**Project Title:** COASTAL: Curriculum Outcomes, And Sustainable Teaching, Assessment, Learning.

**Institution:** University of Brighton

Report authors: Gina Wisker, Poppy Villiers-Stuart, Jennifer A. Elliott

**Overview**

The project aims to identify, share and encourage the uptake of successful models and strategies for embedding Sustainable Development (SD) into the Higher Education (HE) curriculum. The research addresses learning outcomes, assessment, and learning and teaching practices.

In particular, the project looks to investigate:

* The criteria, definitions, examples and models of effective and sustainable development in the HE curriculum
* How HE student SD learning outcomes can be achieved, expressed and embedded through different disciplines and across disciplines, including within community and volunteering opportunities
* How effective models of SD learning can be shared locally and with the HE sectors

**Rationale**

In its sustainable development strategy, ‘*Securing the Future’*, (HM Government, 2005) the Government states that ‘we need to make sustainability literacy a core competency for professional graduates’ (p.39). This statement shows that the UK government is beginning to acknowledge the importance of mainstreaming sustainable development in the higher education sector. The strategy highlights the importance of preparing graduates for a complex global context in which the broad, holistic understanding developed through an Education for Sustainable Development (ESD) will become increasingly valuable to them and the world at large. The current UNESCO Decade of Education for Sustainable Development is built on similar beliefs in ESD as a catalyst for social change, defining ESD as a process of learning how to make decisions that consider the long-term future of the economy, ecology and equity of all communities.

Within some higher education discipline areas (Geography, Environmental Sciences, for example) the values and practices of sustainable development are well embedded. However, these concepts and practices and the ways of focusing on sustainable development remain relatively unfamiliar in curricula within many other discipline areas (Dawe, 2005). In some, where sustainable development is considered, it is done so in terms of its open-ended and contested nature. In addition, education for sustainable development (ESD) is still a nascent concept (Magnier, 2006) and has been identified as a further barrier for individual staff and for achieving ESD goals. Thus with little solid guidance on what sustainable development is, even those who think it might be relevant within the frame of their discipline could find it difficult to acquire the information they need to begin embedding it in their curricula or to make changes towards ESD.

It was in this context and as a response to the call from the Higher Education Subject Centres to explore how to embed ESD in the curriculum, focusing in this case on embedding in different discipline areas, that we developed an education-based learning, teaching and assessment oriented piece of curriculum development, research and practice. We set out to explore ways in which colleagues in a variety of disciplines, including likely and less likely discipline contexts, embedded or identified ways of embedding sustainable development in their curricula. Identification, development and modelling are seen as useful insights for the sector to further explore and embed sustainable development across the breadth of the curriculum offer.

There is much discussion and debate about the pedagogies and content that are relevant to ESD in Higher Education (Huckle, 2005). There is a strong perception that work-based learning – interactive, participatory and experiential, is an important pedagogical approach to ESD. It enables students to relate to their discipline in a holistic way, exploring its wider dimensions and understanding it as part of a complex real-life system (Selby, 2006). However, little research has taken place to identify and analyse already existing models and strategies for embedding this type of active learning into the curriculum (Kagawa et al, 2006). Even less research has taken place into how to engage and enable lecturers to adopt and adapt ESD pedagogies for their own teaching.

In light of these developments and concerns, this research project addresses two key areas of sustainable development need:

* collecting and analysing examples of embedding sustainable development in a variety of disciplines
* highlighting examples of active and community volunteer-based learning as a curriculum initiative which engages with sustainable development

It explores ways of disseminating these examples so that colleagues in the full range of disciplines across the HE sector can use these diverse models to imagine and develop ways to action sustainable development in the curriculum in their discipline.

**Activities Undertaken**

There were three components to the project as identified below. Further details of the approaches and outcomes are expanded in later sections of the report.

1. Researching current good practice

* Existing ESD literature was sourced to gather together effective examples and models of embedding SD in the curriculum, learning, teaching, assessment, and community outreach in local, national and international contexts. This included papers, references, links, summaries, case studies and literature reviews. The particular focus is on the pedagogy employed.
* Face-to-face interviews were conducted with staff across the faculties of the University of Brighton to collate examples of good practice in relation to ESD. In addition, good practice has been identified and compiled from other universities and groups such as EAUC by email, as well as sourced through the literature.

2. Developing internal communication and capacity building based on the theme of ‘moving forward with ESD at the University of Brighton’

* Three community of practice (the ‘ESD Interest Group’) meetings have been held, through which the aims and progress of the project were shared with interested staff and ideas for further improvement considered. ESD has also been a principal focus for a full meeting of the Learning and Teaching Forum in which discussions have centred on how teaching staff are integrating, or are intending to integrate, sustainable development considerations into their curricula.
* An Education for Sustainable Development ‘Community’ has been established within the University of Brighton intranet as a means for communication between interested parties and staff identified through 1 and 2.
* An ESD Resources site has been established by the Centre for Learning and Teaching within the University intranet where the resources detailed under (1) have been summarised and organised according to discipline area, for example. This is also currently the dissemination point for the new resources that have been developed (further details under 3).
* A day-long conference for the dissemination of the results of this project has been organised to take place on 17th October 2008. As well as sharing our findings about good practice in ESD internally and externally, the conference will be an opportunity for practitioners of ESD to network and share ideas and approaches (thereby further building the internal and wider communities of practice). A further intended principal outcome of the conference is the planning and offering of future support to lecturers ‘new’ to ESD, to facilitate development of ESD learning opportunities within their own practice.

3. Development of new case materials

Since our aim was to identify, collect and share examples of successful practice in embedding ESD in the curriculum within the university, and then the sector, it was decided that this project moved beyond the methodology and methods of pure research and into the sharing of scholarly practice. This being the case, it was decided that neither a quantitative collation of reported examples, nor a quantitative collection of participant perceptions would produce models that could be shared. A qualitative approach to data collection, which enabled participants to explore and share their work through offering models of curriculum embedding, was, it was felt, the most appropriate method. To date we have produced a variety of outcomes:

* A number of video recordings have been made of current examples of education for sustainable development activities within the University of Brighton (where students are involved in role-play, action learning etc.). These have been identified and selected from a number of different disciplinary contexts.
* Descriptions of activities identified through interviews with staff have been written up as short vignettes depicting examples of ESD in a variety of different disciplines. These will be used initially on the Intranet CLT resource bank detailed under (2) and on a future multimedia website.
* Interviews have also been conducted with students involved in the learning and teaching experiences of ESD in the curriculum. These have been recorded and the excerpts uploaded and are an important part of the new ESD Resources site. Future plans for a more interactive web area are identified in the next section.
* Two focus groups with students exposed to ESD activities have been conducted towards exploring the impact on student learning.

