Measures to facilitate the scale-up of education for sustainable development in higher education

Rory McConnon

Middlesex University Dubai,
Dubai Knowledge Park – Blocks 4, 16, 17 & 19,
P.O. Box 500697, Dubai, United Arab Emirates
Email: r.mcconnon@mdx.ac.ae

Abstract: This theoretical study reviews the literature on barriers faced by organisations in recruiting graduates educated to incorporate sustainability practices, followed by an assessment of institutional approaches by universities to address this deficit. Having found that sustainability is generally instigated by 'champions' rather than through whole-institution approaches, this study also reviews literature on attitudes and motivations of higher education faculty and on existing education for sustainable development (ESD) interventions and guidelines. The study identified specific areas of research focussing on the predictors of attitudes, subjective norms, and perceived behavioural control, and proposes Ajzen's theory of planned behaviour or its updated iteration, the reasoned action approach as an ideal framework for such future research. Findings also point towards a need for future research into the drivers/predictors of faculty incorporating ESD into curricula. This paper addresses a growing area of concern among employers and university managers and identifies means to gain faculty support for the scale-up of ESD.

Biographical notes: Rory McConnon is a Senior Lecturer and Campus Programme Coordinator for Middlesex University Dubai's Business Management Programmes. He is a Fellow of the Higher Education Academy, UK, and Project Management Professional at the PMI. He is a graduate in Environmental Resources Management. He completed his MSc in Renewable Energy and MSc in Energy Management at the University of Ulster before obtaining an MBA at the Middlesex University Dubai. He has devised and delivered programmes of study on environmental engineering and sustainable energy focussing on both the technical and business aspects of these fields. His research interests include international business, entrepreneurship, project management, and sustainability and environmental management.

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1 Introduction

Why is education for sustainable development (ESD) important? The United Nations decade for education for sustainable development (DESD) made significant achievements, while post-2015 discussions are calling for more to be done to scale up ESD) "to prepare the citizens of tomorrow to respond to the challenges of today" (Bokova, cited in Buckler and Creech, 2014). Wals (2014) and Juárez-Nájera (2015) highlighted the continuing need for new forms of professional development to build faculty competencies in teaching and learning, monitoring, and evaluation, in order to scale up ESD in line with the UNESCO Global Action Programme (GAP) on ESD. The UNESCO roadmap calls for a paradigm shift that can only be embedded in education and learning, as students enter higher education looking to learn more about sustainable development. The roadmap recommends that, in order to scale up ESD, action be taken to develop and implement new approaches to curriculum reform, including "capacity-building for academic staff, to move sustainable development beyond a specialist 'career' focus to a learning outcome and lifelong orientation across all fields of study" [UNESCO, (2014), p.127].

Added to the above is the announcement of the sustainable development goals (SDGs) 2015–2030. The associated SDG knowledge platform provides a repository of policies, initiatives, and good practices to support action by all types of stakeholders, not least higher education institutions. At a strategic level, the division for sustainable development goals (the secretariat for the SDGs) facilitates ongoing consultation from varying sectors, including academia. For example, a thematic review of six of the SDGs in 2019 through an e-consultation process included hundreds of responses from education and academic entities (SDGKP, 2019). The implementation of a new Times Higher Education global university ranking that aims to measure institutions' success in delivering the UN SDGs, is intended encourage widespread uptake of ESD by universities (Bothwell, 2018). Very closely linked with the implementation of the SDGs is the UN Global Compact, which is by their own account, the world's largest corporate sustainability initiative with over 13,000 participants including over 600 academic institutes (UNGC, 2019). Participant universities are encouraged to incorporate sustainability practices into their operations and curricula.

With these international aims in mind, this theoretical paper aims to identify key findings on the topic of ESD with the purpose of identifying gaps for further research regarding the propensity of faculty to integrate ESD into curricula in third level education, with a special focus on business curricula.

