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Identifying Assessment Opportunities in Postgraduate Learning for Sustainability

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Abstract

This paper offers a rationale for how ESD related learning at postgraduate level can be assessed. It proposes a framework for evaluating whether assessments in Master's level programmes align with the pedagogical approach of Education for Sustainable Development (ESD). If assessment is to contribute to the overall learning process, then the nature of the assessment should reflect the pedagogy, values and principles associated with ESD. Utilising an Appreciative Inquiry model, existing models of competences for sustainable development have been used to develop the framework. The framework is not aimed at the performance of the students; rather, it is applied to the course itself to identify if assessment opportunities are in keeping with an ESD approach. The framework is applied to three examples from Master's programmes, with which the authors are affiliated in England and Jamaica. The findings identify key characteristics that should feature in assessing learning for sustainability. The framework enabled the authors to gauge the extent to which their assessment regimes are in line with the aims, purpose and content of their programmes. While the examples cited are from the field of education, the framework can be applied to any Master's programmes containing elements of sustainable development.

Key words: education for sustainable development, Master's courses assessment, competences, pedagogy, postgraduate learning, higher education

Introduction

In response to the pressing need to protect the well-being of people and planet, there have been numerous high-level calls to promote education for sustainable development (ESD), not least by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2004 & 2017). The broad aims of ESD are to benefit social, economic and ecological well-being by engaging and equipping learners to respond to multiple

crises as ‘global citizens’ (Sterling, 2011a). Indeed, the United Nations’ Sustainable Development Goals’ (SDGs) Goal 4, Target 4.7 states:

By 2030 ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development... (UNESCO, 2017).

International declarations notwithstanding, there are multiple barriers to implementing ESD, not least at the postgraduate level, which is the focus of the authors’ work. A lack of clarity around ESD stems fundamentally from the contested nature of sustainable development (SD) itself. Various explorations into the theoretical roots of SD (Kidd, 1992; Grober, 2012; Purvis et al., 2019), while highlighting the tensions between the two halves of this compound concept, do not resolve the issue. It is unsurprising therefore that subsequent iterations of the term have been described as a *sustainababble* (Worldwatch Institute, 2013); this highlights the need for clear guidance in determining the extent to which sustainability is being addressed adequately at postgraduate level.

ESD itself emerged over the course of the 1990s, yet despite international declarations and even a UN Decade for ESD, 2005-14 (UNESCO, 2004) progress has not been straightforward:

ESD has struggled to gain wide acceptance within formal education systems, partly through a lack of clarity, possibly through a tendency to proselytise, and certainly through its misalignment with current educational priorities (Scott & Vare, 2020, p. 142).

While concerns persist around the exact meaning of ESD; the concept is claimed to have the capacity ‘to restructure development thinking and practice around the world’ (Manteaw, 2020, p. 16). As educators with a concern for the role of higher education, the authors have sought to reflect on the barriers that they face in their efforts to infuse ESD into postgraduate programmes and how best to address these.

We recognise that the point at which learning programmes achieve the greatest clarity in terms of what they are *for*, lies in their statements of learning outcomes, i.e. those features or attributes which will be assessed. If change is to be expected, then greater clarity around assessment will be demanded. We also acknowledge that in a crowded curriculum, aspects of student learning that are not assessed, are unlikely to be the focus of tutors or their learners.

Within ESD research literature there is a clear focus on pedagogical approaches (Lozano et al., 2017; Ayers et al., 2020) and on integrating sustainability learning outcomes in higher education curricula (Buckley & Michel, 2020). There have even been efforts to assess the financial sustainability of Master’s level programmes for the students enrolling on them (Maragakis et al., 2016). Less attention however, is paid to the assessment of learning related to sustainability in higher education generally, and in postgraduate programmes in particular. Barth and Rieckmann (2016) found that less than six percent from a sample of over 500 articles on ESD were concerned with assessment. One noteworthy example that does consider assessment is the proposal for a ‘sustainability learning performance framework’ (Ofei-Manu & Didham, 2018). This provides a useful range of indicators for assessing quality ESD globally rather than focusing on the particular context of postgraduate education. This paper therefore focuses on defining an assessment framework that can be applied to postgraduate programmes in order to

assess the extent to which any such programme is likely to contribute to learning for sustainability. To achieve this, the authors engaged in a process of appreciative inquiry (Bushe, 2013; Kung, Giles, & Haban, 2013) involving a number of colleagues, principally during a two-day workshop held at The University of the West Indies in Jamaica.

What follows this introductory section is an exploration of key issues concerning ESD and assessment. The methodological approach – that of appreciative inquiry, is then outlined before presenting the assessment framework that emerged from this work. We go on to describe how the utility of this framework was tested by applying it to elements of the authors' own Master's level work: two complete Master's degree programmes in the UK and Jamaica and one module in the UK. The paper ends with a discussion of the outcomes of the application of the framework, and the implications for theory, practice, and research.

An ESD Approach to Teaching and Learning

The section of society that benefits from higher education, particularly those who graduate from Master's programmes, tend to occupy significant decision-making roles in their professional careers. Roorda and Rachelson (2018) recognise that this confers a unique role on higher education, in terms of responding to the ecological crises facing society, by developing 'sustainably competent professionals'. While this may appear self-evident, there are significant challenges to reaching a position where higher education actually develops such graduates across all professions.

The most highly credentialed members of society certainly influence its direction – but not always for the better, as David Orr has observed:

...many things on which your future health and prosperity depend are in dire jeopardy ... this is not the work of ignorant people. It is, rather, largely the result of work by people with BAs, BSs, LLBs, MBAs and PhDs (Orr, 1991, p. 52).

For Orr, more of the same education cannot address the issues society faces, it requires a major shift in the type of education offered, an argument consistently advocated by Stephen Sterling through his call for a re-orientation of education (Sterling, 2001, 2004 & 2015). If the assessment of learning is an integral part of the learning process, as we argue, then the assessment process needs to be a part of this re-orientation.

