
Scaling up the Woven Filigree: (un) Common Systemic Thinking to Embedding Sustainability into the Curriculum in a Large-Scale Higher Education Institution in the UK

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Abstract

Education for Sustainable Development (ESD) is taking a rich variety of shapes and forms around the globe depending on cultures, resources, and general contexts. In addition, there is a growing but relatively small amount of research and guidance on embedding sustainability into the formal curriculum at a whole institution level. However, some institutions are successfully developing case studies through exploratory approaches, led by emerging roles that vary greatly between institutions. This characteristic seems to be a reflection of the complexities of the ESD agenda in higher education. This paper reports on the “scaling up” of approaches towards embedding sustainability into the curriculum, from one faculty to a whole institution (Manchester Metropolitan University). It analyses the results and achievements of this approach including the potential influence on the ESD agenda in the UK through the National Union of Students (NUS) Responsible Futures Project. Finally, it discusses the role, profile and background of the ESD lead for the vertical and horizontal approaches in large-scale institutions.

Keywords

Higher education for sustainable development · Strategy · Practice · Case study · Environmental management system · Barriers

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1 Introduction

Manchester Metropolitan University (MMU) has a student population of more than 37,000 students of which 70 % remain in the North West of the UK after graduation. Additionally, 44 % of MMU's students come from low-income backgrounds. (MMU 2015) This presents a significant opportunity for MMU to contribute to the Education for Sustainable Development (ESD) skills, values and attitudes of the UK's North West population, because its graduates are likely to have considerable impact on the region's social, environmental and economic sustainability.

MMU has been working to include ESD into its Environmental Management System (EMS) (Tinker and Tzoulas 2015) through a policy area related to Teaching and Learning. The latest MMU's EcoCampus Audit report suggests that MMU is leading the way in this area compared to other universities, which are going through this audit. (Eco Campus 2015). Although teaching and learning might work differently from other policy areas such as waste management, there are several arguments to do so (Nicolaidis 2006). However, few Higher Education institutions are committed and actively pursuing environmental and social sustainability beyond operations and teaching and learning is behind campus management in Europe and the US in term environmental sustainability and social responsibility (James and Card 2012).

For these reasons, this is an area with great potential for development. For instance, the practices of other widely defined policy areas need to be adapted for Learning and Teaching. In addition, research and theory on ESD has the potential to underpin approaches to its integration in the curriculum (for example, Lozano 2010). In practice however, individual organisational circumstances and cultures shape the barriers (Sterling 2012; Lozano 2010) to embedding ESD due to its links to values in education.

One of the latest initiatives in this area at MMU is the National Union of Students (NUS) Responsible Futures Accreditation Mark (RF). The RF project is based on the fact that some 60 % of students have either agreed or strongly agreed with the statement 'Sustainable development is something which I would like to learn more about', with 85 % agreeing that 'Sustainable development is something which universities should actively incorporate and promote' (NUS 2015).

The NUS is a confederation of 600 student unions working on behalf of, and accounting for over 95 % of higher education unions in the United Kingdom. The union has a strong history in campaigning for social rights issues, and it has been committed voice for issues such as climate change and sustainable development for many years. In this time, the union has attempted to engage with students on these issues in a number of ways, not least through the recent Carbon Ambassador and Green Impact programmes (circa 2011–present).

The RF project has encouraged or supported the development of several new and established ESD projects related to the formal and informal curriculum, whilst evaluating the MMU approach to embedding ESD into the curriculum. The broad success of the MMU approach has a number of implications for the wider ESD

agenda in the United Kingdom. The NUS RF project, with criteria co-created by MMU and other institutions, has been shown to overcome many of the obstacles to ESD such as those identified by Sterling (2010), by conforming to the approaches put forward by Lozano (2012). An example of how the criteria have proved useful is demonstrated by the fact that the auditing process conducted by MMU students highlighted the fact that MMU's community engagement, although evidenced, was an area that could be improved, particularly in light of the institution's other significant achievements in ESD. If implemented nationally, this project has the ability to act as a framework to empower academic institutions to embed ESD across the institution by providing a broad strategic foundation on which initiatives can be developed.