The paper was stimulated by the findings of a number of recent publications, notably the current United Nations Principles for Responsible Management Education (PRME) State of Sustainability in Management Education report [Weybrecht, (2015), p.7] which concluded that one of the "biggest challenge[s] that business schools face in integrating sustainability across the curriculum and research is buy-in from faculty." This was linked to factors such as limited awareness, relevance to the subject, and perceived ability to integrate ESD into courses. Maloni et al. (2012) recommended that a better understanding of the tools needed to overcome faculty resistance and disinterest is required, and suggested the use of established theoretical frameworks linked to organisational dynamics such as systems theory, social identity theory, loose coupling, or Ajzen's (1991) theory of planned behaviour (TPB). The 2010 update of the TPB, the reasoned

action approach (RAA), could also be used. Collins and Gannon (2014) recommend further research into factors affecting faculty involvement in environmental performance activities, which they suggest may include independent predictor variables such as environmental concern, student influence, colleague influence, and institutional goals. Additional demographic factors (e.g., age, gender, socio-economic status), have been shown to influence environmental intentions and behaviours (Gelissen, 2007; Liu et al., 2015). Mulà et al. (2017) suggest that universities currently lack the capacity to integrate ESD effectively into mainstream teaching practices and that few institutions have staff development programmes capable of significantly enhancing the ESD competences of university educators.

2   Literature review

Sustainability orientation in business and entrepreneurship is growing in importance in the business world, and this is reflected in the growth in research on the subject. In parallel, there is an ever-increasing enthusiasm by third level education institutions to incorporate sustainability into their curricula, also extensively covered in the literature. However, this enthusiasm is often exhibited by a small number of 'champions', rather than uniformly across the faculty. In fact, although there has been much research on student, and to a lesser extent, managerial and workplace, intentions there is a dearth of research on the barriers to, and the factors driving, the intentions and behaviours of individual faculty to incorporate ESD into curricula. A limited number of guides and methodologies have been published relating to ESD pedagogy and linking ESD to curriculum themes, which have been developed without significant input regarding the barriers to implementation, and the factors driving faculty intentions.

2.1   Sustainability orientation in the business world – link to performance

As a brief precursor to the discussion on academic institutions, it is worth presenting a business case for the scale up of ESD in higher education. The 2018 Deloitte Global Human Capital Trends report (Deloitte Insights, 2018) notes a fundamental change in the way organisations are assessed. They suggest that metrics such as corporate citizenship or impact on society at large are increasingly considered alongside traditional metrics such as financial performance. They refer to this as the 'rapid rise of…the social enterprise'. Their report notes the importance of cross-functional vision, connectivity, and collaboration from C-suite leaders to achieve targets related to these societal metrics. This increasing recognition of corporate citizenship alone is a significant business justification for the future scale-up of ESD in higher education. However, there has already been a growing recognition that companies that operate with high sustainability practices consistently and significantly outperform their counterparts in terms of stock market performance. Eccles et al. (2014), while assessing a matched sample of 180 US companies between 1993 and 2009, also found that high sustainability companies had better stakeholder engagement and were more long-term oriented. de Medeiros et al. (2014), in a systematic review of literature on environmentally sustainable product innovation, found that, among others, critical success factors for technical innovation include understanding marketing, inter-functional collaboration between departments and with senior management, and management willingness to invest in environmentally

sustainable R&D activities. These findings suggest the need for business graduates to hold a deep understanding of sustainability issues in order to contribute to and make decisions to support sustainable innovation.

Maletič et al. (2018) found that when organisations are faced with high levels of competitiveness and uncertainty, sustainability exploration practices can be an especially important predictor of innovation performance. Earlier, Maletič et al. (2014), when reviewing literature on the positive relationship between corporate sustainability and organisational performance, found that exploiting existing sustainability competences alone does not guarantee a sustainable competitive advantage, but that managers also need to build dynamic capabilities in sustainability innovation in order to maintain long-term competitiveness. Furthermore, Klewitz and Hansen (2014) note the prevalence of SME managers who are resistant or reactive to sustainable innovations. Again these findings point to the need for future managers to have a deep understanding of sustainability issues. Schaltegger et al. (2012) found that a major obstacle to sustainability-oriented business models may be managers' lack of clarity about selecting the right business models to exploit more sustainable innovations. This suggests a continuing need to do more than instil sustainable principles in students but to incorporate a deep understanding of sustainability business analytical methodologies and sustainable development cases throughout business and other higher education curricula.

2.2 Sustainability in third level education – institutional approaches

Significant progress has been made over the last decade to incorporate ESD into curricula, guided in many respects through PRME and DESD (DESD), their overarching goal of which was to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. Looking forward, one of the five priority action areas for the future of ESD is to build the capacity of educators (UNESCO Executive Board, 2013), and to improve the ability of faculty to teach sustainability issues and to conduct and supervise related research (UNESCO, 2014). Buckler and Creech (2014) in their UN DESD final report built on this by stating that ESD programme implementation will require a better understanding of ESD competencies and mechanisms to support knowledge sharing among educators.