**Learning through the project, and future directions**

As reported at the interim stage, the focus of this project evolved in order to place a stronger emphasis on methods of dissemination, so that the examples of ESD gathered can become a model and an inspiration to greater numbers of lecturers. It is believed that the development of an interactive web-based platform, in addition to the more traditional text-based reports and resources, will be most effective in engaging lecturers. This could be an opportunity for lecturers to see ESD in action in their own discipline, each example accompanied by sound bites from the students and lecturers involved, explaining how it worked and how it impacted upon the students.

This enhanced focus led to a new methodology within the project relying considerably more on:

* the collection and creation of video clips and photographs of examples of ESD and
* the collection and creation of recorded interviews with staff and students who were involved in the videoed examples of ESD.

These audio and video records have been used as data within this project to evidence successful models of ESD embedded in the curriculum, and will also be used to form the basis for the future creation of an interactive, multimedia wiki-based website for which further resources will be sourced.

This multimedia website is a future plan for the further rollout of the project. As many disciplines as possible would be represented on this website, each with a number of visual and audio vignettes illustrating the range of pedagogic learning and teaching styles that can support the effective implementation of ESD. Particular focus will be given to community and volunteering examples. We have begun to produce the vignettes and a number are currently available as resources within the university and can be accessed via the ESD Resources site.

As a result of this new dimension to the project, the Environmental Association of Universities and Colleges have asked to make some formal links with the work we are doing, and are prepared to assist us in identifying examples and resources and in disseminating the findings. They have invited us to attend a national ESD Swap-Shop in which lecturers from all over the country who have conducted successful ESD will come to share their approaches and to learn from each other. Attendees will write up their ESD case studies and submit them to be compiled into a paper publication. It is envisaged that our role in this event will be to make audio and visual recordings of the attendee’s thoughts and reflections on their case studies.These recordings will be edited and compiled to create a multimedia version of the paper publication.

**Methodology and methods - the approach of the research and the project**

The primary approach used to gather successful models of embedding ESD in the curriculum was via interviewing lecturers, who have already embedded ESD in their curricula, and students who are taking part in their modules. The majority of these were internal interviews with University of Brighton lecturers and students. Three interviews were conducted with lecturers from other universities to give breadth of scope.

**Ethics processes and procedures**

Potential lecturers to be interviewed were identified via two processes:

1. The Heads of each School were contacted with details of the project and its context. They were asked to forward an email we provided to the staff in their school, inviting any lecturers who were working with sustainable development considerations within their teaching to make contact with the COASTAL project.
2. Individual lecturers were identified, drawn from an informal network of lecturers engaging in sustainable development teaching, many of whom had attended the CLT Enquiry Group on sustainable development, or other informal groups in the university with an ESD focus.

In order to assess whether they were engaging in teaching that is relevant to the interests of COASTAL, a short discussion took place over the phone with each identified lecturer as a means for the researcher to obtain a basic understanding of the themes, topics and pedagogies involved.

It was quickly evident that although the overarching theme of this project is 'education for sustainable development', many of the lecturers bringing ESD elements (as understood by the project team) into their teaching do not actually use this term themselves. Further, many bring *one* aspect of sustainable development into their teaching, for example, incorporating environmental considerations into a business module, but do not cover other fundamental sustainable development considerations such as the social and the ethical. However, we consider that the act of enlarging the learning scope of a particular discipline to include non-traditional considerations, consequently offering a more *holistic* understanding of the subject, is generally in line with the principles of ESD.

This is certainly the case when the broadened understanding of the students could enable them to operate in their future professional contexts in a way that supports environmental and or social needs. For example, one colleague’s Community Media module introduces his students to the role of the media in community building but seems to pay little attention to environmental or economic factors. However, on interviewing his students, it became clear that their experiences on the module have raised their awareness of the role that the media can play in supporting real-life community needs, and other human causes that transcend the traditional media domain of PR and marketing.

The University of Brighton is in the main a modular university so the cases considered in the project included full modules ranging from a Geology intensive one-week to a full year of activities, but also included some elements of modules and indeed some ‘extra-curricular’ events and activities (e.g. Football for Peace). Other cases considered examples of tutors ‘delivering’ ESD through their overall ‘approach’ to learning and material development, so that content - what is taught – is one element of some courses, while attitudes and behaviours, rather than content, might be engaged with by other lecturers in their courses.

Where possible, each lecturer who was interviewed also introduced the researchers to two of their students who were willing to be interviewed. As identified below, it was not the intention of the project to develop a representative sample, rather to hear and document staff and student learning experiences and to consider the implications for ESD in the curriculum if it was rolled out to a greater number of courses. In a small number of cases, these examples of learning and teaching were filmed.

Whilst the focus for the project is on the disciplines and learning and teaching experiences at the University of Brighton, the project also aimed to draw in good practice examples from other institutions nationally, particularly in disciplines that do not exist at Brighton. This was achieved via desk-based research, particularly through the Environmental Association of Universities and Colleges ESD email group. Contacts made via this email group and other internet research were followed up through telephone interviews and three site visits where contacts were interviewed face to face.

**Analysis of case materials**

The intention of the research was to document practice, identify models and widen engagement etc., therefore ‘cases’ which are documented are not intended as representative but instead can stand as models or versions of ESD embedded in curricula. Methods for analysis were therefore developed to provide the basis for the development of the web-based resource and to offer a contribution to the wider community across the HE sector, in relation to the development and embedding of ESD in the curriculum.

All interviews were transcribed. The lead researchers conducted preliminary analyses individually and met subsequently as a focus group to further analyse the material. This group analysis session was taped and transcribed, the outcomes of which form the basis of the principal findings reported here, as well as providing the structure for the re-presentation of the case studies within the web-based resource output.

Through the analysis, a consensus emerged regarding three key themes centred on: learning outcomes, pedagogic approaches and lecturers’ experience of curricula change. It was decided that a starting point should be analysing the learning outcomes of the modules as it helped to reveal the lecturers’ perceptions of what sustainable development is, and what education for sustainable development for them is designed to achieve. Learning outcomes could be further differentiated (following Bloom, 1956) into categories of knowledge, skills and effects (values and attitudes) since, as mentioned above, ESD is both curriculum content and an ideological commitment i.e. attitude or behaviour in practice. Through this process, we began to tease out what (as understood by the tutor) the students would know by the end of the course that was related to sustainable development, what they could be able to do with this knowledge, and what they might believe or value that could change their behaviour and their practice. Sets of common or related words began to emerge as we looked through the learning outcomes described by each lecturer, and many of these were supported by the responses of the students during interviews.

The next phase of the discourse analysis was to explore the pedagogies; looking at what the lecturers say that they do in order to engage the students practically. A strong set of common pedagogical approaches began to emerge through a similar process of teasing out of common words, phrases and approaches. Analysing the third category of data, we began to gain an understanding of the continuum of lecturer experience in setting up and running modules which contained social, environmental or sustainable development considerations.