This paper provides an overview of the process and structure of embedding ESD at MMU to date through appreciative enquiry and its evaluation through RF. This sees the ESD co-ordinator focus on asking questions, rather than seeking answers, in terms of the achievements and limitations of this process. The Paper achieves this around a framework of barriers to ESD integration, as identified by Sterling (2012), to illustrate how the approach may overcome such barriers. In doing so, the paper contributes to both wider ESD theory, and its practical application in higher and further education at a local and national level. It is worth acknowledging that this paper is not intended to be a full scientific research case study but a description of one example of the practice of embedding ESD in higher education and some of the complexities in this area.

2 Approach to Embedding ESD at MMU

In my role as ESD coordinator, I have facilitated the MMU approach to ESD. The ESD coordinator role had its origins as Sustainability Intern in the Art School. Early on in that role, I was tasked with developing an approach to embed sustainability into the Art School curriculum. This approach had three main strands (Shuttlewood and Vargas 2014).

1. Interviews with Programme Leaders and students.
2. Curriculum review through a full analysis of unit specifications.
3. The development of a sustainability forum with staff and student participation.

The success of this work saw the post develop into a central position in MMU as ESD co-ordinator where I have been applying a similar approach on a larger scale. Located centrally, the role has to be adapted to a different set of structures and cultures ranging from the subtle to explicit. For instance, diversity between and within faculties includes discipline-specific and organisational language, approaches to developing curriculum, to teaching and to working in general. In terms of curriculum design and development, some programme teams write programme specifications for a group of courses and others for one course, which raises a wide range of questions in terms of reviewing ESD related language in them.

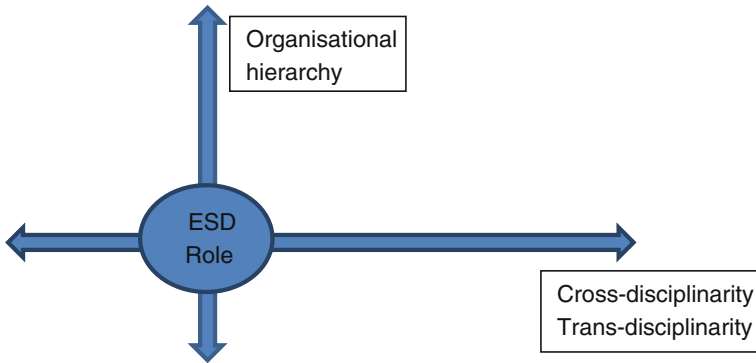


Fig. 1 ESD role in the vertical and horizontal approaches

To help overcome these issues MMU’s approach to embedding sustainability into the curriculum is being developed through the “vertical” and “horizontal” domains, which are working paths towards an institution-wide, collaborative-mixed (i.e. horizontal and vertical) approach that aims to adapt to the dynamic nature and diversity of the institution (see Fig. 1).

These two domains are supported by the Strategy for Learning Teaching and Assessment (CELT 2014) and the Environmental Sustainability Strategy (MMU Environment Team 2014) which addresses two themes: Teaching, Learning and Research; and Estates and Operations. This has allowed exploratory activity leading to systemic change within the institution.

Reciprocally supported by the ESD steering group (consisting of academics and non-academics with an interest or time allocation on ESD). I work as the linking point between the vertical and horizontal approach making this one of many instances of the university-wide collaboration. The ESD co-ordinator role is part of a partnership between the Environment Team, the Centre for Excellence in Learning and Teaching (CELT) (which provides education and advisory services to MMU faculties and staff) and the Faculty of Science and Engineering. The steering group is cross-institutional and includes staff and student representatives from all faculties in MMU.