Tilbury (2011) noted that the process of embedding ESD into business curricula incorporates profound leadership challenges due to the complexity and multi-stakeholder nature of the process, but that where it is happening, senior management teams are being driven by multiple incentives such as government incentives, socio-economic expectations, partnership platforms, student leadership, and experimental practice.

Firth and Smith (2013) in their review of the DESD suggest that for ESD scale up to be successful, educators and students should be encouraged to critically assess issues surrounding sustainability from different perspectives, to challenge approaches and beliefs, and broaden discussions. For this to happen, educators need to be familiar with the concepts and pedagogy of ESD. In line with this, Godemann et al. (2011, p.55), in their analysis of 100 UN PRME Sharing Information on Progress (SIP) reports, highlighted the need to develop tools and methods for creating a "culture of organisational learning and building change strategies around sustainability knowledge", as this is still a challenge even for third level business schools that have signed up to the UN PRME.

As noted in the introduction, Weybrecht (2015, p.7) stated that a major impediment to implementation *is a lack of faculty buy-in*. She highlighted that the majority of faculty either do not have adequate topic awareness and even where they are aware of the relevance of sustainability; they do not link this relevance to their areas of research and teaching, or simply do not have the required skills to integrate ESD into their courses. Indeed, Wals (2014, p.49) in his review of learning and institutionalisation processes in relation to the UN DESD, found that despite numerous successful cases, the recognition of the importance of ESD by some academics, sustainability is still largely 'external' to faculty and that often sustainable development is 'just another course or research project'. Furthermore, Godemann et al. (2014) reported that while three quarters of business schools investigated actively encourage faculty and/or students to carry out research on responsible management, only 10% out of 100 UN PRME signatories in 2011 provided details about their sustainability research strategy. This situation of limited demonstrated activity was also recognised by others such as Lee et al. (2013) in their analysis of Australian universities' commitment to ESD. Srivastava (2014), researching sustainability related courses in AACSB schools in the US, and Lozano et al. (2013) analysing declarations for sustainability in higher education, observed that many universities still lag behind corporations in contributing to societal sustainability and concluded that staff must be empowered to introduce sustainable development into all courses and curricula.

Srivastava (2014), when analysing sustainability-related courses in AACSB schools, found that there is a non-significant difference between sustainability-related courses in management, marketing, entrepreneurship, information systems/information technology, strategy, and globalisation. Lambrechts et al. (2013) took a more nuanced approach in their analysis by considering the integration of competencies for sustainable development in three bachelor programs in Belgian universities (business management, office management, and applied information technology). The competencies used in the study were based on the work of a number of different researchers, primarily Roorda (2010), and also De Haan (2006) and Sleurs (2008). Lambrechts et al. (2013) found that competencies for sustainable development that related to responsibility and emotional intelligence are widely integrated, while those for sustainable development dealing with future orientation and personal commitment are virtually absent, those for action taking are underrepresented, and those for system orientation are too fragmented. The main reason presented for this finding was that responsibility and emotional intelligence were explicitly linked with, for example, business ethics elements of the curricula. The other sustainable development competencies are only passed on to students in an 'unconscious' or 'unofficial' way because they were not explicitly positioned as sustainable development issues. They called for future research on the link between the integration of sustainable development in competencies, and their actual integration within the curriculum.

2.3   Sustainability in third level education – faculty attitudes and motivations

Sustainability in third level education is often instigated by individuals rather than through whole-institution approaches. Wood et al. (2016) cite numerous studies, including Ferrer-Balas et al. (2008), Lozano (2006), Calder and Clugston (2003) and Ryan and Tilbury (2013a), that refer to sustainability advocates or 'champions' who are critical to the successful implementation of ESD in their universities. They reiterate the

warnings from the latter two articles, along with Thomas et al. (2012) and Wals and Blewitt (2010) that the work of these champions is often vulnerable to restructuring within their universities and often does not spread across disciplines or faculties. Indeed, Ryan and Tilbury (2013b) go as far as to say that despite the work of curriculum champions, little strategic progress or systemic change for ESD has happened in higher education.

Shephard and Furnari (2013) carried out qualitative research on a sample of 43 faculty in a New Zealand University to categorise their attitudes towards ESD. They found four 'significantly and qualitatively' different viewpoints: proactive advocates for sustainability and for integrating sustainability into higher education; those who are sustainably minded and incorporate some of the ESD competencies, but do not focus on education for sustainability. Another group was more or less indifferent to ESD; and one group did not see the need to contextualise their topics, nor the impact of their teaching on environmental issues. This research illuminates some of the intentions and behaviours of faculty towards ESD but does not provide any insights into the factors informing these intentions and behaviours.