**FINDINGS**

**Knowledge**

This project has created new knowledge about a variety of examples of inclusion of sustainable development across the curriculum in a wide range of disciplines.

It was evident across the cases considered that most lecturers engaging in education for social justice and/or environmental sustainability aim to acquaint their students with the wider context, within which their discipline-specific knowledge will be used and applied. In particular, tutors considered this important for the ways in which such knowledge enables students to understand the complexities of operating in the real world, and to develop knowledge of the wider social and environmental implications that surround their future professions. Words such as ‘context’, ‘complexity’, ‘holistic’, ‘links’ and ‘real world’ were used widely when describing learning outcomes.

**Case studies - vignettes**

What follows is a range of cases. The names of lecturers and their subjects have been retained but in a more substantial publication it might be more appropriate to change them.

**Geology lecturer, Norman Moles**

Norman Moles introduced his students to the social, environmental and political context of geological operations, in particular, the complexity of running a geological bore holing project with multiple stakeholders. He wanted students to realise that even though it might be technically and scientifically best to drill a hole in a certain place, negotiations with stakeholders, such as the local council and representatives of organisations such as Greenpeace or the Environment Agency, could hold different views on the ‘best’ place for drilling. Norman said: ‘I deliberately created a map, an imaginary map of the site, which has a golf course and a nature reserve just exactly where you would want to place boreholes. So that brings up issues, you know, interaction with the environment and local people, but they basically compromise between where they would like to put the boreholes for scientific reasons, and the practicalities of drilling on site’. In guiding students to consider and develop this type of contextual knowledge, Norman believes that students begin to understand the links between areas that seemed previously unrelated. For this tutor, the value of the learning was in preparing students to operate as future professionals with a broader and explicit awareness of sustainable development issues. One of his students clearly benefited from this exercise, reflecting on what she had learned about the case study company: ‘Southern Water’s a very highly regulated body, but they’re also a corporation so they have difficulty balancing the fact that they’re trying to make money, with the fact that they’re buffered by a lot of legislation from environmental companies … I mean it’s quite, it’s a bit mind opening actually 'cos I think our course … is quite specialised really and very geology orientated.’

**Media lecturer, Peter Day**

With similar learning outcomes in mind, Media lecturer Peter Day aims to give his students ‘an edge’ over other future graduates via their knowledge of the social context beyond the normal domain of PR and marketing. By getting students involved in local community projects, introducing them to social issues and needs in the real world, and looking at how they can offer their media skills in useful ways, Peter considers that students begin to understand the role of the Media in the wider world, beyond the hegemony of commercial interest. He says ‘the students learn a lot about civic responsibility, community development, community networking and … also learn a culture that’s completely different … from academic [culture]’ One of his students spoke about how this module forced her into ‘a completely different way of thinking’ and how ‘it just makes you think outside the box’ constantly keeping in mind that it is the community that is the priority; ‘it is a different dynamic, there is different reasoning for it’. Peter believes that this type of learning will meet the growing demand for applicants who can understand Corporate Social Responsibility and be able to put it into practice: ‘there’s a lot of organisations now looking for corporate responsibility and … to be able to show examples of that and say ‘I made this video’ and ‘here’s a community newsletter’… if it’s a toss-up between … other students who haven’t done that kind of thing but are similar attainment, [my students] are more likely to get it’.

**Business Studies lecturer, Kevin Turner**

A further example of a tutor looking to move student knowledge beyond what they themselves considered ‘traditional’ disciplinary boundaries is provided by Business Studies lecturer Kevin Turner. Introducing his students to the basic science of climate change, he brings home the interdependence between global business operations and the environment. He explains: ‘Even though they are business students they do need to get some of the sciences’ and throughout his module his students are introduced to the impacts that climate change will have upon Business, and how businesses will need to respond.

Further to increasing student’s understanding of the broader context and making links with other disciplinary areas, another common ESD learning outcome identified within the cases was the ability to argue for why these links are important; tutors considered that in order to apply knowledge of sustainable development considerations into their future professions, students must be able to demonstrate how they are important and relevant in the professional context. For example, in the case above, Kevin emphasises the importance of the students developing not only an awareness of ‘Climate Change and its causes’, but also an ability to ‘make it business-related somehow … they’ve got to [learn] something about … what business could do either in terms of mitigation or adaptation’.

**Product Design lecturer, Tim Katz**

Tim Katz considers that students of product design must learn to make the business case for a sustainable product. Tim describes how the sustainability of a product can become ‘a product in itself’, explaining how his students learn to ‘make a case for it, saying yeah, your value added use is much bigger, people [the customer base] want [sustainability] for various reasons.’ During interview, one of Tim’s students demonstrated this ability well, describing up-and-coming ‘environmental ratings systems’ that will be adopted by large companies such as Wal-Mart, and mentioning that this type of information is useful for his research into ‘why it is important for sustainability’. He concluded that ‘stuff like that ... shows that there are companies looking for sustainable design’.

**Mediating the Environment lecturer, Julie Doyle**

‘Making links’ is another learning outcome theme that has emerged from the interviews. This one is only subtly different to the understanding of context and ‘real world’ application as discussed above. Julie Doyle’s ‘Mediating the Environment’ module, for example, aims to help students to understand the links between humanity and the environment, equipping them with ‘the knowledge that humans and the environment are inter-related, they’re not separate’. Further, Julie aims to help students see the links between the media representations of the environment and the way that we subsequently relate to the environment. She says: ‘part of Media Studies is thinking about how we communicate about something also has an effect on how we act upon that as well, that knowledge.’

**Discourse and sustainability lecturer, Arran Stibbe**

Similarly, Arran Stibbe’s module, ‘Discourse and sustainability’, explores the links between the language used in different types of discourses and ‘the whole way that society is constructed’. He says ‘we look at … the discourse of economics and how economists manage to forget completely about the natural world through talking about things like production and consumption as if they are good but forgetting that when you produce something you also destroy something in nature to produce it and when you consume something you actually create a lot of waste’. He facilitates the students’ exploration of the links between the world and the attitudes inherent in the dominant discourses, and their appreciation that ‘the reason why we’ve constructed an unsustainable society is because of particular social constructions, cultural constructions, and they are constructed through the kind of language that we use to talk about things’. He says that normally ‘people see ecology as something separate from language when it’s not actually because ecology is the interaction of people with each other, with other organisms, with the physical environment, and interaction of people with each other is primarily through language so it’s not two separate things, language and ecology.’

More generally, such a knowledge of links between, for example, language and ecology can be more appropriately interpreted by the second aspect of Bloom’s taxonomy: skills (the psychomotor domain) (1956). Through becoming aware of the links between a given discipline and other real-world factors, students begin to develop the ability to think holistically.