The challenge of achieving such a change, which could result in developing sustainably competent professionals, is further complicated by the fact that ESD is a contested field. This is in part due to the on-going debates around the process of sustainable development and the goal of sustainability as alluded to in our introduction. Many of these debates are linked to the relationship between context and sustainability, for example, what is deemed sustainable in one context may be considered unsustainable in another. Differing views on sustainability add to the complexity of implementing it within higher education but, as Corcoran and Wals (2004) recognise:

...the multiple meaning of sustainability is not a weakness but a strength. The fact that it is ill-defined allows people to give it their own meaning as is appropriate for their own context. The process of giving meaning within a context is meaningful learning. Clearly there are different imaginable educational responses to sustainability (Corcoran & Wals, 2004, p. 91).

In their review of learning outcomes related to sustainability in higher education institutions in the United States, Buckley and Michel (2020) recognise the need for specific sustainability learning outcomes to be developed that are relevant to the institution and the course, but importantly they suggest that these are underpinned in each institution by “what pedagogical beliefs about learning for sustainability drive approaches to teaching and learning for sustainability” (Buckley & Michel, 2020, p. 214).

How these sustainability learning outcomes are assessed is another aspect of ESD that is suffering from the relative newness of the field according to Ayers et al. (2020), as they point to a tendency for the development of assessment tools for measuring sustainability outcomes to be an ‘apparent afterthought’. In contrast, Ayers et al. (2020) provide a specific example from a Master’s programme in Strategic Leadership towards Sustainability of how a pedagogy can be linked to a form of assessment. They demonstrate how two reflective learning tools were successful in enabling students’ self-assessment of their own learning.

The assessment framework developed in this paper does not include specific assessment tools for students, rather it is formulated from an ESD approach to learning for sustainability and is designed to be used by tutors to identify assessment opportunities relevant to the context of the course. This makes the proposed framework applicable to postgraduate programmes across different geographical and disciplinary contexts.

An ESD approach can be adopted by any Master’s programme, regardless of disciplinary specialism. This is not about developing practitioners in *education* for sustainable development although this may be the case for specialist programmes, rather it is concerned with embedding sustainable development learning outcomes into the professional practice of graduates from a wide variety of disciplines. Enabling graduates to acquire agency to contribute to change towards sustainability, seeks to address Orr’s (1991) concerns cited above; this is as vital as ever given that, three decades later, we appear to have made limited progress:

...we know little about how to meaningfully teach sustainability-related subject matter to higher education students such that they will apply it in their roles as citizens (Michel, 2020, p. 7).

The history of the term ‘ESD’ can be traced back to the emergence of sustainable development (WCED, 1987) with different iterations such as Sustainable Development Education (SDE), Education for Sustainability (EfS) and Learning for Sustainability (LfS) having varying emphases. However, the philosophies and the pedagogical traditions upon which ESD is based go back much further. In the UK, ESD has drawn heavily on environmental education (EE) and development education (DE) while in Jamaica, ESD follows a longstanding emphasis on EE, which was integrated into the formal education system in the 1980s (Collins-Figueroa et al., 2008). The importance of EE in supporting sustainable development led to the development of environmental education for sustainable development (EESD) and the National Environmental Education Action Plan for Sustainable Development (Collins-Figueroa et al., 2008; Down, 2006). The United Nations Decade of ESD, 2005–2014 intensified the mainstreaming of ESD into aspects of formal education in Jamaica (Down, 2006; Down & Nurse, 2007). Meanwhile in the UK, following the devolution of education in 1999, diverse policy initiatives have occurred in the jurisdictions of England, Northern Ireland, Scotland and Wales aimed at embedding ESD in mainstream education (Martin et al., 2014).

Competences and ESD

While learning programmes have identified common skills, attitudes and values related to ESD, identifying knowledge statements is more challenging. Traditional subject-specific knowledge domains conflict with the concept of ESD for several reasons. Supporting students' understanding of the interconnected and complex nature of the world requires a transdisciplinary, or at least, a multidisciplinary approach as well as systems thinking alongside the specialist or reductionist thinking that has tended to dominate formal education (Meadows, 2009; QAA, 2020). In addition, knowledge is seen as emergent rather than absolute in many models of ESD.

In a recent consultation document the UK Quality Assurance Agency for Higher Education set out a broad vision of the coherence required by an ESD approach:

ESD requires constructively aligned teaching, learning and assessment activities designed to meet key SD competencies and learning outcomes. It should provide learning experiences that transform the ways of thinking and practising, empowering students to become informed advocates of SD (QAA, 2020, p. 17).

The rise of frameworks of competences and learning outcomes in both sustainable development and ESD has helped to identify key characteristics that have the potential to be applied in different contexts. A competence is defined as the dynamic combination of knowledge, skills, attitudes and values brought to bear on making decisions and performing tasks (CEDEFOP, 2008; Rieckmann, 2012; Wiek et al., 2015; QAA, 2020). This reflects the active, participatory aspects of ESD and sustainable development and suggests the application – not just acquisition – of learning. This is highlighted by Bourn (2018) when looking at global skills for graduates:

It is this functional element that underlies much of the discussion on competencies, bringing together knowledge, skills and values and how to apply them (Bourn, 2018, p. 53).

Bourn goes on to emphasise that competences involve the application of learning with 'an underlying agenda', which is something we return to below in relation to assessing the motivation for learning. This view of competences relates to the role of ESD in respect of learners gaining agency from their learning, empowering them to become agents for change towards a more sustainable world. More specifically this is defined by the United Nations' SDGs (United Nations, 2015) with UNESCO (2017) outlining related learning objectives.

There is a view that competences and learning outcomes are generally learned rather than taught (Vare et al., 2019). The teacher creates the learning opportunities, but cannot dictate the outcomes in advance. This view is also commensurate with an ESD approach in which the teacher is seen as accompanying the learner, guiding and facilitating their learning, rather than simply delivering a one-way communication of factual knowledge.

While a diverse number of frameworks have emerged in the field of ESD (Strachan, 2012), a recent research project called A Rounder Sense of Purpose (RSP) has identified key elements that an ESD approach brings to an education programme (Vare et al., 2019). The RSP project set out to create a more succinct formulation of an earlier

competence framework (UNECE, 2011) reducing the number of competences down from 39 to 12 (Table 1) while retaining UNECE's three 'essential characteristics of ESD':

- *A holistic approach* – seeking integrative thinking and practice;
- *Envisioning change* – exploring alternative futures, learning from the past and inspiring engagement in the present;
- *Achieving transformation* – changing the way people learn and the systems that support learning (see: <https://www.aroundersenseofpurpose.eu>).

