

Metadata of the chapter that will be visualized in SpringerLink

Book Title	Integrating Sustainability Thinking in Science and Engineering Curricula	
Series Title		
Chapter Title	Food for Thought: A University-Wide Approach to Stimulate Curricular and Extracurricular ESD Activity	
Copyright Year	2015	
Copyright HolderName	Springer International Publishing Switzerland	
Author	Family Name	Puntha
	Particle	
	Given Name	Helen
	Prefix	
	Suffix	
	Division	
	Organization	NTU Green Academy Project 'Food for Thought', Centre for Academic Development and Quality
	Address	202 Dryden Centre, NTU, Nottingham, NG1 4BU, UK
	Email	
Corresponding Author	Family Name	Molthan-Hill
	Particle	
	Given Name	Petra
	Prefix	
	Suffix	
	Division	Management Division
	Organization	NTU Green Academy Project 'Food for Thought'
	Address	Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
	Division	
	Organization	Nottingham Business School
	Address	Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
	Email	petra.molthan-hill@ntu.ac.uk
Author	Family Name	Dharmasmita
	Particle	
	Given Name	Aldilla
	Prefix	
	Suffix	
	Division	
	Organization	Nottingham Business School
	Address	Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
	Email	aldilla.dharmasmita@ntu.ac.uk
Author	Family Name	Simmons
	Particle	
	Given Name	Eunice
	Prefix	
	Suffix	

Division	Department of Animal, Rural, and Environmental Science
Organization	Nottingham Business School
Address	Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
Email	eunice.simmons@ntu.ac.uk

Abstract

Sustainability and Higher Education have been the focus of much recent academic and professional research as there has been a growing expectation that Higher Education institutions will produce 'sustainability-literate graduates' (Lacy et al. in A new era of sustainability. U.N. Global Compact-Accenture CEO Study, 2010; Sky in The sustainable generation: the sky future leaders study, 2011; Scott et al. in Turnaround leadership for sustainability in higher education, 2012) and a growing demand from students for future-proof skills (Drayson et al. in Student attitudes towards and skills for sustainable development. NUS/HEA, 2012). The process of embedding Education for Sustainable Development into curriculum is however challenging, and for some disciplines more than others. This paper examines how Nottingham Trent University has adopted a unique approach to centre the development of Education for Sustainable Development around the specific topic of food. The paper will share the model for engaging students and staff members across an institution with sustainability using a unifying theme which constitutes a critical global challenge of relevance to all disciplines. Details will be given of the process and challenges of the approach which has sought to facilitate personal, disciplinary and inter-disciplinary sustainability literacy. The approach has been largely successful in its aim of developing new processes and content to lead to the embedding of Education for Sustainable Development across the formal and informal curriculum as well as the institutional culture.

Keywords (separated by '-') Sustainability literacy - Curriculum - Online learning - Virtual learning environment (VLE) - Video - Food



Food for Thought: A University-Wide Approach to Stimulate Curricular and Extracurricular ESD Activity

Helen Puntha, Petra Molthan-Hill, Aldilla Dharmasasmita and Eunice Simmons

Abstract

Sustainability and Higher Education have been the focus of much recent academic and professional research as there has been a growing expectation that Higher Education institutions will produce ‘sustainability-literate graduates’ (Lacy et al. in A new era of sustainability. U.N. Global Compact-Accenture CEO Study, 2010; Sky in The sustainable generation: the sky future leaders study, 2011; Scott et al. in Turnaround leadership for sustainability in higher education, 2012) and a growing demand from students for future-proof skills (Drayson et al. in Student attitudes towards and skills for sustainable development. NUS/HEA, 2012). The process of embedding Education for Sustainable Development into curriculum is however challenging, and for some disciplines more than others. This paper examines how Nottingham Trent University has adopted a unique approach to centre the development of

H. Puntha

NTU Green Academy Project ‘Food for Thought’, Centre for Academic Development and Quality, 202 Dryden Centre, NTU, Nottingham, NG1 4BU, UK

P. Molthan-Hill (✉)

Management Division, NTU Green Academy Project ‘Food for Thought’, Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
e-mail: petra.molthan-hill@ntu.ac.uk

P. Molthan-Hill · A. Dharmasasmita

Nottingham Business School, Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
e-mail: aldilla.dharmasasmita@ntu.ac.uk

E. Simmons

Department of Animal, Rural, and Environmental Science, Nottingham Business School, Room 703 Newton, NTU, Nottingham, NG1 4BU, UK
e-mail: eunice.simmons@ntu.ac.uk



Education for Sustainable Development around the specific topic of food. The paper will share the model for engaging students and staff members across an institution with sustainability using a unifying theme which constitutes a critical global challenge of relevance to all disciplines. Details will be given of the process and challenges of the approach which has sought to facilitate personal, disciplinary and inter-disciplinary sustainability literacy. The approach has been largely successful in its aim of developing new processes and content to lead to the embedding of Education for Sustainable Development across the formal and informal curriculum as well as the institutional culture.