**Fashion lecturer, Toni Hicks**

Fashion lecturer, Toni Hicks, suggests that she constantly ‘drip feeds’ her students with considerations of the links between fashion and ecology or fashion and social justice. She says that: ‘I’ll just sort of throw in odds and ends of information’ and in this way sustainability considerations become as much a ‘part of the way that [her students] think’ as colour range or customer profile. Thinking holistically becomes an automatic skill and is an expected learning outcome throughout her fashion modules.

**Education for Sustainable Architecture lecturer, Karen Jascke**

Similarly, in Karin Jascke’s Education for Sustainable Architecture, she takes a phenomenological approach, looking at architecture as a body that is engaged with every other thing that is in the world, and every other being. She conceives of education for sustainable development as ‘a way of making students understand the repercussions of anything they’re doing, so systemic, holistic, an ability to think holistically, systemically and to question what they are doing with respect to even the furthest repercussions and then weigh what that means for them and how they might change their project ... so it’s really a way of thinking’. She aids her students to develop this holistic understanding and approach by looking at the entire life cycle of a building, right back to how the raw materials are produced.

**Developments in the modules and courses**

Building upon this skill of holistic thinking, a number of lecturers interviewed also spoke of building ability within students to take this understanding into their future work places and share it with colleagues, effectively becoming agents of change towards sustainable development. Product Design lecturer Tim Katz gives his students opportunities to interact with companies whilst still studying, organising projects through which they can communicate with specific companies, suggesting more sustainable approaches to the design and manufacture of their products. One of his students spoke of the challenges involved in attempting to suggest more sustainable options to companies: ‘it is always hard to break through with new ideas, which a lot of people have found on my course that have done projects with companies’. However, despite the challenges of bringing sustainability into the professional field of product design, this student still showed hope for his own career in sustainable product design saying: ‘I am looking for a job now myself and there are jobs that actually look for people who are trained in sustainability’. Tim considers the future role of his students as change agents to be a crucial drive behind his teaching: ‘Here we have students that will be determining – well them and their colleagues obviously – what we all use for the rest of our lives … they are going to come out of here and start designing things and if they don’t have sustainability on mind we’re lost … it is going to get very, very awkward.’

Toni Hicks encourages the idea of change agency in her students: ‘I’ll say to students well you can go in and you can inform other people. And they love the idea ... that they are pioneers, and I will say ‘that’s good, you are pioneers, you have knowledge that other people haven’t and you must let other people know about it’. When asked about bringing sustainability considerations into future careers, a student of Toni’s confirmed this saying: ‘I really hope so, yeah, I really hope so, because I’m just really interested in it and I find it fascinating and I think it’s the way forward because we can’t really continue to pollute the environment and we just need to be more ethical in this industry really. So it’s the way forward’. Another student was evidently excited by what she was learning and she couldn’t wait to get into the fashion industry. Speaking of the course she said ‘It’s definitely changed what I think and ... I think it’s really important to get a business educated ’cos ... I don’t think some people know anything really about it’.

However, concurrent with inspiring her students to become pioneers, Toni also ensures that they consider how they will be communicating their knowledge. She emphasises the importance of humility, reminding them that ‘other people will have experience in other types of knowledge and you just sort of swap your knowledge’. She emphasises the link between her own teaching style and the change-agency style that she hopes to cultivate in her students: ‘I learn a little bit from them and they learn a little bit from me and we all just kind of build up what we know about it ... I don’t really try and impose anything. I mean similarly to the way that I’m actually telling them that they mustn’t impose design ideas too strongly on people who might have some knowledge already.’

Just as Toni offers her ideas gently, giving plenty of time to listen to her student’s contributions, she encourages her students to develop similar skills in their own communication styles, avoiding the possibility that they might go out into their professions with self-righteous or preachy airs. A different approach is taken by teacher trainer Kevin Fossey, who places a strong emphasis on change agency through personal example, constantly reminding teachers that ‘when they’re in the classroom [they must be] decent role models’, demonstrating sustainability as well as teaching about it. For example, the ethos of ‘reduce, reuse, recycle’ would always be put into practice in his classroom.

Another skill that emerged repeatedly throughout the interviews is the ability to critique current systems, approaches and discourses in terms of sustainability. Philosophy lecturer Bob Brecher believes that this skill is essential to the betterment of the world. He helps his students develop the skill of critical analysis, looking at real-life scenarios such as political systems or education and exploring them in the light of applied ethics. He believes that this act opposes the Neo-liberal cause ‘which aims to keep people stupid’ and asserts that ‘education can be a very political force … the more clearly people are able to think, the better things will become’. English Language lecturer Arran Stibbe also values this skill, aiming to help his students critique the hegemonic discourses of society, a process that reveals the extent to which these discourses uphold and perpetuate unsustainable values and attitudes. He says that his aim is very simple ‘it’s getting [his students] to think: here’s a model of the world, how does it relate to sustainability, or even does this model include social factors and environmental factors and economic factors … or is it forgetting about some important aspects of life?’. However, a further skill that Arran seeks to cultivate in his students is the ability to ‘use creative ways to redirect society, reorient society towards a more sustainable route.’

Like Arran, who aims to take his students beyond just criticising these unsustainable attitudes, a number of the lecturers interviewed aim to cultivate new attitudes within their students: attitudes they consider conducive to sustainability and social justice. Peter Day wants to develop in his students a sense of civic responsibility, bringing a stronger sense of humanity into their future professions. He says that through the experiential, community-based learning that his students experience, they will become ‘more compassionate, empathetic journalists, understanding a side of life that they may not have previously known: struggling communities, the digital divide etc.’.

Through their community volunteering experience, the students of the Community Participation and Development module are given the opportunity to work out what their own values are, and what they would like to achieve in the world. Juliet Millican, the module designer, emphasises the value of the student engagement with many different types of people, saying that ‘to begin to work with people of different ages, people of different classes, people of different ethnicities, people of different abilities and disabilities, get to know them as people, really as individuals rather than stereotyping them, I think this opens their eyes quite a bit to how the world works outside the protected environment that study is ... what they might want to do in it, how they might want to get involved.’ In developing new attitudes towards difference, students are given the opportunity to explore what they might believe is important for the world.

Creative Writing teacher, Jess Moriarty, aims to imbue her students with a sense of social and environmental responsibility, arguing that: ‘university should not be about just ticking boxes so that they get an English degree, but so that we produce kind, creative, thoughtful, socially conscious, environmentally aware human beings’. As part of her Creative Writing module she runs a seminar on the social responsibility of the writer, inviting students to write about world issues that they feel passionately about and using drama exercises to help them explore the social impact of the writer.