Table 1

RSP Framework

	Thinking holistically	Envisioning change	Achieving transformation
Integration	Systems	Futures	Participation
Involvement	Attentiveness	Empathy	Values
Practice	Transdisciplinary	Creativity	Action
Reflection	Criticality	Responsibility	Decisiveness

Due to the close link between ESD and sustainable development, these essential characteristics and competences for ESD overlap considerably with frameworks for sustainable development competences and learning outcomes in higher education. Rieckmann (2018) synthesises some of the existing frameworks including five key competences for sustainable development in higher education identified by Wiek et al. (2015). Rieckmann's final list, which has been adopted by UNESCO and is also presented in QAA (2020), comprises:

- *Systems thinking competency*;
- *Anticipatory competency*;
- *Normative competency*;
- *Strategic competency*;
- *Collaboration competency*;
- *Critical thinking competency*;
- *Self-awareness competency*;
- *Integrated problem-solving competency* (Rieckmann, 2018, p. 45).

While the purpose of these frameworks is to focus on essential characteristics of learning associated with sustainable development, they also reflect characteristics associated with 'quality education'. Hence the debate around ESD has raised questions as to whether ESD is simply a version of good quality education. This has been addressed in research by Laurie, Nonoyama-Tarumi and McKeown (2016), Pigozzi (2007) and by Rieckmann who argues '*ESD should be seen as an integral part of quality education and lifelong learning*' (Rieckmann, 2018, p. 39). ESD and quality education both reference transformative learning with the implication that when education attempts to be transformative in nature it is of a higher quality. Transformative learning as described by Mezirow (2000) has featured prominently in the ESD discourse on re-orienting education over a number of years (Sterling, 2001, 2011b & 2014). The connection between a deeper level of learning and transformative learning is summarised by Sterling as follows:

Learning can entail progressively deeper levels of engagement between simple learning such as of factual content and higher orders of learning which involve deeper reflection and can be transformative, involving change of personal frame of reference or worldview (Sterling, 2014, p. 91).

Transformative learning is concerned with change, which is central to ESD's notion of building agency for change towards sustainability. All change is not necessarily transformative and it could be argued that transformation is an unnecessarily high bar, but as Sterling points out, "[t]here is no change without learning and no learning without change" (Sterling, 2015, p. 91).

Aspects of ESD, such as systems thinking, empathy, participation and action can be employed as effectively for unsustainability as well as sustainability. What determines the direction of any particular transformation or change is the motivation behind the application of the learning, which as Rieckmann highlights, is due to the values held by the learner:

However, while competences describe the capacity or disposition to act to address complex challenges, they do not necessarily imply that an individual will act in a certain way in a specific situation. Hence, to transform capacities into real sustainable actions, individuals need corresponding values and motivational drivers (Rieckmann, 2018, p. 45).

While all education brings change, it is the motivation for, and direction of, this change that makes it ESD, or not.

Motivational drivers, ultimately determined by the learner, play a crucial role in the achievement of any competence or learning outcome and are thus a key factor in determining whether an activity designed to be transformative will actually achieve that outcome. Transformation cannot be guaranteed; learners' personal frames of reference may be re-affirmed or changed. Assessments that enable learners to reflect on their motivational drivers may provide a step towards deeper learning, personal development and change. The intention is to link learners' values to the knowledge and skills they apply through their chosen professional field in order to contribute to a sustainable future. As Buckley and Michel (2020) identify, the disposition of students toward sustainability related issues is an integral aspect of their learning along with knowledge of key concepts and skills.

This approach is reflected in the work of Roorda and Rachelson (2018) who developed a framework of six competences that are additional to, but sit alongside, discipline specific competences in order to develop the kind of professional needed across all disciplines to address multiple sustainability crises. Entitled RESFIA+D, the areas of competence are: Responsibility, Emotional Intelligence, System Orientation, Future Orientation, Personal Involvement and Action Skills. The '+D' refers to the relevant disciplinary skills of the professional concerned.

These models of ESD and sustainable development inform our subsequent work on the development of a framework for tutors specifically for embedding assessment for learning into Master's level learning.

Considering Assessment

Simply put, assessments are activities that require student engagement to complete individual or group exercises, the outcomes of which are placed under judgement that contributes to certification (Ashwin et al., 2015). Formative assessments aim to improve student performance by providing on-going assessment and are used to empower students as self-regulated learners (Nicol & Macfarlane-Dick, 2006; Ayers et al., 2020). Summative assessment indicates student performance after a programme but “can be learning-oriented when, for example, it encourages deep, rather than surface, approaches to learning and when it promotes a high level of cognitive engagement consistently over the duration of a module” (Carless, 2015, p. 964). Assessments are not only useful to students but can (and should) be used by educators to monitor and improve teaching practices. These two approaches to assessment may also be symbiotic in that summative assessments can offer opportunities for a number of different formative assessment strategies and learners can use formative feedback to prepare for summative assessments (Sambell, 2016).

Institutionally there may be resistance to changing an assessment culture from an emphasis on measurement to one of learning (Bloxham, 2016; Sambell et al., 2012). A study conducted to explore the views of assessment design by new academics found that not only do assessment practices often lack sophistication but there is very little incentive to innovate (Norton et al., 2013). Yet it is argued that learner assessments should promote and enhance learning (Sambell et al., 2012; Carless, 2015), which is essential if universities are to develop sustainably competent professionals.

According to Carless (2015) a learning-oriented assessment approach that aims to uncover the potential in ‘develop[ing] productive student learning processes’ (p. 964) with the primary focus on promoting learning, should also aim to inform theory and practice. This approach has three core principles: assessment task, self-evaluation and feedback engagement. These form part of the ‘inter-relational’ core elements of student learning. Such learning-oriented assessment approaches arguably complement sustainability pedagogies, which are broadly defined as student-centred with interactive enquiry-based approaches (Sterling, 2004).