3 The Vertical Approach

The vertical approach is about engaging different hierarchical levels using channels that include reporting through MMU’s governance structure (MMU Environment Team 2014). For instance, ESD activity and progress has been reported to the Estates and Services Advisory Group (ESAG), which is one of the committees and advisory groups established by the Board of Governors (Vargas and Prowse 2015). In addition, this activity has been reported to the Environmental Sustainability Board (ESB) and as ESD co-ordinator I have been invited to The Faculty Executive

Groups (FEG), whose membership includes Heads of Departments and Deans. Currently, the ESD steering group does not report to FEG. However, MMU is exploring which would be the best reporting structure through curriculum boards and groups.

4 The Horizontal Approach

The horizontal approach works on the principle of collaboration between different faculties and departments, including Estates and Central departments, such as CELT. This path provides a platform for links between different faculties or disciplines that otherwise would be unlikely to work together; in the process providing benefit to ESD work, improving the student experience, and facilitating a holistic view as to how their degree is related to authentic situation learning.

One example of successful collaboration between faculties emerged from attending the Sustainable and Ethical Enterprise Group (SEEG) and the Sustainability Research Network at MMU. Through these groups a Senior Lecturer in Fashion, Art School; a Principal Lecturer in Electrical & Electronics Engineering, Faculty of Science and Engineering and I developed a project to explore ways to bridge curriculum gaps in the area of sustainable production and consumption whilst addressing priorities for human development. The project named *Incorporating Sustainable Wool Processing using Engineering Solutions into the Academic Curriculum* won the 2nd European Award for Best Practices for the Integration of Sustainable Human Development (SHD) into Technology and Engineering Education (Fernando et al. 2014).

5 Supporting Initiatives and Framework

The MMU approach is strongly supported by a wide range of formal and informal Continuing Professional Development (CPD) activities, and by extra-curricular opportunities for students. These include: a curriculum review tool based on the Quality Assurance Agency's ESD Guidance (QAA 2014); bespoke workshops; and two accredited postgraduate units—*Education for Sustainable Development* and *Global Citizens, Global Learners*. Opportunities for students include support to develop projects and papers, workshop facilitating skills development and voluntary auditing work experience.

In addition, a number of research projects also support the development of the approach to embed ESD into the curriculum of MMU. Examples of this are a Society for Research into Higher Education (SRHE) Scoping Award: *The Potential of the Human Capabilities Approach (HCA) for strategy development in the Higher Education curriculum* and a Higher Education Academy (HEA) funded project: *Integrating strategic goals in the 21st century curriculum: creating a new resource*.

6 National Union of Student (NUS) Responsible Futures (RF) Project

The ambition for RF is to create an externally assessed accreditation mark for academic institutions that is desirable to them—rather than being viewed as bureaucratic or irrelevant (NUS 2015). This accreditation would assess universities on a whole-institution level, based on their approach to environmental and social responsibility, i.e. in line with the broader definitions of Sustainable Development,

Table 1 Overview of MMU's commitments, interventions and outcomes reported to RF, criteria adapted from NUS (2015)

Area	MMU's commitment/intervention/outcomes
1. Knowledge and understanding	Enrolment student surveys, NUS HEA local survey results, global citizenship survey staff and students, curriculum audit
2. Partnership	ESD steering group, SMART action plan, engagement of five key stakeholder groups, senior staff sponsor, graduate attributes, corporate strategy, L&T strategy, sustainability strategy, internal communication strategies
3. Policy and commitment	SU policy commitment, student officer (ESD), time allocation for academic staff, very diverse CPD offer, curriculum review tool based on QAA guidance (2014), HR processes, induction
4. Interventions	Internal events, external change programme, funding opportunities, collaboration between academic staff and estates, student coursework, courses about SD, interdisciplinary experiences for students (faculty, course, unit level), informal curriculum (MMU Futures 2015)
5. Leadership and outreach	Support other institutions on ESD, ESD in community outreach activities and present MMU's work at sector events
6. Progress and positive outcomes for staff and students	<ol style="list-style-type: none"> 1. Society for Research into Higher Education (SRHE) Scoping Award 2014 2. Higher Education Academy (HEA) Enhancement Programme 3. HEA Integrating strategic goals in the 21st century curriculum 4. (GDEE) European Award (Fernando et al. 2014) 5. Result of 100 % in Education for Sustainable Development criteria in the People and Planet Green League (2015), which contributed to MMU's 3rd place in this league 6. Eco campus gold Eco campus gold awarded to MMU in March 2015 7. Several blogs and emails from students about positive outcomes related to ESD 8. New degrees: BSc contemporary health and BA food business entrepreneurship