Many of the lecturers interviewed (17 in total) foster learning outcomes spanning all three areas:

**Knowledge** – an understanding of why sustainability or issues of social and environmental justice are important; what sustainability means in the given disciplinary context and how this would work in the real world. (15 out of 17)

**Skills** – an ability to criticise current unsustainable practices and to articulate new, more sustainable approaches; communicating effectively with colleagues on these issues and making the case for sustainability. (10 out of 17)

**Attitudes** – personal transformation; empathising with the need for sustainability and personally wanting to promote these values within own career. (14 out of 17)

**Pedagogies**

The common thread running through all the pedagogies used by interviewees was that of learning via ‘real-life’ scenarios. In order to help students understand sustainable development, lecturers often want students to get a taste of actually taking it into practice, enabling them to transfer their learning into the profession and even become agents of social change. Students encounter these real-life scenarios in many forms, from case-study learning, to role-play, to volunteer-based learning in real projects or organisations. It seems that connecting the discipline or subject to a real-life context is key to helping students to understand the complexity of sustainability, what it looks like in practice, and how to make it come about (knowledge and skills). It is also an effective way of stimulating attitudinal change.

**Case study and role-play learning**

Eight interviewees present their students with case studies, or even ask them to find their own, and invite them to develop projects, plans and reports based on these case studies. Tourism students of Pete Burns form groups and take their local town/city as a case study for developing a tourism plan. They research the town and develop a vision for a real-life tourism strategy with a significant sustainability component. Pete encourages them to explore how tourist plans can drive sustainability, saying: ‘here is the environment, here are the economic needs of a region, how can we use tourism in order to help with the economic needs and at the same time to be a driving tool for change in attitudes towards the environment?’. In interviews, Pete’s students confirmed that they found using local case studies useful in bringing sustainability into focus. One commented that it is ‘because it’s just round the corner, so you realise sustainability issues are not necessarily, you know, in other parts of the world, they’re everywhere.’ Having the opportunity to develop a tourism plan as if it were real-life is a powerful education for students about real-life sustainability requirements. In order to develop their plan for Eastbourne, one group researched and subsequently used the most up-to-date tourism plan toolkit available. This increased one student’s understanding of ‘all the side effects of sustainability and all these other issues’ commenting that: ‘you can’t, you know, get round *not* dealing with them’.

Students from the Global Business Operations and Climate Change module choose a real business and develop a business case for introducing sustainability considerations and climate change mitigations to its operations. One student chose to focus on a business that he had previously worked at during his placement year. Kevin described how he investigated the company’s use of peat and how ‘he’d come across the fact that peat is quite a problem in terms of CO2 emissions, [so was] looking at alternatives and [arguing] for whether or not B&Q should carry on selling peat.’

Karin Jascke introduces her architecture students to the real-life case study of the building of the Eden Project. Through the Eden Project’s consideration of the entire life cycle of all its building materials, and their interactions with the mining company from which they sourced their copper, the students can see how sustainable architecture is achieved in a real-life context. Furthermore, this case study offers the example of a sustainable architectural project that has managed to influence the industry of architecture. The interactions between the Eden Project and the mining firm actually led to the mining firm being educated about sustainability – a real life example for the students of change agency within the architectural professional context.

Case-study learning can evolve naturally into learning through role-play. Once they have created their tourism plan, Pete Burns’ students perform as professional tourism planners, making their case to a mock city council board. As mentioned earlier, Norman Moles’ geology students take part in a mock community consultation meeting in which they must negotiate with a range of stakeholders about the location of their proposed drilling site. Speaking of this role-play experience, one of Norman’s students said that: ‘this course really is broadening the idea that it’s not just you as the geologist going along and doing things, it’s in fact that many, many different groups, and some of them you wouldn’t necessarily think of straight away, are involved in these processes’. Hence this type of activity presents a very direct opportunity for students to face the complexity of the real world and to evolve their arguments and understandings accordingly. The sustainability aspirations of tourism students are pitted against the economic priorities of the city council, and geology students learn that the best technical location for their drill may be out of the question when faced with the forces of environmental legislation and community will.

Economic, social and environmental considerations make useful virtual collisions via role-play and case-study learning, exposing students to the need for holistic thinking when it comes to sustainable development. A number of the lecturers using case studies have found that it is particularly effective to choose local case studies, as they have found that a personal relationship between the students and the case study creates more engagement and a better grasp on sustainability concepts. Tourism lecturer Pete Burns commented that: ‘we have no difficulty in getting the students to engage with Eastbourne and its problems because they all live here so they’ve got a stake in it. I think the idea of getting them to talk about something that they’ve got a stake in engages them.’

**Project-based and peer-to-peer learning**

Seven of the interviewees use pedagogies that could be described as project -based learning. Similar to case-study and role-play pedagogies, this type of learning gives students the space to get really involved in their own project, requiring personal research and investigation and an ongoing process of reflection and feedback from the teacher and peers.

Tim Katz’s product design students engage in a compulsory, final year, 60-credit module in which they must design and build a product demonstrating a number of sustainability considerations. An important part of this module is its weekly ‘action learning sets’, in which small sections of the class meet with lecturers for an hour and discuss the progress of each individual’s project, sharing challenges and offering suggestions and feedback. A product design student commented on the value of these action learning sets and the peer-to-peer learning that they encourage: ‘no-one is made to feel stupid in any way and if you can’t understand something, as well as tutors having their expertise there are people within the course ... there are certain areas where someone is better or certain areas that they have tackled before’. This type of learning culture makes space for student expertise in sustainability which is empowering and beneficial to both lecturers and students in increasing the knowledge contributions.

Design Technology lecturer, Dean Hacket, has recently switched to project-based learning and has found that the quality of his students' work has risen noticeably, remarking that ‘it has produced a crop of significantly different students’. For Dean, he has found that when given the space to develop the skills that they personally need, rather than following a fast-moving sequence of ten credit modules as they did in previous years, the students get into a lot more depth in the areas that they most need to learn about. This self-directed project -based learning, coupled with an awareness of the required sustainability considerations, has proved very successful. Dean says that: ‘they have taken a lot more responsibility for it and when you look at the range of stuff that they’ve done; we haven’t taught them all that ... This has been about them finding things out and exploring ideas and working out what works.’ He has found that this type of learning has promoted more interaction and peer-to-peer learning between students: ‘students are coming in with very different experiences and very different backgrounds and areas of expertise ... we’ve seen that they grow quite considerably this semester, with this new course, and students having to rely on each other and talk to each other’. It seems evident that the skills developed through self-directed project-based learning and peer-to-peer learning feed well into the sustainability skill set, producing empowered students who are able to develop and drive their ideas independently, drawing upon the network of resources and information provided by students and lecturers with various specialisms.

As mentioned above, Kevin Turner’s students work on individual projects developing a report on the sustainability options for a certain business. As part of this process he has them deliver a progress presentation to the other students who must provide specific feedback. Kevin considers this is a useful process for the way that it helps ensure that students actually turn up for each other’s presentations, but also for the way that it provides an opportunity for students to share ideas and responses that the lecturers may not have thought of: ‘It can provide interest and different feedback to what a member of staff might provide, you know, the students might spot something or come up with some idea that we wouldn’t have done’. Again there is a sense here that sustainable development is a new field, and that in some areas, the students know more than the lecturers.