Another dimension to consider is, “designing assessment *for* learning, rather than assessment *of* learning, [which] shifts the emphasis from a summative judgement of a students’ performance to a formative process of improving learning” (Ashwin et al., 2015, p. 144). An exciting aspect of this approach is the move away from the traditional balance of power between the educator and learner towards a more collaborative partnership of learning (Sambell, 2016). Assessment for learning complements ESD because a key principle of both is the reciprocity of learning between the learner and educator. It is widely accepted that ‘sustainability education requires active, participative and experiential learning methods that engage the learner and make a real difference to the learner’s understanding, thinking and ability to act’ (Sterling, 2011, p. 36). Consequently, ESD assessment practices need to strike the right balance between measuring performance and promoting learning while providing a ‘landscape’ for learners (and educators) to realise potential for transformational learning. Proposing an ESD assessment framework that empower tutors to evaluate the extent to which assessments align to ESD pedagogy increases the possibility to transform assessments practices.

Methodological Approach

In seeking to explore the alignment between assessment and ESD, the authors applied an Appreciative Inquiry (AI) framework. Appreciative Inquiry has been described as:

...a method for studying and changing social systems (groups, organisations, and communities) that advocates collective inquiry into the best of what is in order to imagine what could be followed by collective design of a desired future state that is compelling and thus, does not require the use of incentives, coercion or persuasion for planned change to occur (Bushe, 2013, p. 1).

Kung, Giles, and Haban (2013) describe it as a “strengths-based research approach” which emerged “as an alternative to traditional organizational development models” which “seeks to identify positive elements of the immediate social world in terms of what is working or what appears to be causing a sense of life” (p. 29). Initial principles underlying AI propose that inquiry should commence with appreciation, be collaborative, provocative, and applicable (Bushe, 2012 & 2013; Bushe & Kassam, 2005; Kung, Giles, & Hagan, 2013). These principles form the basis for the 4-D approach (Bushe, 2013; Kung, Giles, & Hagan, 2013):

- Discovery – participants reflect on and discuss what is best concerning the focus of inquiry;
- Dream – visioning, where groups, organisations or communities imagine their best in relation to the focus of inquiry;
- Design – focused on the development of concrete proposals for a new organisational state;
- Destiny – where commitments are expressed to take action on the design stage elements.

This model formed the basis for the approach to the development and application of our ESD assessment framework. The Discovery stage involved a webinar in May 2018 between two of the institutions – The University of the West Indies (Jamaica) and London South Bank University (England) – on meaningful assessment for Masters’ level students in ESD and the barriers to this at the higher education level. Thus, ‘assessment for sustainability learning’ was our ‘affirmative topic’ (Bushe, 2013) or focus of inquiry. This webinar included three academic faculty members with ESD expertise – two from London South Bank University and one from The University of the West Indies – alongside two other academic faculty members at The UWI whose specialisation area was Science and who were also members of the ESD Working Group at The UWI.

The *Discovery* stage took further shape a year later in May 2019 when the two institutions along with the University of Gloucestershire met for a two-day workshop on ESD assessment practices in higher education. At this workshop, individuals from the three universities, inclusive of 13 academic faculty members from various specialisations (see Table 2), and 4 alumni of the Master’s degree in Education for Sustainability at London South Bank University, came together. All but one of the participants from The UWI were also members of the ESD Working Group and thus had various levels of understanding of ESD.

Table 2

Profile of Academic Workshop Participants

Department/faculty and university	Type and number of participants	Specialisation area
School of Law and Social Sciences, London South Bank University	2 Academic Faculty • 1 Member • 1 Member	<ul style="list-style-type: none"> • Education for Sustainable Development • Education for Sustainable Development, Sociology
Education and Humanities, University of Gloucestershire	1 Academic Faculty	Education for Sustainable Development
School of Education, Faculty of Humanities and Education, The University of the West Indies	10 Academic Faculty • 1 Member • 3 Members • 1 Member • 1 Member • 1 Member • 1 Member • 1 Member	<ul style="list-style-type: none"> • Education for Sustainable Development • Science • Curriculum • Teacher Education • Social Studies, Geography • Educational Measurement • Literature • Educational Psychology, Research Methods

These participants shared their own assessment practices in higher education, moving past general barriers at the higher education level to identify best practice in relation to their programmes of study. Additionally, the three universities surveyed various models of competences for sustainable development (as discussed above) and drew on the overlapping and meaningful aspects of these frameworks in relation to learning for sustainability. Whilst it is not possible to cover the gamut of assessment issues related to ESD in a two-day workshop, time was maximised as a preliminary outline of the framework was shared with participants prior to the workshop so that salient issues could be discussed in a substantive manner during the two-day forum. In this participants crossed boundaries between different institutions to create a 'venue for learning and development (in) the spaces between previously separated entities in the field of education' (Svenkerud et al., 2020, p. 159).

The *Dream* and *Design* stages were also initiated during this workshop as participants from the three universities worked to further develop an assessment framework that could be applied to their ESD modules, courses and programmes to identify if assessment opportunities were consistent with an ESD approach. The framework was designed with a clear-sighted vision of the reality facing academics in terms of the various pressures on their time.

Moving from the *Design* to the *Destiny* stage, the authors applied the developed framework to their own ESD teaching, leading to the findings presented in this paper.

A Framework for ESD Assessment

This section presents the framework before it is then tested by applying it to the assessment regimes of the authors' work.

This framework is the outcome of an appreciative inquiry by practitioners who teach on postgraduate programmes examining the assessment of learning for sustainability.

The framework represents a light touch approach, offering a limited range of key learning outcomes. It is hoped that, once engaged in this level of analysis, tutors may seek further information such as that provided by the competence frameworks cited above. The framework is divided into three parts (Table 3).