Keywords

Sustainability literacy • Curriculum • Online learning • Virtual learning environment (VLE) • Video • Food

1 Introduction

In this paper we will share how we at Nottingham Trent University (NTU) addressed the challenge of embedding sustainability across an entire institution through our use of the over-arching theme of food during phase one of our ‘Food for Thought’ projects. We used food as the focus topic for an online certificate which was open to all students and staff as well as a starting point to create co-curricular activity to enhance the student experience. The paper will focus on an explanation of the certificate as this has been the most heavily-resourced and successful aspect of phase one of the project. We will explain the curriculum design model which could be adapted for use at other institutions both in online and offline settings to support sustainability literacy. The strength of the curriculum model lies in the use of a theme which immediately establishes the project as ‘real-world’ rather than theory-driven and is flexible to encourage personal, disciplinary and interdisciplinary understanding of sustainability as well as provide stimulus for extra-curricular activity such as research and community-based action. The design of the certificate enabled the facilitation of sustainability literacy as well as other skills and attributes and provided ground-breaking opportunities for students to co-create curriculum, providing impact beyond the immediate certificate participants through the ‘recycling’ of participant work into teaching material.

For a long time, Higher Education (HE) has been a catalyst for change; creating exemplars for governments and business organisations to follow and having an influence in policy decision-making. There is one area however which recent research has identified as a challenge with regard to its integration into HE strategy and especially into its curricula; Sustainability (Cortese 2003; Stubbs and Schapper 2011). Lozano et al. (2013: 10) argue that, ‘In spite of a number of Sustainable development (SD) initiatives and an increasing number of universities becoming engaged with SD, most higher education institutions (HEIs) continue to be traditional, and rely upon Newtonian and Cartesian reductionist and mechanistic paradigms’. This is in spite of



a document written to “shape the upcoming United Nations Decade of Education for Sustainable Development 2005–2015 (McNamara 2010).

Several academics have argued that HE institutions are segregated into highly specialised yet specific ‘areas of knowledge’ and that this has resulted in disjointed learning as departments focus solely on incentives such as tenure and research, and are often deterred from trans-disciplinary collaboration. Consequently producing graduates who know only about their specific area—‘individual learning and competition... professionals who are ill prepared for cooperative efforts’. (Cortese 2003: 16; Winter and Cotton 2012; Djordjevic and Cotton 2011).

Orr (1994: 5) contends that ‘The kind of education we need begins with the recognition that the crisis of global ecology is first and foremost a crisis of values, ideas, perspectives, and knowledge, which makes it a crisis of education, not one in education’. This is echoed in Cortese (2003: 16) who further argues that ‘Higher education institutions bear a profound, moral responsibility to increase the awareness, knowledge, skills, and values needed to create a just and sustainable future. Higher education plays a critical but often overlooked role in making this vision a reality’.

Many HEIs have achieved success during the last decade in addressing sustainability through their estates. Whilst there have also been notable successes in the area of curriculum and co-curriculum development it would seem that the embedding of sustainability into the whole curriculum and not only into individual modules and degree courses presents a challenge to HE institutions.

2 Background

NTU has been rated as one of the greenest universities in the UK, based on Green League Table from 2008–2013 (Green League 2013). It has an EcoCampus Platinum award and participates in Green Impact and the LiFE Index. Our institutional mission to provide ‘education and research which shapes lives and society’ reflects our existing commitment to sustainability. NTU has made major achievements in the area of sustainability in recent years with clear related strategy and activity in the areas of estates, procurement, waste, volunteering and catering. Our current aim is to embed education for sustainability into the curriculum in line with our Graduate Attributes, one of which is on the subject of Global Citizenship and calls for inclusion of ESD in the curriculum. In 2010 NTU began to integrate ESD with the introduction of a steering committee, the Sustainability Action Forum (SAF).

In September 2012 NTU invited renowned expert Geoff Chase to run a primer workshop for embedding ESD. The workshop achieved some success in motivating academics to engage with sustainability; however some common obstacles were identified in the workshop feedback. Participants expressed concern that the diversity and complexity of sustainability issues meant that integrating sustainability into the curriculum in any meaningful way posed great challenges for example in terms of where to begin, which of the many urgent sustainability



challenges to tackle first and the amount of time required to undertake the changes within their courses and modules. Related to this, some participants or their colleagues were of the view that sustainability was an ‘add-on’ to core curriculum and should not be prioritised. Through our own research undertaken in late 2010 we had identified a need to provide structure for embedding ESD in line with our related strategy and this need seemed to be reflected in the workshop feedback.

In November 2012 we applied to take part in the second round of the Higher Education Academy (HEA) Green Academy Change Programme with the intention that we would use the programme to undertake work to support the embedding of ESD into curriculum whilst addressing the existing challenges identified through the research and workshop feedback. We envisaged that the project should therefore provide the following:

- ESD curriculum which would facilitate not only the learning of sustainability content but wider skills and/or knowledge with the potential to support students’ wider learning and employment
- teaching resources which are either already contextualised or could be easily contextualised into the various disciplines to reduce the time required of academics
- wider impact beyond the immediate project participants particularly in terms of mainstream curriculum development
- flexibility of access in terms of who when and how staff and students engage
- appeal to wide pool of staff and students by the nature of the project—wanted to do something unusual that would therefore add value to the usual work/study experience

In addition, we viewed the programme as a potential opportunity to join up some of the existing good practice within and outside the curriculum for example estates and catering. Our application was happily selected and we commenced our project. At the time of writing we have completed the first phase of the project and the second phase is due to end in October 2014.