Borg et al. (2014) carried out a study of 3,229 Swedish upper secondary school teachers' conceptual understanding of sustainable development in relation to their subject discipline and teaching experience. While not directly related to higher education, their findings indicate that teachers from various disciplines differed in their conceptual understanding of what sustainable development meant, in relation to ecological, economic, and social dimensions. They found that the ecological dimension was the most commonly recognised view of sustainable development while only about half of the sample considered social dimensions to be a component. The economic dimension of sustainable development was found to be associated with the greatest uncertainty. They further noted that university academics' understanding of the concept of sustainable development could impact secondary trainee teachers' higher education, which in turn would be later reflected in their own views of ESD. Other than discipline-specific factors, this research does not provide a broader analysis of the factors driving intentions to incorporate ESD into curricula.

An earlier publication by the same authors (Borg et al., 2012) focussed on the barriers encountered by teachers implementing ESD. The most common obstacles identified were a dearth of examples of how to include sustainable development in teaching, and a lack of necessary expertise about sustainable development. Other barriers identified were insufficient time to implement necessary changes to courses, lack of support from school management, and the perception that sustainable development was not relevant to their subject. These factors can be tied to the direct and indirect measures used in the theory of planned behaviour (TPB; Ajzen, 1991) or its latest iteration, the RAA (Fishbein and Ajzen, 2010). Borg et al. (2012) also noted the most commonly used teaching methods when teaching sustainable development were group discussions followed by lectures, small group research projects, and class debates.

Reid and Petocz (2006) carried out phenomenographic qualitative research into university lecturers' understanding of sustainability. The results were categorised into three dimensions: lecturers' understanding of teaching in the context of sustainability (the structural dimension) where teaching and sustainability are either disparate, overlapping, or integrated; understanding of sustainability (referential dimension) relates to whether faculty think of sustainability in terms of definitions, link it to resources

(material, biological, human), or justice and fairness. The third dimension is faculty intentions towards their students. Indeed, Ajzen's (2019) TPB/RAA questionnaire construction instruction (updating a previous 2006 version which focussed exclusively on the TPB) could be used to encapsulate many of the potential factors that may influence faculty intentions and behaviours towards ESD.

Although there is a lack of research into the extent to which demographic factors (age, sex, nationality, socio-economic status) influence faculty intentions towards ESD, numerous studies examine motivational factors driving environmental intentions and behaviours in the general population. Examples of these include Hines et al. (1987) and Kollmuss and Agyeman (2002) who assess motivational factors and barriers to pro-environmental behaviour. Other researchers such as Franzen and Meyer (2010), Liu et al. (2015) and Gelissen (2007) examine pro-sustainability motivators across international perspectives. Others, such as Zabkar and Hosta (2013) and Botetzagias and Malesios (2012), focus on socio-economic related motivators for sustainable intentions and behaviours.

3   Existing ESD interventions and guidelines

Maloni et al. (2012) recognised the limited available research into how to build faculty support for sustainability programmes. They noted a number of possible success factors and challenges, including leadership support, alignment with institutional goals, funding, political and bureaucratic challenges, curriculum flexibility, and program ownership. They developed a structural model to measure differential faculty support for sustainability, which they applied across the business faculty in their institution. Their results showed some level of concern about environmental issues but "a general lack of interest in sustainability teaching and research among our faculty" [Maloni et al., (2012), p.320]. The recommendations of their report included more empirical research to identify sustainability perceptions among broad faculty bases in order to identify underlying individual and group barriers that limit sustainability penetration in business academia.

3.1   What has been done: case studies

A number of case studies document attempts to incorporate ESD into curricula. Examples include that of Dickson et al. (2013) who developed a management course specific to the apparels industry that supported PRME, and a retrospective examination by Exter et al. (2013) of the change-management process to embed corporate responsibility and sustainability at the Cranfield School of Management. These publications provide some examples of ESD implementation but offer limited insights into faculty perceptions and intentions. Similarly, another case study by Benn and Dunphy (2009) reported on an action research approach to integrating sustainability into core subjects in an Australian university MBA programme. They found that while the openness of the definition of sustainability led to some faculty embracing the topic for their subject, others saw this openness as too abstract and diffuse and therefore overly difficult to incorporate. They suggest that faculty may be more receptive to a more critical approach that recognises the complex and contradictory aspects of corporate sustainability. Finally, Lozano et al. (2014) presented the findings of a survey on students' opinions on a newly

developed BA environment and business module on organisational change management for sustainability. The report provides some useful insights into integrating ESD using theories of teaching and learning applied to a business-linked sustainability course. Notably, the course was based on holism and a constructivist position to help students address the inter-relatedness and complexities of sustainability and organisational change management.