Table 3
Assessment Framework

	Essential characteristics	Learners should be able to:
Essential ESD/ Sustainable Development Learning Outcomes	Inter-connections	Identify relationships, non-human and human, and recognise their significance Think systemically, across disciplinary and spatial boundaries and apply an ecological perspective
	Context	Relate their studies to wider sustainable development issues See things through the eyes of others Consider the value of participation, particularly of under-represented groups
	Intention	Reflect upon, and re-assess, their own values Consider alternative perspectives Demonstrate an awareness of the temporal dimension including a futures perspective
Generic postgraduate learning outcomes	Criticality	Consider the <i>reflexive</i> nature of change as related to themselves and to the wider world Challenge assumptions, established practice and data sources
	Originality/ Creativity	Propose appropriate and innovative solutions Deal with complex issues and make decision in complex and unpredictable situations
	Presentation/ Communication	Engage meaningfully in discussions and activities that contribute to change
	Research skills	Recognise motivational drivers for their own study and research Recognise the contextual nature of their work Relate theory and practice
Discipline specific learning outcomes		

Firstly, there are characteristics that we consider essential for any Level 7 programme that will enable graduates to develop agency in terms of contributing towards changes for a sustainable future, a critical part of the re-orientation of education. ‘Interconnection’ places an emphasis on the connections and relationships within holistic and systemic perspectives. ‘Context’ is critical because what may be considered sustainable, and the dilemmas associated with making such judgements, will differ depending on context. ‘Intention’ highlights the underlying agenda of the learner and the values associated with their motivation. Self-awareness through reflection plays a key role in recognising these

motivational drivers as illustrated by Ayers et al. (2020). These learning outcomes form an inter-related whole with each learning outcome having relevance to all the others.

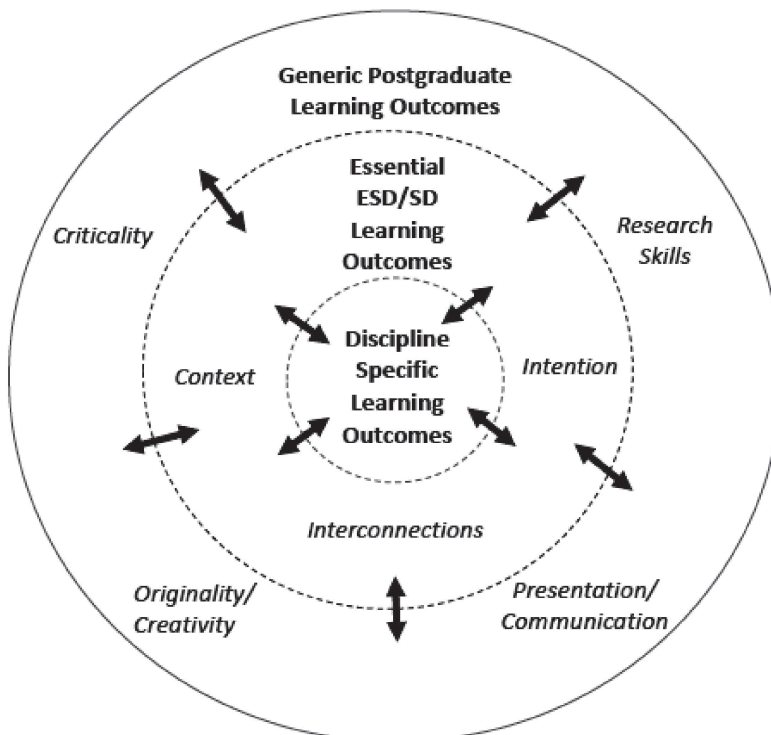
The second section of the framework acknowledges that some of the learning outcomes associated with sustainable development are already incorporated in Master's programmes as generic learning outcomes. (An example of these generic outcomes at Level 7 in England and Wales can be found in the *UK Quality Code for Higher Education* (QAA, 2014, p. 28)).

The final section recognises these essential learning outcomes have to sit alongside the discipline-specific outcomes of any Master's course. In this way the framework echoes the RESFIA+D approach (Roorda & Rachelson, 2018) where the 'D' represents discipline-specific learning outcomes. It is quite possible that in some cases these could overlap with the essential learning outcomes for sustainable development already listed.

Figure 1 illustrates how the three sections of the Assessment Framework are inter-related. The discipline specific learning outcomes are the central focus, giving any post-graduate course its identity. In the UK, and in other regions to varying degrees, there are generic learning outcomes common to all postgraduate programmes that students should address. If the programme purports to recognise the importance of sustainable development and adopts an ESD approach to teaching and learning, then the essential ESD/sustainable development learning outcomes should be integrated with both the discipline specific and the generic learning outcomes.

Figure 1

Relationships of the Learning Outcomes Within the Assessment Framework



The purpose of this framework is to evaluate the extent to which the assessment of any given postgraduate programme provides students with opportunities to demonstrate their learning in relation to becoming a more sustainability-oriented professional. As an initial test of the framework, it was applied to elements of the Master's level work carried out by the authors; each of these programmes happen to be in the field of education. The results of our reviews are summarised in the subsequent sections.

Applying the Assessment Framework

Example 1. The Master of Education Degree Programme in ESD at The University of the West Indies (UWI)

Description of Programme

The Master of Education Degree Programme in Education for Sustainable Development, Global Citizenship and Peace was developed by the School of Education at UWI, Mona Campus, Jamaica. The programme aims to produce graduates with various ESD competences who are able to infuse ESD into formal and non-formal education. The programme has four core courses that focus on theories and perspectives surrounding ESD, climate change education, violence prevention education, and citizenship. Additionally, there are 'track option' modules for those working in formal education and those working in non-formal education. Alongside these components, students also sit a range of research and elective modules.

Assessment

In developing the programme, consideration was given to knowledge, skills, values, and behaviours that align with sustainable development and ESD. Consideration was also given to the types of assessment activities that would allow facilitators and learners to evaluate their own learning and development.

Five of the core and track modules within the programme have a final examination component worth 50 % with coursework also worth 50 %. The remaining five core and track modules are assessed by 100 % coursework. Assessments include reflective pieces, visioning exercises, field reports, action projects and final examinations. Thus, the programme has a blend of traditional and non-traditional assessments. With this background in mind, the following was found in relation to the ESD Assessment Framework.