that include the triple bottom line issues of the Environment, Society and the Economy (Elkington 1997).

The whole-institution approach to RF sees the students' union working actively with the institution in a partnership, with the aim of delivering together positive change to both the institution, and to its students (Table 1).

The accreditation process of RF comprises approximately 36 pre-defined criteria in six main areas (Table 1), the completion of which would help facilitate and embed sustainability and social responsibility issues in the core business of participating institutions. These criteria were developed by a number of pilot institutions including MMU, in a series of workshops led by the NUS (2015). Ten of the criteria are mandatory in nature, whilst the rest are optional. In addition there is a number of open criteria where the institution is able to include activities it may have conducted and seen as relevant to RF, but that did not fit into any of the criteria.

Rather than being conducted by an NUS representative, the RF project sees students recruited by the institutions and trained as NUS auditors (under the guidance of an NUS member of staff). Following the audit, members reported to the institution their findings, followed by an additional report from the NUS on the audit outcomes, and any recommendations that could be made (NUS 2015).

7 ESD Role: Profile and Background

In some higher education institutions, an ESD role similar to the one introduced above is emerging. In MMU, in the role of ESD co-ordinator, I lead the approach to embed ESD into the curriculum as well as the Teaching and Learning policy area within the EMS—developed around the EcoCampus framework towards ISO14001 accreditation (Tinker and Tzoulas 2015). From discussing such role with the pilot institutions working to develop and gain RF (NUS 2015), it seems that such role varies greatly from one institution to another across the UK and these variations occur at different levels. At a very basic level, the ESD role can be part time or full time. The role sometimes sits in the students' union, however in other cases it sits centrally in the institution, in the academic services or estates department. The staff in this role also vary from early career professionals to experienced academics. The focus of the role too may vary; some roles may have a stronger focus on social responsibility, others on environmental sustainability and others having a holistic ESD spectrum goal.

Firstly, this role brings the possibility of uncertainty, because it is not yet an established role in higher education institutions. In MMU, I face the challenge of working through a structure that is not yet fully defined, due to the fact that this is an emerging field. The benefit of this uncertainty is that it allows me, my managers and less directly the staff interacting with the role to shape it and develop it. We would argue that if the role is not linked to academic development when becoming mainstream, it risks becoming more prescriptive which may reduce our ability to develop an adaptive approach.

Secondly, as the role needs to move with ease between the horizontal and vertical axes, or domains, (see Fig. 1) to develop the MMU's approach presented earlier in the paper of this paper, the profile of my role in MMU needs to address the following in each domain:

1. Horizontal domain within the mixed approach:

I engage with different disciplines through multidisciplinary initiatives, with the view of developing 'transdisciplinarity' (Max-Neef 2005). In order to do this, the role develops or requires flexibility and the ability to provide impromptu ideas on how to embed ESD into a wide range of situations and initiatives.

2. Vertical domain within the mixed approach:

I also encourage ESD activity and support groups and individuals at various hierarchical levels in the university's structure, with the view of exploring multiple levels of engagement. In order to do this, I need to be able to engage different audiences, and some cases to use subtle influencing skills.