This project learning with a peer-to-peer learning element also takes place in fashion lecturer Toni Hicks’ ‘Special Project’ unit. Her students work in groups to develop a fashion trends newsletter for indigenous (overseas) clothes makers to facilitate entry to western fashion markets such as through Fair Trade arrangements. Like Kevin, Toni values highly the role the students play in educating each other, whilst also emphasising the importance of creating the right atmosphere for all to feel that their contributions are welcomed: ‘it’s nice to actually have a kind of rapport where it’s a little more give and take ... sometimes some of the students are incredibly knowledgeable’. In this way she ensures that the class benefits from those who have a particular knowledge in an area of ecology or social justice. She considers the emergence of social and ecological considerations in fashion as such a new thing that she is with the students on a journey towards understanding it: ‘I sort of think ... at this point in time I might know a little more about certain things than students but it doesn’t mean that ultimately they’re not going to know a huge amount more than I do about [social and ecological aspects of fashion] … a lot of it’s finding out and facilitating their finding out and throwing in encouragement, it often seems to work’. All are learners and all are contributing rather than her being the expert.

**External Speakers**

Bringing in external speakers from the professional field can be an effective way of engaging students in the complexities of working in a real-world context, and can also provide inspiration for becoming a change agent.

Kevin Turner, for example, invites the Estates and Facilities manager of the University to come into the class as a guest speaker. He talks through what the University has done, demonstrating to the students what type of sustainability procedures and technologies can be put in place at the university, including water and energy saving measures, and the importance of increasing biodiversity. Kevin says that this talk is a ‘bit broader than our focus has been’ and emphasises that it is of particular value to those students who haven’t had any professional experience, illustrating the sustainability adaptations and mitigations that a business can make via the University, which ‘they could relate to quite strongly’.

Toni Hicks also brings in guest lecturers into her fashion modules: ‘we have individual speakers coming in who are an interesting range of people. We had a lady; she’s the person who sources the factories for Gap, which is quite a contentious kind of issue.’ Toni values the inspiration that speakers such as this woman can provide for the students: ‘the students listening to someone with [such a] role was very helpful … for when they go out eventually and operating within organisations they’ll be able to bring factors that perhaps weren’t thought of by people who are established already… so it’s a little bit of a fresh eye on it.’

**Community/volunteer based learning**

Five of the lecturers interviewed use community and or volunteer-based learning. Martin Haigh describes his module ‘The Ethical Geographer’ as ‘carbon neutral’ in which his students run a project planting trees on the university campus, exploring the idea of giving back the carbon dioxide that they will use in their own lifetime. He believes that this type of action learning engages his students more deeply and personally with a sense of their own impact upon the environment and consequently their responsibilities. As mentioned above, Toni Hicks involves her students in a real-life project engaging with the needs of communities on the other side of the world. She considers this involvement with the needs of other societies as important in creating empathy amongst her students, and also in giving them a sense of agency: ‘life projects are helping students to realise that they can be effective, they really can do it’; they are actually affecting the world in a positive way at the same time as learning: ‘even though we are here inside a building on the other side of the world, we’re ... not operating in isolation, it’s not a bubble’.

Media lecturer, Peter Day’s ‘community project’ module, provides media students with the opportunity to use their PR, marketing, Photoshop and website-building skills for the benefit of the local community. They are introduced to community organisations in Poet’s Corner, an area of Brighton and Hove, and the students consult with residents and various community organisations about the issues and challenges of the local area. Following this, they develop ideas and proposals for media-based solutions to these problems.

For example, one group of students found that a lot of the activities that were going on were not well known about within the particular community. Accordingly, they spent a lot of time with the YMCA, working out what activities they could advertise, and taking pictures, and once it was completed, their marketing work was added to the local community forum website. They also created posters and flyers for the Salvation Army youth night, and business cards for The Honeycroft Centre nursery.

This module is useful for putting their marketing skills into practice and understanding how they can be used in the interests of social and environmental needs. As one student commented: ‘… you are putting into your community and they are also getting out of it by using your skills, so it’s a nice balance’. Whereas media skills are more often used to serve the commercial market, this module introduces students to marketing in a community context. Through real-life experience, they have the opportunity to develop new attitudes and values. The tutor sees it as a way to ‘get them to challenge a lot of the theory that they learn in class … it enables them to work in a different way and understand that there are different ways and to think for themselves ... it enables them to be innovative and creative and actually gives them something to be really proud of’. One of the students compared community-based learning with more traditional educational styles: ‘it's quite nice and you get to see the rewards because it's like a little community, we could like, see it actually working … [in other modules] we put all our efforts into assignments but it just sits in a folder somewhere ... at least now we can actually see it has helped and some of the organisations are really thankful’. Like Toni Hick’s fashion module, this feeling of achievement becomes a part of developing a sense of agency, as they realise that they can use their skills to make a difference: ‘it’s also nice to see what’s going on in the community and, like, you can make a difference. I think it gives you more confidence for when we leave’.

Juliet Millican’s Community Participation and Developmentmodule is an optional module that is available to students from a number of degrees. Students are introduced to a variety of local community organisations and choose one that is relevant to their own discipline. Throughout the module they spend a certain amount of hours volunteering within the community but also engage in substantial reflection, reporting on their experience and relating practice to theory within group-based workshops and individual tutorials at the university.

This experience in a community organisational context stimulates personal and professional development, aiding the students to become more confident in their own beliefs and aspirations. Through personal experience, they evolve their understanding of themes such as inequality and sustainability, which Juliet believes stimulates a deeper learning experience than just listening to lecturers. Further, it gives them an opportunity to really explore their professional aspirations, trying out their discipline in the real world and making connections between their degree area and the voluntary, statutory and private sectors. Juliet says: ‘I think it opens their eyes quite a bit to how the world works outside the protected environment that study is ... what they might want to do in it, how they might want to get involved’.

Enabling students to interact with difference and complexity, aiding them to develop a more holistic and nuanced understanding of the world, can be considered essential skills for sustainable development. This is important to Juliet who says: ‘I think we need to introduce students into that complexity, really show them it’s not black or white, right or wrong, [not] knowledge handed down from other people, but it’s about our behaviours on a regular basis’. In terms of the student experience of that complexity she remarks: ‘We all know that young people are quite opinionated ... and think they know quite a lot about the world and that they are brave and strong and know how to change it ... [but] when they start to encounter [it] and see the complexities of working with issues of equality that it’s not so straightforward’. Certainly, encountering the practical realities was valued by a student of the module who comments: ‘It’s been really good ... I think it would be really helpful if everybody had to do that module because ... when you’re at university it’s all very theoretical ... all my friends who actually took the module, it really broadened out all our perspectives ... and now we have much more opportunities if we wanted to get a job in that field’. Whilst volunteer and community-based learning is often the most time consuming and challenging to set up, there is evidence here to suggest that it is a powerful way to shift attitudes and value systems.