3 Sustainability and Food

As stated, we decided to use the over-arching theme of food. It was felt that a theme would constitute an engaging and flexible way of embedding ESD. In contrast to previous theory-driven approaches the adoption of a theme would:

- offer a ‘way in’ to sustainability for students and staff
- enliven the subject for those with no previous knowledge or interest in sustainability
- facilitate student disciplinary and interdisciplinary knowledge and skills
- develop a collective understanding of sustainability which would support cooperative and collaborative work



- provide opportunities within research and extra-curricular activities as well as curriculum
- reduce the effort required of academics to contextualise sustainability theory into practical issues and/or application
- offer a unique opportunity to be part of an institution-wide project addressing a critical local and global sustainability challenge

Food production and consumption is an urgent global sustainability challenge with far-reaching implications for everyone (Foresight 2011). The theme is so broad as to encompass all three aspects of sustainability: economic, social and environmental; and can be made relevant to all academic disciplines as it covers such vast topics as agriculture, food production methods, nutrition, transport, waste, energy, climate change, bio fuels, biotechnology, commodity prices, biodiversity etc.

Food initially provided an authentic topic with which staff and students could engage to develop their understanding of sustainability as a concept. The intention is that this initial grounding will lead to further activity beyond the theme of food.

We entitled the project ‘Food for Thought’ and it included two strands: ‘Appetite for Change’ (Formal Curriculum) and ‘Sustain Yourself’ (Informal Curriculum). The main focus of this paper is the ‘Appetite for Change’ strand, or formal curriculum.

4 Appetite for Change

The first phase of the ‘Appetite for Change’ (formal curriculum) strand consisted of an optional online ‘Sustainability in Practice’ certificate. The second phase which is being embarked upon at the time of writing involves the embedding of ESD into the mainstream curriculum through the work of four interns together with academics (this is discussed in more detail in the ‘student-as-co-creator’ section). The certificate is explained below. The certificate was open to staff as well as students; where the paper uses the term ‘participant’ this refers to the experience of both staff and student participants within the certificate; where the paper uses the term ‘student’ with regard to the certificate this refers to aspects of the certificate experience relating solely to student participants.

4.1 Certificate Design and Promotion

Given that the certificate was not credit-bearing it was felt that it should provide a unique experience which would add value beyond the participants’ usual work or course of study. In the case of the certificate this included the opportunity to develop digital literacy skills, enhance their CV, produce a video which could be shared with potential employers, contribute to NTU Global Week and win prizes! These benefits were emphasised in promotional work which took place during NTU



Welcome Week in September 2013 and NTU Green Week (when the certificate was officially launched) in November 2013. We anticipated that we might gain 90 participants for the certificate however we had over 2,000 students access session one and 70 complete the certificate. The reasons for the drop-off will be explored at a further date.

4.2 Online Format

The certificate was open to all NTU students and staff and appeared automatically in the students' Virtual Learning Environment (VLE) homepage, staff needed to be enrolled manually. It was a fully online course comprised of 4 sessions and a video assessment piece (discussed in more detail in a later section). The estimated time commitment required to complete the certificate was 20 h including 30–60 min per session and up to 16 h for the video. Participants could complete the course in their own time alongside their usual course or work over a 3 month period between November 2013 and February 2014. Each new session was released to the participant once they had completed the following session. Completion of the Fourth and final session unlocked the Dropbox for students to submit their video assessment piece.

It was decided that an online format would be the most appropriate for the certificate. This format offered an effective way to reach all students and staff without the logistics of timetabling, room booking etc. It also offered participants the experience of online learning which for many was their first experience of a fully online course.

Our initial intention was to hire an external company to build the certificate to our requirements. It proved impossible to secure the expertise and as a project team we employed an individual to build the certificate learning room within our institutional VLE. Having never created an online course before this was a massive challenge and we gratefully received a lot of support for example from the NTU Continuing Professional Development Department who provided training as well as some hands-on support for the VLE. There were many advantages to housing the learning room within our institutional VLE rather than an external platform; it allowed us to monitor more accurately which students were accessing or not and the demographics of those students. It allowed us to automatically enrol all students making it more convenient for them to commence the certificate and it encouraged people to view the certificate as part of the 'everyday' business of the institution since the learning room was fully integrated within the VLE.

As the certificate was based online it was necessary to provide a great deal of on-screen information that otherwise might have just been spoken to in a face-to-face teaching session. We had to pre-empt what the participants might want to know and might need and this required some consideration in terms of the wording and lay-out appropriate to an online environment. The learning room itself included extensive sections on support and course information as well as assessment



guidelines. We also set up a twitter feed to keep the learning room more ‘live’; we tweeted twice or more each week day with links to food and sustainability news items, websites, news updates about the certificate itself and some more entertaining tweets such as Instagram photos of cooking experiments which had failed, pictures of pandas etc. We gained several Twitter followers including Network NCN (a business networking event aiming to bring local entrepreneurs together with students, Dairy Farmers of America (DFA) and the Nottingham Evening Post newspaper.

