader, M., Tilbury, D., Mulà, I., Benayas, J., Alba, D., Mader, C., Michelsen, G., Vintar Mally, K. Charles University in Prague, Prague, 136 pp., available at <http://www.ue4sd.eu/images/2015/UE4SD-Leading-Practice-PublicationBG.pdf> (accessed on 24 February 2017).

UE4SD (2016a), 2015 Innovation Report, UE4SD, Cheltenham, available at http://ue4sd.eu/images/2016/Innovation_Report_2014_15.pdf (accessed 29 July 2016).

UE4SD (2016b), UE4SD Online Platform of Resources, available at: <http://platform.ue4sd.eu/>

UNESCO (2016), *Education for people and planet: Creating sustainable futures for all*, UNESCO, Paris. Available at <http://unesdoc.unesco.org/images/0024/002457/245752e.pdf> (accessed 7 December 2016).

UNESCO (2015a). Incheon Declaration. UNESCO, available at <http://en.unesco.org/world-education-forum-2015/incheon-declaration> (accessed on 21 December 2016).

UNESCO (2015b). *World Education Forum 2015. Final Report*. UNESCO, Paris, available at <http://unesdoc.unesco.org/images/0024/002437/243724e.pdf> (accessed on 7 December 2016).

UNESCO (2014a), *Shaping the Future We Want: UN Decade of Education for Sustainable Development Final Report*, UNESCO, Paris, available at <http://unesdoc.unesco.org/images/0023/002303/230302e.pdf> (accessed 26 July 2016).

UNESCO (2014b), *UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development*, UNESCO, Paris, available at <https://sustainabledevelopment.un.org/content/documents/1674unescoroadmap.pdf> (accessed 27 July 2016).

UNECE (2016a), *Framework for the future implementation of the UNECE Strategy for Education for Sustainable Development*, available at: <https://www.unece.org/fileadmin/DAM/env/documents/2016/ece/ece.batumi.conf.2016.11.e.pdf> (accessed on 21 December 2016).

UNECE (2016b), Draft Batumi Ministerial Statement on Education for Sustainable Development, available at <https://www.unece.org/fileadmin/DAM/env/documents/2016/ece/ece.batumi.conf.2016.L.2.e.pdf> (accessed on 21 December 2016).

UNECE (2012), *Learning for the Future: Competences in Education for Sustainable Development*, UNECE, Geneva, available at: https://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf (accessed 27 July 2016).

UNECE (2005), *UNECE Strategy for Education For Sustainable Development, adopted at the High-level meeting*. High-level meeting of Environment and Education Ministries (Vilnius, 17-18 March 2005) (Agenda items 5 and 6), UNECE, Geneva,

University of Gloucestershire (UoG) (2012), *Education for Sustainability: A Guide for Educators on Teaching and Learning Approaches*, UoG, Cheltenham.

UNEP (2015), *African Environmental Education and Training (EE&T) Action Plan (2015-2014). Strengthening Sustainable Development in Africa*, UNEP, Nairobi.