Interconnections

With respect to learning outcomes pertaining to systemic thinking and relationships between human and non-human beings, some of these outcomes are assessed through the field report as part of the Theories, Perspectives and Issues in Environmental Education and Education for Sustainable Development module. In this module, fieldwork focuses on exploring the systemic components of particular communities and the associated sustainability linkages. Additionally, students compose two short reflective pieces on various concepts/aspects such as literary pieces, which highlights how literature as a discipline can be utilised to enhance sustainability. In the Approaches to Education for Sustainable Development track course, students develop and deliver a lesson plan on ESD. The latter examples assess students' abilities to think systemically across disciplinary boundaries. Students can also choose electives on related ESD themes from departments

and disciplines outside of the School of Education. Additionally, for some courses, guest lectures are invited from other departments/faculties. In both these instances formative assessments might be utilised to evaluate students spatial and disciplinary systems thinking and their ability to see and understand connections between the human and non-human world.

Context

This aspect of the framework was not consciously considered when developing the assessments; while provision is made for some elements, these could be made more explicit. The visioning exercise as part of the Climate Change and Disaster Risk Reduction Education assesses students' abilities to understand and empathise with the perspectives of others in a vision of a low-carbon future. The field research on an active citizen in the Education and Citizenship module allows students to not only report on the life of an active citizen but to understand what active citizenship means from their perspective. Additionally, students can relate their studies to wider sustainable development issues such as climate change, violence, gender equality and global citizenship in core and track modules through reflective and visioning assessments and action projects. Students also have opportunities to consider the value of participation of underrepresented groups, which will be included in the assessment guidelines.

Intention

The reassessment of values and personal change are primarily encouraged through a series of reflection pieces, which call for students to reflect on personal values and actions. A few assessments call students to envision alternative futures, for example students are asked to write short reflective pieces on concepts of nature, place or other module topics, what it means to be a global citizen, personal actions as a peacemaker, societal and global values and leadership qualities for sustainable development. Students reflect on personal actions through a carbon footprint exercise as part of the Climate Change and Disaster Risk Reduction Education module and they are challenged to envision alternative futures through a low-carbon visioning exercise.

Generic Learning Outcomes

Assessment activities across the core and track courses aim to evaluate generic learning outcomes including students' creative abilities, critical thinking, research, and presentation/communication skills. Two track courses involve students in the design of a non-formal ESD programme and an ESD project. Whilst students do not actually initiate these projects during the programme, the idea is that students respond to real-world needs by proposing innovative and relevant solutions. For two of the core modules – Education and Citizenship and Conflict Resolution and Violence Prevention in Education – students design and initiate citizenship and peace projects respectively within their classrooms, schools or communities. Here they demonstrate their creativity by proposing projects that build on theoretical components in class by applying them to real-world issues and contexts.

The assessments shown in Table 4 allow students the opportunity to communicate ideas and receive feedback on intended activities such as lesson plans, proposals, and strategies.

Table 4*UWI Assessment Elements Linked to Generic Learning Outcomes*

Course	Assessment element	Generic learning outcomes
Approaches to Education for Sustainable Development	Delivery of a lesson plan on ESD	Students present their lesson plans and peers provide feedback on the lesson plans
Gender and Peace Education	Case study presentation	Students present their case studies, which are then critically discussed during a question/answer session
Values-Based Education	Values-based education strategy	Students present their ideas for the application of an instructional strategy to address an ESD related issue and peers offer feedback to further develop ideas
Project Management and Proposal and Grant Writing	Grant proposal peer review exercise	Peer review feedback will allow individuals to revise their grant proposal

Across the programme, the intention is for the various learning outcomes to develop through the assessments. It is noted, however, that further thought needs to be given to the formative assessments within the individual courses which comprise the programme and how these can be used to further lead to these outcomes. After the first offering, there will need to be an evaluation of the programme in order to ascertain the extent to which these outcomes have been met.

Example 2. Master of Science Degree in Education for Sustainability (Efs) at London South Bank University (LSBU), UK

Description of Programme

The MSc in Efs is a distance learning course initially developed by a group of UK non-governmental organisations (NGOs) in 1994 in response to the outcomes from the 1992 Rio Earth Summit and Chapter 36 of Agenda 21. The distance learning material gradually migrated from hard copy, delivered via mail and courier, to being internet-based, while participants changed from being mainly UK-based to being worldwide, with significant numbers in Africa, Asia and Latin America. This analysis of the assessment regime refers to the current iteration of the course delivered through a virtual learning environment with email communication between student and tutor. There are six sequential modules and a dissertation studied as a three-year, part time course. Tutors change with each module bringing a degree of multidisciplinary input. There is a common introduction to the study guide material for each module, which reinforces the core themes, which are:

- Timescales and geographical scales;
- Dynamics of change – personal, social and ecological;
- Social justice, participation and learning;
- Politics of knowledge;
- Theory and practice.

Assessment

The students are generally in employment, mainly in the public and civil society sectors with a few in the private sector. This is particularly relevant, as the module assessments have been designed to enable students to produce work that can be applied in their professional contexts. The distance learning nature of the course requires the students to look at their own context and relationships as potential resources in their learning. The lack of face-to-face peer interaction is restrictive in relation to assessing some of the learning outcomes and there is a heavy reliance placed on written assignments for summative assessments, which comprise 3,000 to 4,000-word assignments at the end of each module and a 15,000-word dissertation research project.

The formative assessments are built into the distance learning study guide through which the students are required to engage with activities that generate online discussions between learners and tutors. It is here that the tutors are able to informally assess students' understanding of concepts. The student is expected to send an assignment plan for a formative assessment review. This is an opportunity for both the student and tutor to exchange ideas and create a dialogue.

The introductory activities in Module 1 are designed to orientate the students to the overall approach of the course and establish online engagement that can be carried forward to subsequent modules. Mandatory activities require students to post a response to a discussion board as part of the assessment requirements. Posting a response to reflective activities is optional but encouraged.

Inter-Connections

Systems thinking is introduced in Module 1 and recurs in subsequent modules. It is built into the summative assessment of Module 3 where it requires students to take an analytical look at the causes and impacts of climate change in a specific context. As part of the formative self-assessment activities in this module students are asked to review an article to identify the contributions made by different disciplines to the article's analysis of climate change. Module 5 requires the students to work beyond traditional boundaries and explore the relationship between science and culture in both self-reflection activities and in the summative assessment. The promotion of a holistic perspective and the exploration of social change throughout the course involves the analysis of human relationships and this is particularly pertinent in the Module 2 summative assessment.