In addition to the Twitter feed, we employed some further techniques to keep the learning room ‘live’ to encourage engagement and retention. The first was that we held prize draws for participants wherein participants could win credit for their NTU smartcards to spend on printing, catering etc. on campus. The aim of this was both to motivate participation and to encourage participants to stay on ‘track’ with the certificate since entry into the prize draws was dependent on them completing activities within certain time periods. In session one we awarded credit of higher monetary value to participant prize winners who attempted more challenging tasks (this session had three alternative activities to complete which ranged from basic, intermediate and advanced). Second we used videos in several different ways to make the learning room live and personal:

- each session began with a welcome video which outlined the aims of the session and reminded participants of the prize draw. Each session ended with a closing video which summarised the session and incorporated participant comments and ideas from the discussion forum. The videos for each session featured different team members every time to enable the participants to ‘meet’ different members of the team
- the Session One opening video was placed on the homepage
- we filmed a ‘Christmas-themed’ reminder video which we placed on the homepage

We tried to make the videos interesting to watch e.g. use of props, one team member talking whilst standing on their head and we produced a video montage of the ‘bloopers’ which we added to the homepage of the learning room at the close of the certificate.

4.3 Pedagogical Approach

Constructivists such as Novak (1998) believe that for learning to be meaningful it should encompass thinking (cognition), feeling (affect) and acting (motor or psychomotor). The certificate was designed to encompass all three aspects with the aim of providing a meaningful and transformative learning experience which would broaden the participants’ perspective of their self and subject as well as teach them

knowledge. Related to this, the certificate was designed to facilitate graduate attributes. As indicated earlier in this paper, like many HEIs NTU has a set of ‘Graduate Attributes’ i.e. a list of qualities, skills and competencies which the institution seeks to facilitate within its students. One of the Graduate Attributes relates to global citizenship and encompasses sustainability, international awareness and leadership capacity.

In recognition that sustainability can be used as a tool to support students’ learning and skills in all sorts of areas and also that some staff do not view sustainability as a curriculum priority, the certificate aimed to support not only the global citizenship Graduate Attribute but others such as communication skills, critical thinking and international awareness needed for students to thrive in a world of ‘supercomplexity’ (Barnett 2000).

We designed activities to support the development of participants’ sustainability literacy as outlined by Stibbe (2009: 10f):

... the skills, attitudes, competencies, dispositions and values that are necessary for surviving and thriving in the declining conditions of the world in ways which slow down that decline as far as possible. Gaining practical skills requires a form of learning which goes beyond memorising and repeating facts. It requires **active learning**, a broad term used to refer to **self-reflection, self-directed enquiry, learning by doing, engagement with real life issues, and learning within communities of practice.** (emphasis added)

Table 1 indicates the strategic design of the certificate content, and how the certificate aimed to support participants in their exploration of sustainability challenges through the lens of their personal, disciplinary and interdisciplinary perspectives; in this way encouraging a real-world view and a thorough exploration of complex issues.

Table 1 Overview of certificate content

	Topic	Aim	Example activity
Session one	Student experience of sustainability and food	Engage students on a personal level	Explore the most ‘sustainable’ options for a chicken stir fry
Session two	Sustainability and food in the disciplines	Facilitate disciplinary understanding of sustainability	Source an online video which relates to food, sustainability and the student’s discipline
Session three	Connections between disciplines; identifying challenges	Facilitate interdisciplinary understanding of sustainability	Source an online video which relates to food, sustainability and two or more disciplines with reference to the food life cycle
Session four	Global and local solutions	Identify disciplinary/ interdisciplinary solutions to sustainability challenges	Source local or global food sustainability solutions



4.4 Content Design

As the certificate was open to all staff and students it was important that it was accessible to all as well as being an appropriate level of difficulty and relevant to all disciplines and this presented many interesting challenges during the content design stage. The content was developed collaboratively with staff from across the university. We had a core team who did the initial planning during a one-day intensive session which included reps from the Student Union, Environment team, Business School, Centre for Academic Development and Quality. We then held a planning session for each session to develop content and this attracted other staff in addition to the core team. It was important that participants could ‘see themselves’ and their disciplines within the certificate, that they could perceive the relevance of the activities. We were fortunate to be given support from many colleagues across the university who provided over ninety online examples (links to news stories, journal articles, websites etc.) of sustainability challenges relating to food within the various disciplines. Two examples of such resources include a web link to a news story about the effects of light pollution on crop production which was provided by a lecturer in Astrophysics and a web link to a news story about the rise of food bank use in the UK and the suggested causes for this, provided by a lecturer from Social Sciences.