I have the ability to report and communicate directly with senior decision makers, but at the same time be able to work with the silos as in an approachable, collaborative way that is empathetic to their own needs and concerns. Doing so has helped to start establishing trust towards the co-ordinator, and thus 'buy-in' to the ESD agenda; these are two important objectives for any individual looking to implement change in an organisation (Neyland 2008).

Finally, my role at MMU needs to adapt to institutional changes working in an aspirational and adaptive, rather than prescriptive way. For instance, attitudes towards values might change over time amongst individuals, requiring me to manage these changes by asking appropriate questions to develop ESD from a culture of values.

Although several post holders in equivalent roles across the UK in this area have a scientific background, and I do not, the analysis above suggests that some key requirements for my role may be creativity, adaptability, autonomy and engagement.

8 Achievements of the MMU Approach

Despite a number of barriers to embedding ESD in academic institutions (see for example Sterling 2012; Lozano 2010), and to achieving organisational change in general (see Nonaka 1996), the work thus far described in this paper can be considered a success on a number of levels. Organisational change is widely regarded in the literature as a complex and difficult thing to achieve requiring buy-in at senior levels, cross-organisational commitment, and a general high level of awareness about the issues at the root of the change sought (Nonaka 1996). MMU's approach to ESD can be seen as successful in this regard in that the ESD role, with vertical and horizontal flexibility, has empowered me, as coordinator, to communicate at high levels within the organisation.

Lozano (2010) identified a list of barriers (reference) and recommend seven ways in which they might be overcome. Table 1 illustrates how the MMU approach was able to apply these solutions (Table 2).

Table 2 How barriers to ESD may be overcome (adapted from Lozano 2010)

Potential solution	MMU performance
Prioritising teaching of SD concepts	SD concepts being embedded into curricula across the institution, albeit this is typically as a bolt-on to existing course material, rather than becoming a central aspect within each curriculum
Incremental implementation of SD	Rather than demanding that sustainable development principles be deeply embedded into course curricula as a one off exercise, the process has been incrementally focused to ensure that participants find the processes less overwhelming and have the flexibility to adapt and develop it on their own terms
Utilising multiplier effect from first steps	The MMU approach has seen the initial-incrementally focused steps to ESD set the groundwork for further achievements to follow. For example, a project by Fernando et al. (2014) on human and sustainable development led to further projects including a 'wool-counter' device that resulted in an academic paper. Additionally, a range of extra-curricular activities [i.e. the MMU Futures scheme (MMU 2015)], and subliminal and informal curricula (Fig. 2) (such as communication and engagement strategies) help to raise the awareness of ESD in 'soft-touch' ways
Intertwining sustainability in regular courses	At MMU sustainable development principles are starting to become embedded into courses traditionally not associated with such issues. This is well demonstrated in the Business School, where students take part in a sustainable business module that complements other modules rooted in more traditional neo-classical economic theories (Tomer 2002). The idea being to educate students on the failings of the neo-classical economics, and how capitalism can be a force for good by internalising externalities such as the environment. The example of the Business School's Sustainable Business module is an example of this
Staff promotion or top-down managerialism	Vertical approach provides top-down facilitation of ESD
Tailor ESD to the nature of each specific course	ESD principles are being embedded on a course-by-course basis to ensure that the materials covered are relevant to the taught material
Using leverage from top management	Vertical approach provides top-down facilitation of ESD to individual departments, facilitated through the institutions overarching corporate and sustainable strategies

9 Limitations and Critique of the MMU Approach and Evaluation

MMU's approach to ESD has been assessed externally through the RF project ran by the NUS. This has seen MMU become accredited through the project for their engagement with ESD. However, a number of limitations to the approach can be observed, through which MMU may be able to improve their ESD approach. From a curriculum perspective, embedding ESD as a 'bolt-on' to the established course material has proved successful in light of the knowledge and resources (particularly time) made available to the ESD coordinator, whilst also facilitating buy-in from course leaders and mitigating the concern that their course and established materials are under threat. From a purely sustainable development perspective however, it could be argued that this approach is not fully efficient as sustainability issues are more likely to be considered as subsidiary to the wider subject matter. For example, if over-consumption is the primary threat to the sustainable development of society (Monbiot 2007; Porritt 2007; Meadows et al. 1972), then it can be argued that this should be a central component in academic fields such as marketing—which are often focused at maximising consumption in the search for enhanced profits (see Tye 2002).