Context

The coursework topics are open to allow students to make use of their own experience in summative assessments. Accordingly, it is made clear that writing in the first person is acceptable in summative coursework. However, references to their own experience must be supported by details of the context that they are referring to, including time, place, their role and any existing written or photographic record. Most summative coursework requires reference to examples or case studies, which can be drawn from primary or secondary sources but all of these must be placed in context. If there is a need to adapt a coursework topic in order to enable students to address their own context or interest, this can be negotiated with their allocated tutor, providing that it links to the content of the module as defined by the learning outcomes.

There are a number of online introductory activities at the start of the course that ask students to share their geographical and professional contexts before going on to

share specific challenges that they face in relation to sustainable development or EfS. Students are asked to comment on, and supply suggestions to the posts of others, which requires a degree of empathy. While there is currently no formative assessment of these activities, this is a potential opportunity for assessing the ability to see things through the eyes of others. For example, a core theme of Module 2 is social justice, which focuses on values of equality, diversity and human rights, with a choice of two summative assessments; report or critical essay.

Intention

From the first engagement with the course, the students are introduced to the concept of the 'reflective practitioner'. Students are asked to develop a critical and reflective approach to their own perspectives in Module 4. The module study guides feature individual reflective activities throughout, which contribute to the overall self-assessment for each module. Students are also asked to reflect on their learning in each module by completing an interactive self-assessment cover sheet for their summative assessment. Tutors respond directly to students' reflections via feedback to the summative assessment, which promotes self-learning and extends the dialogue between the student and tutor.

Generic Learning Outcomes

Generic learning outcomes essential for an ESD approach, such as critical thinking and challenging assumptions, are embedded in the summative assessments. This approach is supported by elements within modules that address power relations, vested interests and hegemony. Originality and creativity are both rewarded in assessments in relation to developing learning programmes or presenting recommendations for change towards sustainability (often linked to the SDGs).

There are opportunities for assessing research skills across all modules with the main opportunity being Module 6 and the dissertation. Prior to starting the dissertation students are required to complete a proforma, which involves reflecting on their own motivation for research and how they will utilise their learning from the six modules that they have completed.

Our analysis of the LSBU Education for Sustainability course with the assessment framework has produced three outcomes. Firstly, it confirms where appropriate assessment is already taking place. Secondly it identifies areas where learning is potentially taking place in relation to the learning outcomes but where learning is not currently being assessed in a meaningful way. And thirdly it reveals some gaps in relation to the learning outcomes.

Example 3. Master's Module, Learning and Sustainability: A Values-Based Approach at the University of Gloucestershire, UK

This is an elective module offered as part of the MA in Education. Typically, students are education professionals (often teachers from across all phases of education) with an interest in wider issues. They do not normally see themselves as environmental activists or seek a career linked to sustainable development *per se*.

Students are currently assessed through two presentations (one individual and one collaborative effort) plus a traditional 4,000-word essay. The individual presentation (Assessment 1) requires students to prepare a brief presentation on either an actual

practice or a proposed programme of learning for sustainability, with an explanation of the underpinning theory and consideration of how its effectiveness might be measured.

The group presentation task (Assessment 2) requires a small group of students to prepare a presentation on a sustainability-related issue of their choice, explaining why this issue has arisen, presenting alternative perspectives and describing how education might be used as part of a broader strategy to address the issue.

Broad themes are suggested for the 4,000-word written assignment but students are encouraged to develop their own titles and agree these with the module tutor.

In all three assessments the generic Master's level assessment criteria apply such as the coherent organisation of ideas and critical engagement with an extensive range of literature.

Under Assessment 2, each student is asked to submit a 'participation grid' on which they assess themselves and their fellow students against the following criteria:

- Attendance;
- Contribution to the team in terms of ideas and motivation;
- Effort in assisting with tasks and standard of work done;
- Communication with other team members;
- Awareness of others (with a view to ensuring that everyone feels included).

Table 5 summarises our proposed ESD Assessment Framework in two columns with an additional column on the right showing notes on where the module addresses this Framework.

Table 5

ESD Assessment Framework Applied to MA Module 'Learning for Sustainability: A Values-Based Approach'

Essential characteristics	Learning outcomes	Links to module assessment criteria
Inter-connections	Non-human and human relationships Boundary-crossing/ ecological perspective	An expectation throughout but this is not made explicit An expectation of Assessments 2 and 4 but not explicit
Context	Relate to wider SD issues Empathy Consider participation	Criterion 4 throughout, particularly Assessment 2 Covered within Assessment 2 Participation Grid Assessment 2 – particularly the Participation Grid
Intention	Reflect upon own values Alternative perspectives Temporal dimension/ futures	Not sought explicitly Mentioned under Assessment 2 Implied under Assessment 2
Criticality Originality/ Creativity Presentation/ Communication		Criterion 2 and 3 throughout Considered throughout; mentioned explicitly within Criterion 4 Considered throughout; covered by Criterion 1
Research skills		Criterion 3 throughout
Discipline-specific learning outcomes		Multiple references to educational practice throughout

The module appears to cover most dimensions of the ESD Assessment Framework with the group exercise (Assessment 2) proving to be critical in terms of providing opportunities for participation and empathy. Interestingly, despite the specific mention of values in the title of the module, at no point are students required to express their own values or feelings in relation to the module content. The fourth of the generic assessment criteria prompts students to 'develop personal theory' but even here the question of values need not arise explicitly. It is only when students complete the voluntary module evaluation after completing the module that they are invited to express their personal feelings about module content. That said, students do express their feelings freely and openly throughout the taught sessions but this is not linked to assessment.

The module content includes an explanation of what it means to adopt a futures perspective, however the aspect of temporal dimension is not made explicit under the current marking criteria although it is implied under Assessment 2. Currently students are not asked to explain their motivation for completing any of the assessment tasks.