4.5 Use of Digital Pedagogies

We did not want to have a learning room full of text documents but wanted the certificate to be as interactive as possible. The certificate was designed in the style of a Massive Open Online Course (MOOC). As stated previously the certificate was based entirely online. In addition we employed various digital pedagogies to support participant learning. Digital artefacts such as videos, prezis, quizzes and discussion forums were the basis of the certificate learning activities and participants has to conduct their own online research to complete a task for each session. Such artefacts and accompanying tasks were designed to keep the learning environment active and to facilitate skills such as critical thinking and communication skills for example:

- (i) the use of a prezis in session three on the subject of the life cycle of a strawberry yoghurt demonstrated the interconnections between the different stages of the food life cycle as well as the connections between the various disciplines and how they relate to different stages of the food life cycle and to each other in terms of different sustainability challenges relating to food. This level of complexity would have been difficult to communicate effectively through a textual document; the motion of prezis allowed a visual representation of the connections to be drawn and considered.



- (ii) a quiz was employed in session three following the prezi on food life cycles. The quiz offered a new but relatively easy task to provide a quick check on what participants had learned from the prezi as well as providing some new information not contained within the prezi.
- (iii) a zee map of the world was created in session four. When participants completed their tasks and posted their solutions to the discussion forum we then added these to the world map which we displayed during NTU Global Week and other events.
- (iv) discussion forums were established for each session as well as within the support section of the learning room. The discussion forums performed several functions: they provided a location for participants to submit their work at the end of each session, they provided a venue for students to meet and discuss ideas (the activities sometimes stipulated this for example the session two activity involved participants posting a video to the discussion forum and commenting on someone else's video), they allowed us to monitor student engagement and satisfaction and they enabled us to add a release function to the session material i. e. participants would have the next session released to them once they posted to the discussion forum.

4.6 Video Assessment Piece

We opted to use the innovative assessment medium of video for the certificate. Participants were asked to submit a video of 3 min or less as their final piece of work. This was the only piece of work which was assessed. There were several reasons for the choice of video as medium:

- since the certificate was fully online the video medium was in keeping with the participant experience of the certificate
- as the certificate was non-credit-bearing we wanted it to provide an interesting experience beyond the participants' usual work or course of study
- it was felt that a short video would provide an innovative addition to participants' CVs
- it was considered that the end videos would provide an unusual and interesting addition to teaching material

From session two onwards participants were asked to source videos online as part of the session activities to introduce them to video as a medium of presentation in preparation for their end assessment. The videos were judged as pass or fail by school panels. Multidisciplinary and staff videos were judged by the project team. The videos were judged according to achievement of the following learning outcomes:



- demonstrate engagement with sustainability as a concept
- interpret the theme of Food for thought and contextualise this through the subject of their degree
- devise an interesting, innovative, creative or perceptive means of displaying this concept to a wide audience

All submitted videos were entered into a competition to win restaurant vouchers for a local restaurant with strong sustainability credentials. During NTU Global Week in March 2014 the videos were displayed on the NTU Student Union website and were voted for by students. According to the number of votes received a student winner was selected for each of the nine academic schools as well as an overall student winner and an overall staff winner. On the last day of NTU Global Week we held a Video Awards Night where we screened the 10 winning videos, presented school winners with some small tokens and presented the restaurant vouchers to the overall staff and student winners. The event also provided an opportunity to stimulate interest for further work in the area and to thank all the colleagues who had contributed to the certificate and present them with tokens of appreciation—selections of locally-produced products which had been donated by ‘The Great British Food Group’ a local support group for independent caterers and food/drink producers as initiated by our Guest of Honour for the evening local café owner Wendy Baird.

We received some anecdotal feedback that some potential participants were put off starting or completing the certificate as they were reticent about producing a video. We are exploring options for future rounds of the certificate e.g. providing some hands-on support for the making of the video or offering an alternative assessment medium.

4.7 Sustainability as Interdisciplinary Working

Inter-disciplinary working was an important and unique feature of the certificate designed to provide participants with new perspectives and opportunities which might not be open to them on their usual course. It was considered that this feature would support preparation for inter-disciplinary employment environments as well as supporting solutions for food sustainability challenges which require expertise from many different fields.

Some participants took the interdisciplinary experience to a further level and created and submitted a multidisciplinary video for example a student from Arts and Humanities teamed up with a Nottingham Business School student to co-produce a video on the theme of waste which included potential solutions based on their disciplinary expertise.



4.8 Students as Co-creators of the Curriculum

In the spirit of both the circular economy of a sustainable food life cycle we designed the certificate to have minimal waste and reusing/recycling wherever possible i.e.:

- the work which participants undertook throughout the certificate repeatedly returned to their course of study so that they could tie it in with other work on their course whether knowledge or skills.
- Where course activity did not correspond directly to a students' course it brought them into contact with staff and students from other disciplines so that even where they were learning content that they may not come back to they were discussing it in the context of inter-disciplinary thinking.
- The next phase of the project will see participant work from the certificate being recycled into teaching materials. We have employed four interns all assigned to different academic schools to undertake this work which it is intended will include ready-made seminars, tutorial activities, case studies and other resources based on the student videos and discussion forum ideas.