Implementing such initiatives is however limited by the fact that I, as ESD coordinator, have a lack of knowledge regarding the specificities of all courses taught at MMU and certainly how these relate to the often-abstract theories of sustainable development. This is not a critique of my particular capabilities, but rather an observation that it is unlikely that any individual would hold such high-level understanding of such a range of interdisciplinary issues as required for this kind of cross-institutional role. Overcoming this obstacle could be facilitated by having a local coordinator in each department of the university. Such a role would be able to specialise in the pertinent theories within each course, and act as the facilitator of ESD into the curricula as required. This too however could be limited by the fact that as ESD is a relatively nascent field engaging with more established fields, existing knowledge regarding ESD within these departments may be limited. A solution could be for each department to individually recruit staff to new roles rooted in both the sustainable development and standard course literature, with this person acting as lecturer, researcher, and ESD coordinator. The university is aware of the benefits of this approach and they form part the long term plan for the institution, however implementing such ideas is difficult due to barriers of finding such skilled employees, and obtaining the necessary funds.

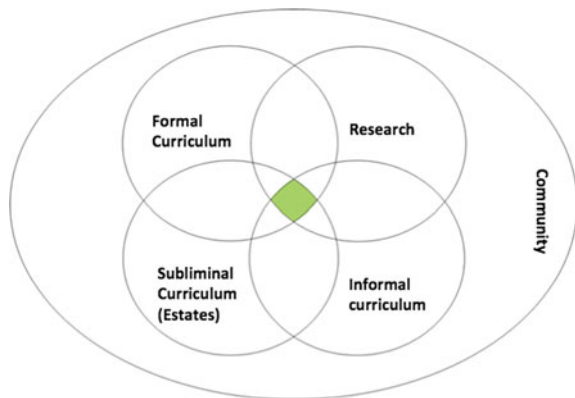
It should be noted that the MMU Board of Governors has no direct ability to communicate downstream to the individual faculties and other disparate groups of the institution. As ESD coordinator I function in this gap (in terms of vertical flexibility), however the level of engagement I have in this respect is limited. This could be addressed by increasing the seniority of the coordinator role, which would also respond to a further critique of the approach in that the ESD co-ordinator does not have the power of senior management to actively impose the sustainable

development agenda across the institution. Whilst my horizontal and vertical flexibility to move around the institution acts in a way to overcome this problem, it is likely that an ESD role with more executive power would have enhanced efforts to embed ESD initiatives into the institution. However, this would warrant testing as it runs the risk of disconnecting the co-ordinator from the individual departments. By acting as an intermediary between senior management and the silos, the coordinator has the ability to apply a ‘soft-touch’ approach to implement ESD within the institution.

Additionally, the ESD approach taken by MMU to date is somewhat short-term in nature, in that the contract of the coordinator is only on a short-term basis, coupled with an overall short-term strategy towards ESD by the university. A longer term ESD coordinator appointment would allow for longer term projects, and to help facilitate longer term strategies with greater reward potential. This could include, for example, ensuring that ESD at MMU includes the formal and informal curriculum, the subliminal curriculum (i.e. subconscious learning from the campus), and research, and that these are able to facilitate direct impacts within the local community, as illustrated in Fig. 2.

Engaging in this way could be particularly important in light of the fact that a further critique of the current MMU approach regards the institution’s engagement with the local community. This is not to say that the university has neglected such groups, indeed, several successes have been achieved; not least working with Manchester City Council and local businesses on a carbon literacy project, and a number of smaller scale initiatives. Longer-term ownership and strategy of ESD within the institution would enable projects with more outreach to be implemented, for example application of a Living Lab framework (Niitamo et al. 2006), that would enable more holistic projects that have the ability to bring together the student body, researchers, academics, and local community groups.