**The lecturer experience in establishing Education for Sustainable Development**

Through the analysis of interviews with lecturers and the discussions of their experiences, a number of themes emerged in relation to how they were able to embed ESD approaches within their teaching.

**Against the Grain**

For a number of the lecturers interviewed, they considered that their ESD teaching approaches in some way went against the grain of their discipline’s teaching culture, or at least, they are considered quite novel approaches. For Peter Day, this extends to feeling himself quite ‘outside’ his department as the only person researching or teaching community media. Although he feels that he has strong moral support from various members of senior management, he works many more hours than the time officially allotted to running his module. He says that ‘in practical terms of making the teaching stuff happen, the support you need is on the shop floor … and that’s difficult, I don’t get that to be honest.’

Norman Moles explains that when his intensive module, introducing geology students to the dynamics of project management and community consultation, was first suggested, he encountered significant opposition from colleagues, receiving the suggestion that it was considered a ‘soft skills’ module and not technical enough. He also confirms that some students find the focus of this module strange and challenging in comparison to the rest of their degree. When interviewed, one student did perceive that the module had been ‘a complete waste of time’, although Norman pointed out that whilst this had been the case before - that some students struggled to see the value of the module at the time of doing it, he had evidence that when they have gone into the professional field that they realise how useful communication and project management skills are.

Similar to Norman’s initial experience, Karin Jascke has met scepticism from colleagues around sustainable development within her School. She considers that some staff hold preconceptions of sustainable development as stifling creativity, and that it is more a political ideology and a current fashion than an architectural approach that is to be taken seriously. Hence she has found that there is still no opening for a sustainable architecture module that she would wish to see, but has adopted a strategy of integrating sustainable development into some of her lectures without any opposition.

Arran Stibbe’s introduction of ‘Sustainability Literacy’ into the English Language curriculum was considered ‘very new and wacky’ and was met with strong opposition in his department. However, Arran managed to use the mission statement and corporate plan of his university to support the establishment of this module, which fortunately contains explicit references to the university’s role in bringing about sustainable development.

However, despite being novel and different, the embedding of education for sustainable development into the curriculum does not always meet with opposition. In the context of Brighton Business School, Kevin Turner’s Climate Change and Global Business Operations module has been described by one student as ‘one of a kind’. He considers that due to increased interest in sustainability and the fact that the module was created during a major review exercise, the module was established without any opposition. One student even described it as ‘the best course’ she had done, and said that it had ‘restored her faith in the university’! Pete Burns believes that the sustainability focus integrated into the teaching of tourism at the University of Brighton is very unique in the context of other UK universities and that it is the reason that the University’s school of Tourism is ranked very highly on the national scale.

**Importance of drawing on/establishing personal networks**

Those lecturers who have set up role plays or community/professional interactions often draw upon a network of community contacts, companies and professionals. Fashion lecturer, Toni Hicks, emphasises the importance of openness and opportunism in developing these kinds of educational networks. She attends external events such as those of the Ethical Fashioning Industry and says: ‘it’s really sort of keeping the ear to the ground and pulling in whatever possible really’. She says that many of her connections with live projects are ‘just the result of a conversation ... and nearly everything I do is a result of meeting somebody or just maybe seeing something that I notice and like the look of and I’ll just phone somebody up ...’. Toni emphasises the freedom and scope for networking that opens up due to being employed by the University: ‘it gives you that opportunity because you are not a threat, you are not a competitor, you’re just an interested party ... I just ring and say ‘oh, I’m from the University of Brighton, I’ve just seen something of yours and I think it is really interesting’.’ Using this method, Toni brings in ‘as many [real] life projects as possible’ for her students to get involved with.

Like Toni, Community Media lecturer, Peter Day, draws upon his personal network of community contacts. He says ‘it was nice to get [students] working in an area where we knew there was a lot of community and voluntary sector organisations and they had a great network, so it was a sort of partnership’. In his case this network has evolved through his own research work in a particular locality of Brighton and Hove. Through exploring the role of community media in community empowerment strategies, Peter knows a number of organisations that he can introduce his students to without much extra effort, although as mentioned above, he does admit to regularly working overtime on this particular module. Norman Mole values the insight provided by a professional contact from Southern Water. This contact kindly provided him with useful information about real drilling projects to be used in piecing together a challenging case study for the students to work on. The contact even attends the students’ final presentations in which they report on the project evaluation before a mock ‘Southern Water’ board. Norman cautioned that when professionals do come to sit on mock boards like this, they must be briefed in detail about the module’s stated learning outcomes and the types of questions that can be fired at students at the end of their presentation. Otherwise they have been known to ask questions that are out of the students’ depth, which can be rather intimidating!

**Conclusions**

Interviews conducted to explore ways in which ESD is embedded in the curriculum reveal the achievement of knowledge, skills and attitude outcomes. Our focus on this work has largely concentrated on the lecturer and student comments about where and how ESD is embedded and what is experienced and achieved. Towards the latter part of our work we have begun to consider whether, how, and if deeper forms of learning are involved in this engagement. We have begun also to consider the appropriateness of the theories of threshold concepts (Meyer & Land 2006, 2008) and conceptual threshold crossing (Wisker & Kiley, 2008) as ways of describing and understanding the kinds of learning leaps made by students who become fully engaged with the learning experience and achieve the learning outcomes of these ESD focused modules or courses. The interviews through this project with both lecturers and students illustrate an ESD learning trajectory that could be compared to the stages that it has been suggested that students pass through when embarking upon the acquisition of threshold concepts and troublesome knowledge. As Magnier (2006) identifies, sustainability is readily seen as a troublesome concept, so complex, with so many shades and different definitions, that it is hard for the students to understand. Mangier also aligns many of the pedagogies used in ESD with the learning experiences associated with tackling troublesome knowledge and crossing threshold concepts. For example, Magnier argues that experiential learning through direct encounters with sustainable development issues can become trigger points in crossing the conceptual threshold and students beginning to ‘get’ sustainable development.

This study has certainly shown that the predominant approach to education for sustainable development, taken across the case studies, is to give the students as direct an experience of real-life sustainability as possible, whether it is through role-playing or involvement in local or international development projects. Further supporting Magnier’s argument, this study also found that direct experience of the complexity of sustainable development can be created via interactions with guest speakers from the professional field, and examples and case studies drawn from the campus and local community. Such active, experiential learning, Mangier argues, can aid students in viewing this ‘troublesome knowledge’ from new perspectives, aiding their grasp of the concept of sustainable development and its initial application.