As stated previously, staff could participate in the certificate and through their participation could gain a greater understanding of sustainability in order to then feed this into their curriculum. Given previous feedback from workshops and research as described earlier we understood that many staff are not interested in and/or do not prioritise sustainability within the curriculum. For those teaching staff who did not participate in the certificate, the student-as-co-creator model offers the opportunity for a role reversal where students can teach staff about sustainability following their participation in the certificate. Through the teaching materials to be developed from the certificate work students can directly or indirectly (depending on their involvement at this stage) support staff in embedding it into the curriculum. This model reduces the time and effort required of academic staff to do this themselves as well as giving students a unique opportunity to be involved in curriculum development. Through the teaching materials staff will have access to real-life examples of sustainability challenges and solutions from within and outside their disciplines to support the embedding of the graduate attribute of global citizenship within the curriculum as well as facilitating other graduate attributes.

The interns will also support individual academics and course teams to develop other new curriculum outside of the certificate through bespoke training, guidance for course development approval processes etc.

5 Sustain Yourself

From project conception it was planned to support the certificate with various activities relating to the informal curriculum i.e. to facilitate sustainability literacy through extra-curricular activities. One project known as 'Sustain Yourself' aimed to engage students in ESD through the themes of food and health with a series of



optional cookery classes. It was intended that the sessions would support students to adopt healthy lifestyles, develop important life skills, socialise with other students, feel more ‘at home’ at the university and place their activities and consumption patterns in the context of wider local and global networks e.g. in terms of food supply and security and food miles. The project which built on an existing cookery course led by Beverley Lawe from the School of Education complemented existing initiatives such as work by NTU catering on sustainable food and student cookery books which were developed by NTU Student Support Services.

The cooking classes achieved some success on the city campus in terms of the ‘train the trainer’ model i.e. training students to train other students, though take-up of the classes was not as high as hoped. Future activity is planned, some of it using a different approach to encourage wider take-up. At the time of writing, preparation is underway for some ‘brain food’ events wherein students will be given ideas for nutritious food to eat during the exam period in summer 2014. We are also looking at the possibility of community-based cooking activities perhaps in tandem with the mobile Citizens Advice Bureau as suggested by NTU law students at the NTU Global Week world café; the world café was a further extra-curricular activity led by the project interns as part of NTU Global Week in March 2014 wherein attendees were invited to discuss ideas relating to food, sustainability and the future of the university and to write their comments on paper tablecloths as they moved around different tables which were hosting various discussion topics.

6 Conclusion

Undoubtedly the use of the over-arching theme of food within the project has been a key element of the success of the project in terms of encouraging good participation from across the institution from staff and students and in ensuring coherence between different aspects of the project—curriculum, co-curriculum, extra-curriculum, events etc. It is difficult to imagine that a more theory-based approach would have achieved the same level of success as this approach rooted in the critical challenge of food sustainability; an issue which relates to and implicates all of us both personally and professionally. The flexibility and perceived significance of the theme then has ensured participation and coherence. In the future we may look to include a different theme constituting another sustainability challenge either alongside or instead of food.

Whilst the use of the theme of food established the project as an action rather than theory-driven endeavour phase one of the project which we have described in this paper remained largely theory-driven with the exception of the cooking courses. The certificate itself facilitated sustainability literacy. It encouraged and in some cases will have resulted in action as it may have impacted on the perspective and behaviour of the participants. A fuller evaluation will illustrate the extent of this impact. The content and tasks of the certificate though remained largely theoretical and abstract. Participants researched or formulated solutions regarding food and sustainability and in some cases may have enacted these solutions but the model of

the certificate in phase one did not formally integrate action with theory. During phase two we are looking to potentially integrate parts of the certificate with volunteering activity as well as disseminating the ideas of participants both as teaching material and to interested parties e.g. researchers, industry, charities etc. who may be able to enact the solutions with or without the input of participants.

The interdisciplinary nature of the activity content and the fact that the certificate was open to all staff and students provided an unusual opportunity for participants to interact with students and staff from other disciplines in an academic setting and to learn from the starting point of a problem rather than from a discipline perspective i.e. the starting point for the certificate was ‘how do we feed the world in a sustainable way?’ and participants, through the various activities and assessment piece, were invited to interrogate this question from personal, disciplinary and interdisciplinary perspectives some of which changed over the duration of the certificate as more levels of complexity were added.

Anecdotal feedback from participants who completed the certificate suggests that the curriculum design model described above—personal, disciplinary and interdisciplinary—was appreciated by participants who found that this added depth to their knowledge and experience. We have not yet gained feedback from participants who did not complete however and this is a topic we would like to know more about. There was a large drop-off between session one which focussed on personal perspectives on sustainability and session two which introduced disciplinary perspectives of sustainability. There are many possible reasons for this for example, despite our encouragement to participants to stay with the certificate; that they would begin to see the relevance of the certificate to their discipline as the certificate unfolded some may have found session one which focussed on the sustainability of a chicken stir fry to be not academic enough to hold their interest. Alternatively participants may have enjoyed session one but have found session two ‘too academic’ to hold their interest for an optional non-credit bearing certificate. Once we have conducted a more thorough evaluation we may then amend the design for the next phase of the certificate.