The existing criteria relate more to generic academic learning outcomes than to anything specifically labelled ESD. This could be said to demonstrate how ESD education is simply quality education; however, not all of these academic criteria feature on the ESD assessment framework. This suggests that the framework complements rather than overlaps with more familiar generic assessment criteria.

Findings

One limitation of this research in terms of the application of the assessment framework is the fact that all three examples are concerned with developing education professionals, albeit in different contexts and across different sectors of education. However, the application of the assessment framework to these three Master's level examples has been a useful exercise both for the authors involved in the programme (LSBU) and module (UoG) which are already well established, as well as for the author working on the recently developed programme at UWI, which, at the time of writing, is in its first year of delivery. The findings from the application of the framework have underscored several important ideas with respect to the assessment of learning for sustainability.

Firstly, since ESD involves more than knowledge, assessment of sustainability learning outcomes must move beyond the traditional essay and test assessments to embrace other modes which allow for individuals to engage with their values, beliefs, and attitudes, as well as to develop their skills. The programmes at UWI and LSBU, for instance, utilise various summative and formative assessment pieces that encourage important processes such as reflection and critical-thinking amongst learners. At UoG, it was noted that there is an opportunity for students to express personal thoughts and feelings throughout the semester although not linked to formal assessment. This is a potential assessment opportunity if desired by the Module Leader.

Connected with this is the idea that learning for sustainability should hone systemic and ethical thinking that encourages students to see connections and linkages across disciplines, space and time, and that allows them to see from alternative perspectives whether temporally, culturally or otherwise. While operating at various levels, the programmes reviewed did allow for this, though it is noted that at UWI, the exploration of some of these alternative perspectives does have to be made more explicit in the

assessments now that the programme is underway. At LSBU, this opportunity presents itself in a more concerted manner with respect to the social justice issues and the associated summative assessments.

Thirdly, as with all programmes across all disciplines, it is argued that generic learning outcomes should always be targeted. ESD offers the perfect opportunity for this given that sustainability learning involves facets such as critical-thinking, participation, creativity, research and communication – a number of which are the so-called generic skills required by all professions. All three of the programmes facilitated these aspects through assessment activities, with the grant proposal peer review exercise (UWI), development of learning programmes (LSBU) and group presentations (UoG) providing examples.

Finally, it is important to note that our focus was on applying this framework to our assessment activities. The substantial proof of the efficacy of the learning would need to be further explored through a focus on the learners themselves and measuring outcomes among them. The exercise reported in this article is a necessary prerequisite towards that end. The next step for any colleagues who apply the framework to their Master's programmes would be to address the issues revealed by their analysis through new or amended assessment activities.

Implications

Given that much of the existing literature focuses on learning for sustainability content and pedagogy, and that there is a less robust body of literature on associated assessment processes, this paper offers insight into what constitutes meaningful assessment that aligns with learning for sustainability. The various elements of the framework can also initiate discussion with respect to the ways in which ESD assessment can/should/does engage with assessment for learning as advocated by Ashwin et al. (2015). In this way the proposed framework offers a basis for dialogue within and across course teams on their assessment of sustainability content.

For course leaders and module tutors involved in the delivery of sustainability content in higher education, the framework offers a useful means of examining the alignment between their course assessments and pedagogy with values and principles of learning for sustainability. Based on the results of this evaluation process, course leaders and module tutors might choose to make modifications to both formative and summative assessments so that these assessment processes are truly an integral component of the learning process – for their courses in general and for sustainability content in particular. The framework also offers opportunities to develop assessments that move beyond traditional test and essay assessments to more authentic, project-based, and community connected assessments that support the pedagogical underpinnings of sustainability learning. It is important to reiterate that this framework is not restricted to those working within the field of ESD, rather it supports the assessment of programmes across a range of disciplines. Indeed, this can be particularly useful where the emphasis of assessment from the outset is on core disciplinary content while sustainability content is being infused, such that assessments can be adjusted in order to gauge learning for sustainability.

Additionally, within recurring global initiatives and frameworks (UNESCO, 2004, 2015a, & 2015b), the necessity for sustainability to be integrated into multiple disciplines

utilising various pedagogical approaches across all levels of learning is clear. The heightened role of universities in pursuing the UN Sustainable Development Goals, evident in initiatives such as the UN Higher Education Sustainability Initiative and the Copernicus Alliance, adds further impetus to disciplines engaging more deeply with sustainability at postgraduate level. As stated earlier, this focus on content and pedagogy is essential but associated with this, is the necessity to focus on assessment to validate the learning that is taking place.

The authors have argued that the proposed framework can be utilised across multiple disciplines and it is recommended that follow-up research examine the application of this framework to Master's programmes outside of the discipline of education. Further research will also benefit from the deeper engagement of learners themselves in examining the nature of sustainability-related learning outcomes. Additionally, research that focuses on course leaders' and module tutors' understandings of learning for sustainability and its pedagogical underpinnings would be a valuable foundation prior to their application of this framework to their assessments.

Conclusion

Sustainable development, with its focus on society, environment, governance, and economy provides a holistic framework for addressing complex issues facing humanity. An ESD approach is critical with respect to enhancing knowledge, developing values and ethics and engendering the capacities required to tackle the global issues facing us. This paper argues that the necessary reorientation of education to fully embrace sustainability (Orr, 1991; Sterling, 2001) must include thoughtful attention to the process of assessment.

The proposed assessment framework emerged from our appreciative inquiry into competence frameworks as well as competing definitions of sustainability as viewed from our diverse contexts. By emphasising the importance of inter-connections, context and intention alongside discipline-related learning outcomes, the assessment framework has the flexibility to be applied across a range of Master's programmes that reflect an ESD approach.

The authors, all working on ESD programmes at the postgraduate level, sought to test the outcomes of this appreciative inquiry by applying the resulting assessment framework to their own Master's level courses and modules. While all three examples are intended for education professionals, it is hoped that the framework proves useful for those working in any discipline at postgraduate level whether they address sustainability issues directly or seek to embed ESD into their programmes. By applying this framework, course leaders and tutors can ensure that their assessment aims and procedures will better contribute to the development of sustainability-oriented professionals. In this way we hope to contribute to ensuring that learning for sustainability is meaningful and widespread across a growing range of postgraduate programmes.

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