However, while this study supports the idea that experiential learning is a key factor in a student’s comprehension and adoption of sustainable development approaches, the idea that this adoption is the equivalent to crossing a conceptual threshold seems less certain based on the findings here. For example, Bradbeer (2005) describes the learner’s passage across a conceptual threshold as being both troublesome and troubling and requiring substantial intellectual effort until eventually the student reaches a ‘Eureka moment’. However, the cases and findings of this study do not support the idea that students find the comprehension of sustainable development an intellectual struggle or that there is a particular ‘Eureka moment’. Indeed, we suggest that the learning processes explored seem more concerned with two areas: learning to *value* sustainable development, and learning how to make it *happen*. It is thereby in terms of its *outcomes* and the values related to it that sustainable development learning begins to look more like a threshold concept.

Evidently, there is often a transformational aspect within ESD that is a key feature of threshold concepts. As Bradbeer (2005) describes, the new understanding acquired in the Eureka moment is often a transformative shift to a new worldview, which cannot be forgotten, or ‘unlearned’. This type of irreversible realisation on behalf of students was certainly seen in this study:

*‘I see myself as one of them [who] will consciously try to make it sustainable because that has been so enthused in our head ... the amount of things I have just learned and become aware of to do with like consumerism and sustainability and like if things keep going the way it does what will happen to our landfill sites and stuff, I just don’t think I would be able to turn my back on it.’*

Another point of similarity between this study and Bradbeer’s (2005) work is the sense of identity that emerges from ESD learning experiences. Bradbeer observes that once a threshold concept is passed, the learner has gone through what could be described as ‘a rite of passage’, and their identity is confirmed, for example as a geographer or a geologist (Bradbeer, 2005). Some of the examples gathered in this study support this view, suggesting that ESD has developed a sense of identity within students as sustainable development advocates within their discipline and future professions:

*‘I’ve always been interested in this, so I’ve kind of always wanted to work (in ethical fashion) … it’s definitely changed what I think … it’s really important to get business educated ’cos … I don’t think some people know anything really about it’*

However, rather than being triggered by the mastery of a threshold *concept*, this study has found more evidence that it is a threshold *values* *shift*, causing the irreversible transformation and the new sense of identity as change agents; students have undergone some kind of active learning that has engaged them with the topic of sustainability at a deep level, leaving them with a desire and a commitment to support sustainable development. For example, in the product design course, the tutor teaches sustainability principles throughout the entire product design degree. However, it is only those students who have come to *value* sustainable development, and believe that it is an important issue, who decide to major on it in their final year design projects. As the tutor commented:

*‘Sometimes they regret [having to design sustainably]. They can see, for instance, that they want something very extravagant, a particular bit, and you have to say all right, you can do it extravagant but you’ve got to make a case for it. I had one student … who was doing something sustainable in the minor project and chose specifically not to do something in a sustainable way.’*

It would seem that students such as this one choose not to adopt sustainable practices, not because they don’t understand it, but because they don’t value it enough to make the sacrifices and adjustments required for a product to be truly sustainable. Another student commented:

‘*I think it’s coming back down to making sacrifices ... you have to think about the needs and the sustainability ... [sustainable] development is a kind of a perfect uniting of those two things, which is really hard to do ... it's that kind of kinship, the Yin and the Yang of ‘sustainability meets user demand ... so that’s pretty much how I see it and what I work towards’.*

It is evident that the adoption of sustainable development principles are challenging in that many different considerations must be applied at the same time, and this takes energy and commitment. What the cases here suggest is that it is driven by a set of values, rather than depending upon an intellectual realisation. Another student from the same course demonstrates that his relationship with sustainable development is one of commitment to its complexity:

*‘… you can quite often get like overwhelmed and lose site of it and then you have to take a step back and say ‘is it still sustainable?’ and then be like really critical about it. If that ticks all the boxes then does it meet all the users’ needs? And then if it doesn’t meet a need you can say ‘right, how do I change this side of things, like trying to balance it.’*

It seems that the theory of threshold concepts and troublesome knowledge is a useful framework within which to understand the learning passages and pedagogies of ESD. This study begins to support the idea that there are a number of similarities, for example, in the type of pedagogies required to achieve meaningful learning and in the common learning outcomes of transformation and identity-formation. The study also suggests that there are some clear differences. For example, whilst the journey towards crossing a threshold concept is an intellectual one, troublesome and tricky to understand, sustainable development is often described as common sense and the students interviewed often already understood and supported it before even beginning the course. Their journey, however, is one of education *for* sustainable development, rather than education *about* sustainable development, and this involves acquiring the resolve, the willpower, the commitment and the practical know-how to actually take it forward, bringing it into their disciplines and future professions.

Thus it is that ESD so frequently involves action learning through which students interact with real life organisations and real-life projects. Academic priorities are cast into the messy mix of real world needs and demands, the social and environmental requirements of sustainable development becoming unavoidable, forcing students to consider their own perspectives on these demands, and how they come to bear upon their subject area. It is through such experiences that students have an opportunity to cross what could be called a ‘values threshold’ and discover new worldviews, irreversible knowledge and a new sense of identity as change agents. However, the interviews in this study only begin to hint at this, and further research is needed to confirm such conclusions.

**Bibliography**

Bloom, B.S. ed., 1956. *Taxonomy of Educational Objectives: the classification of educational goals: Handbook I, Cognitive Domain*. New York: McKay.

Bradbeer, J., 2005. Threshold concepts and troublesome knowledge in the GEES disciplines*.* *Planet,* 3, p.3.

Dawe, G., Jucker, R., & Martin, S., 2005. *Sustainable Development in Higher Education: Current Practice and Future Developments*. A report for The Higher Education Academy, November 2005.

HM Government, 2005. *Securing the Future: delivering UK sustainable development strategy*. London: HMSO

Huckle, J., 2005. *Education for Sustainable Development: a briefing paper for the Teacher Training Agency*. Available at: http://www.ttrb.ac.uk/viewArticle.aspx?contentId=11693

Kagawa, K., Selby, D., & Trier, C., 2006*.* Exploring student perceptions of interactive pedagogies in education for sustainable development. *Planet*, 17, pp. 53-56.

Land, R., Meyer, J.H.F., & Smith, J., 2008. *Threshold Concepts within the Disciplines*. Rotterdam and Taipei: Sense Publishers.

Magnier, K., 2006. Sustainability as a troublesome concept in the GEES disciplines*. Planet*, 17, pp.32-33.

Meyer J.H.F., & Land, R., 2006. *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge*. Routledge: Falmer.

Selby, D., 2006., The Catalyst that is sustainability: bringing permeability to disciplinary boundaries. *Planet*, 17, pp. 57-59.

Wisker, G., Robinson, G., & Kiley, M., 2008. Crossing liminal spaces: encouraging postgraduate students to cross conceptual thresholds and achieve threshold concepts in their research. In M. Kiley & G. Mullins, eds., *Quality in postgraduate research: Research education in the new global environment - Part 2: Conference Proceedings*. Canberra: CEDAM, ANU.