The certificate was based completely online; overall the online format provided an interesting and flexible format with a lot of potential for active learning styles such as problem-based learning. A great deal of technical expertise was needed however to build and maintain the learning room. In addition a certain pedagogical approach different to in-person learning was needed to ensure effective engagement and learning. We utilised various means described in more detail in earlier sections to encourage engagement, a feeling of academic community and a ‘personal touch’ within the online setting such as discussion forums, videos, a support forum, twitter feed etc. For most students however online learning particularly a fully online course constitutes a new way of learning and in the next phase of the certificate we may look to provide regular ‘live’ tutorial sessions based online within the learning room and also some possible face-to-face sessions both of which may support further engagement and a greater sense of academic community. In addition we are looking to set up a Facebook page for participants so that they can continue to network and explore collaborative research and practice opportunities with other certificate participants.



The inclusion of the innovative assessment method of video stimulated debate with the project team in terms of the advantages and disadvantages of the method. Overall it was felt that such a method was appropriate as it was in keeping with the MOOC-style online format, encouraged parity of submission and assessment process particularly with the interdisciplinary nature of the certificate and would provide the participants with a unique addition to their CV. Anecdotal feedback suggests that the video format may have discouraged some participants from completing the certificate. With the understanding that this constitutes a new method of assessment for most if not all participants we are looking to introduce more support in addition to the current learning room guidance for future phases of the certificate e.g. online or in-person workshops on video production. We will also provide videos from previous participants as examples and may offer an alternative assessment method.

The student-as-co-creator model adopted within the certificate was a unique aspect of the curriculum design and one which will ensure that the certificate has a wider impact beyond the immediate participants and we look forward to the work of certificate participants being fed forward into future curriculum. The challenges we will encounter with this aspect of the project will likely include the transference of knowledge between disciplines in ways which are relevant to different subject areas and in keeping with the subjects being taught on the various courses. For each video or discussion forum idea which will be developed into teaching material, careful consideration will need to be given as to which course/module learning outcomes the video can support in terms of knowledge and skills and how to utilise the video most effectively to support these learning outcomes.

One unanticipated outcome of the certificate was that a few academic colleagues have asked if they can use material from the certificate for their future research and it might be that we can strengthen the links between the certificate and research in the future as this was not a feature by design in phase one of the project. A second emergent piece of work is that the cooking classes will continue, some in different formats and perhaps involving some community-based work again which constitutes a new direction for the project.

As alluded to, a formal evaluation will follow with staff and student participants and contributors and this will no doubt provide further ideas of how to improve and expand the project for future phases. It is considered that aspects of the project might be useful for adaptation and adoption at other institutions and we would welcome both discussion and collaboration with other institutions on this project.

Acknowledgments The authors would like to thank everyone who has contributed to the Sustainability in Practice Certificate in particular Professor Chris Pole, Grant Anderson, Laura Scott, Katie Wright, Charley Greening, James Lindsay, Seraphina Brown, Kelly Osborne, Amy Scoins, Kayleigh Smith, Trevor Welsh, Graham Thomas and the eLearning team from the NTU Centre for Academic Development and Quality and all the academics across the institution who researched and provided web links, supported the development of content and promoted the certificate to their students. We would also like to thank everyone involved in promoting and running the cooking classes in particular Beverley Lawe, Christine Walker, Fiona Dick and the Welcome Week reps.



References

- Barnett R (2000) Realizing the university in an age of supercomplexity. Open University Press, Buckingham
- Cortese AD (2003) The critical role of higher education in creating a sustainable future. *Plan High Educ* 31(3):15–22
- Djordjevic A, Cotton DRE (2011) Communicating the sustainability message in higher education institutions. *Int J Sustain High Educ* 12(4):381–394
- Drayson R et al. (2012) Student attitudes towards and skills for sustainable development. NUS/HEA. Available at http://www.heacademy.ac.uk/assets/documents/esd/Student_attitudes_towards_and_skills_for_sustainable_development.pdf. Accessed 8 Apr 2014
- Foresight (2011) The future of food and farming: final project report. The Government Office for Science, London. Available at <http://www.bis.gov.uk/assets/foresight/docs/food-and-farming/11-546-future-of-food-and-farming-report.pdf>. Accessed 24 July 2013
- Green League (2013) Full people and planet green league 2013 tables. Available at <http://peopleandplanet.org/green-league-2013/tables>. Accessed 8 Apr 2014
- Lacy P et al (2010) A new era of sustainability. U.N. Global Compact-Accenture CEO Study 2010. Available at http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_A_New_Era_of_Sustainability_CEO_Study.pdf. Accessed 24 July 2013
- Lozano R et al (2013) Declarations for sustainability in higher education: becoming better leaders, through addressing the university system. *J Clean Prod* 48:10–19
- McNamara KH (2010) Fostering sustainability in higher education: a mixed-methods study of transformative leadership and change strategies. *Environ Pract* 12(01):48–58
- Novak J (1998) Learning, creating and using knowledge: concept maps as tools to understand and facilitate the process in schools and corporations. Lawrence Erlbaum Associates, New Jersey
- Orr D (1994) Earth in mind: on education, environment, and the human prospect. Island Press, Washington, D.C
- Scott G et al (2012) Turnaround leadership for sustainability in higher education. Available at http://www.iau-hesd.net/sites/default/files/documents/le11_1978_scott_report_2012.pdf. Accessed 14 Jan 2014
- Sky (2011) The sustainable generation: the sky future leaders study, Dec 2011. Available at http://corporate.sky.com/documents/pdf/publications/2011/sky_future_leaders_study. Accessed 8 Apr 2014
- Stibbe A (2009) The handbook of sustainability literacy: skills for a changing world. Green Books, Totnes, UK
- Stubbs W, Schapper J (2011) Two approaches to curriculum development for educating for sustainability and CSR. *Int J Sustain High Educ* 12(3):259–268
- Winter J, Cotton D (2012) Making the hidden curriculum visible: sustainability literacy in higher education. *Environ Educ Res* 18(6):783–796