Fig. 2 Student experience domains, adapted from Willmore and Tweddell (2015)



10 Conclusion

The work described has broadly been a success, bringing together the many dispersed efforts of the institution to embed ESD principles throughout the university in a single holistic approach.

The vertical and horizontal approach has helped to facilitate clear and visible change across the institution, empowering me as ESD co-ordinator to report to the Board of Governors, and to support the individual departments across the university. In doing so, these independent groups are brought together in such a way that wider implementation of ESD principles is beginning to be achieved. The vertical approach is limited in its ability to communicate between faculties, and in terms of reporting down from the Board to these faculties—but in the context of a short-term project, this is understandable.

A longer-term strategic approach and vision for ESD would see the linkages between the Board of Governors and the individual faculties strengthened, facilitated by the coordinator. Long-term strategic direction and visioning can be considered an essential process of an organisation's success and so the lack of such a long-term vision can be viewed as something of a failing of the MMU approach to date, despite its evident commitment to tackling the ESD agenda.

The limited seniority of ESD role has been judged as one of the main contributing factors to the role's overall success. It gives flexibility for academics to lead and shape their projects in the most appropriate way for them. Working in this way, combined with vertical and horizontal flexibility, has enabled the co-ordinator to act as a facilitator between senior management and lower level groups.

One of the key elements of a long-term strategy might be the Living Lab Framework (Niitamo et al. 2006); a project designed to link different parts of the institution together in such a way that the campus becomes a living laboratory in which innovation and ESD principles may be implemented and tested together. Discussions are currently in place to link this type of work with both MMU and Manchester University, and could include the businesses that exist between the two, potentially along the proposed Oxford Road Green Corridor into central Manchester city centre (Corridor Manchester 2015). Doing so would not only bring together the different faculties in each institution (potentially improving the student experience), but it would also facilitate cross-institutional working, with direct benefit to both the local community and the local environment.

The progress made by MMU with ESD is the start of a journey, in which many successes have been achieved. There is however a long way to go towards achieving the university's vision for ESD, by seeing it fully embedded in all activities in the institution; from the curriculum it teaches, the research it undertakes, and to the central processes that underlie everything it does.

The approach taken by MMU, the governance structure and the ESD role are replicable to other higher education institutions across the UK and potentially in other countries. However, due to barriers of the culture of each institution these need adaptation in terms of the subtleties and the practicalities of the approach.

Finally, as a nascent field that is still under development, and in the nature of collaboration and shared learning, we welcome and encourage feedback regarding this article, and the MMU approach to ESD described above. In addition, I, as ESD Co-ordinator and MMU as an institution are interested in making links and embedding ESD through partnerships and knowledge exchange. All ESD resources are publicly available for other institutions to use them within their own context. If you would like to share your feedback or get further understanding of the details of this approach—the woven filigree—please feel free to contact the authors using the contact details provided.

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Author Biographies

Valeria Vargas is ESD Co-ordinator at Manchester Metropolitan University and she leads the Environmental Management System policy area on ESD (teaching and learning), which includes the approach to embedding ESD into the curriculum. Valeria has a multi-disciplinary background and explores transdisciplinarity daily. She explores arts based research, action research, autoethnography and case studies as methods to address ESD in different contexts and through subtle approaches.

Graeme Heyes is a PhD student at Metropolitan University, conducting research in sustainable business model innovation, with a range of experience in sustainability, having working in a number of corporate roles in the past before returning to education in 2012. This includes working as the Environmental Manager at Keep Britain Tidy. Graeme has a keen interest in the sustainable development conversation, both in terms of the corporate approach to this challenge, and to how such concepts may be embedded in the education sector.