Authors Biography

Helen Puntha is a Research Officer in the Centre for Academic Development and Quality at Nottingham Trent University. Her current work is in the areas of research informed teaching, assessment and feedback and sustainability in the curriculum. She is Deputy Lead of the University's Food for Thought Green Academy (an HEA change programme) and is a Steering Group member for the British Conference of Undergraduate Research (BCUR).



Dr. Petra Molthan-Hill is Principal Lecturer in Business Sustainability at Nottingham Business School and as NBS Sustainability Coordinator responsible for embedding sustainability and business ethics into the curriculum of the business school. Currently she is leading the HEA Green Academy 'Food for Thought' Project for Nottingham Trent University developing teaching methods on how to embed sustainability into various disciplines from Business Studies through Medieval History to Astrophysics. Her main research interest has been experiential learning methods and the integration of sustainability into the curriculum but also the behaviour and sense-making of managers in cross-cultural comparisons.

Aldilla Dharmasmita has been teaching Undergraduates and Postgraduates in various modules, where sustainability has been fully embedded. She is also supervising students in Greenhouse Gas Management Consultancy Projects. Her research interests are applying Institutional Theories for comparative studies in Corporate Social Responsibility (CSR) and Sustainability. Currently, she also plays a key role in embedding and designing an innovative online pedagogy into the University's curriculum across all faculties (as part of an HEA initiative), the Sustainability in Practice Certificate.

Professor Eunice Simmons is the Dean of the School of Animals, Rural, and Environmental Science (ARES) at NTU. She has qualifications in Biology, Soil Science and Forestry plus a PGCE and two years' teaching experience in a rural comprehensive. Posts in five very different Universities have given Eunice expertise in maximising educational opportunities for students on every level and type of course.

Author Query Form

Book ID : 328200_1_En
Chapter No.: 3



Please ensure you fill out your response to the queries raised below and return this form along with your corrections

Dear Author

During the process of typesetting your chapter, the following queries have arisen. Please check your typeset proof carefully against the queries listed below and mark the necessary changes either directly on the proof/online grid or in the 'Author's response' area provided below

Query Refs.	Details Required	Author's Response
AQ1	Kindly confirm the corresponding author is correctly identified and amend if necessary.	
AQ2	There is a opening quotation mark after 'shape the upcoming United...'. Please clarify where the opening quotation mark should be.	

MARKED PROOF

Please correct and return this set

Please use the proof correction marks shown below for all alterations and corrections. If you wish to return your proof by fax you should ensure that all amendments are written clearly in dark ink and are made well within the page margins.

<i>Instruction to printer</i>	<i>Textual mark</i>	<i>Marginal mark</i>
Leave unchanged	... under matter to remain	Ⓟ
Insert in text the matter indicated in the margin	⧵	New matter followed by ⧵ or ⧵ [Ⓢ]
Delete	/ through single character, rule or underline or ⌵ through all characters to be deleted	⧶ or ⧶ [Ⓢ]
Substitute character or substitute part of one or more word(s)	/ through letter or ⌵ through characters	new character / or new characters /
Change to italics	— under matter to be changed	↵
Change to capitals	≡ under matter to be changed	≡
Change to small capitals	≡ under matter to be changed	≡
Change to bold type	~ under matter to be changed	~
Change to bold italic	≈ under matter to be changed	≈
Change to lower case	Encircle matter to be changed	≡
Change italic to upright type	(As above)	⧵
Change bold to non-bold type	(As above)	⧵
Insert 'superior' character	/ through character or ⧵ where required	Y or Y under character e.g. Y or Y
Insert 'inferior' character	(As above)	⧵ over character e.g. ⧵
Insert full stop	(As above)	⊙
Insert comma	(As above)	,
Insert single quotation marks	(As above)	Y or Y and/or Y or Y
Insert double quotation marks	(As above)	Y or Y and/or Y or Y
Insert hyphen	(As above)	⌵
Start new paragraph	⌵	⌵
No new paragraph	⌵	⌵
Transpose	⌵	⌵
Close up	linking ○ characters	○
Insert or substitute space between characters or words	/ through character or ⧵ where required	Y
Reduce space between characters or words		↑