3.2 What has been done: tools and frameworks

Other researchers have produced tools and frameworks to assist faculty and administrators in the process of scaling up ESD. For example, Albinsson et al. (2011) created and presented a set of learning activities with the aim of applying the cognitive domain of Bloom's (1956) taxonomy for a more holistic learning experience. They analysed results by administering learning activities in 18 business courses with more than 1,000 students at two universities in the USA during a three year period. The outcomes indicated that weeks after being exposed to these exercises, the primed students were more adept in integrating the concept of social responsibility with their knowledge and experiences and were more concrete in providing details of various socially responsible practices they had adopted.

A generic and flexible matrix of options for integrating sustainability in higher education is presented by Rusinko (2010a, 2010b). This matrix involves integrating ESD into existing courses, creating new discipline-specific sustainability courses, integrating ESD into common core requirements or creating new cross-disciplinary sustainability courses. The matrix could be used as input to a proposed intervention; she suggests that in future research, the variables in the matrix could be tested with respect to, for example, demographics of particular universities, disciplines, programmes, courses, faculties, resources and support, and sustainability philosophy or mission.

Taking a different approach and aiming to create a reference framework for academic programme development, Wiek et al. (2011) examined the literature to synthesise the discussion about key competencies in sustainability that are considered critical for graduates. They presented a compilation of competencies in sustainability that can be used to guide both student requirements but also may be used to guide assessment of subjects' perceived ability to incorporate ESD. Holdsworth and Thomas (2015, p.137), recognising that there had been "little to show that ESD has been implemented in most universities" used an action learning approach, involving academics in auditing their courses/subjects to renew their curricula, resulting also in 'more capable academic staff'. They then created a framework to assist universities seeking a process to implement ESD. This may help in the development of ESD pedagogy and connections with curriculum themes.

3.3 What has been done: detailed 'best practice' guides

A number of more detailed guides to incorporating sustainability have been published. For example, Parkin et al. (2004) presented a toolkit including a sustainability competencies matrix, to help course designers identify and prioritise sustainability elements in courses, as an output of the Higher Education Partnership for Sustainability (HEPS). This guide by its nature is aimed at high-level course design across a broad

spectrum of courses, rather than focussing on business courses. The guide presents some limited, but important, insights into factors driving faculty intentions and behaviours. While introducing the concept of 'sustainable literacy', one of the highlighted barriers to integrating ESD is that of faculty perceptions of uncertainty because of the lack of a clear definition of the relevance of sustainability to faculty and their subject areas.

Ceulemans and De Prins (2010), discussing a teacher's manual on methods for SD integration in curricula, propose ready to use exercises. Recognising teachers' different backgrounds and education, the manual provides a four-step method for SD integration, incorporating 'conversation[s] on motivation' between promoters of ESD and the concerned teachers. However, the report does not provide further details on what these motivational factors might be or how to deal with them. Additionally, this manual is aimed at schools rather than higher education.

Publication such as *The Sustainable University: Progress and Prospects* (Sterling et al., 2013) and *Sustainability Education: Perspectives and Practice Across Higher Education* (Jones et al., 2010) bring together commentary by numerous academics involved in ESD providing experiences, insights, and analysis of barriers to ESD from specific university case studies, research and literature reviews, and also provide guidance on the role of future research in the field.

The *Guide to Quality and Education for Sustainability in Higher Education* (Tilbury and Ryan, 2013) is a resource that aims to make connections between education for sustainability and the practice of quality assurance and enhancement in the HE curriculum. It provides materials and tools, informed by input from five major British universities, covering the topics of ESD and quality assurance and their links. This resource provides pedagogical advice and practical tools that can be used to inform future implementation but offers limited insight into the factors driving the intentions and behaviours of faculty in relation to incorporating ESD.

The Future Fit Framework by Sterling (2012) provides an introductory guide to teaching and learning for sustainability in higher education aimed at curriculum and educational developers and practitioners in all disciplines. The guide provides pedagogical advice and practical tools, but importantly, it also highlights some of the major barriers to ESD from the perspective of faculty that has been characterised into a typology of four 'kinds of limiting factors', i.e., paradigmatic/perceptual; policy/ purpose-related; structural (governance, budgetary, compartmentalisation, etc.); and resource/information deficiency. The guide asks its readers to question the relevance of these barriers to their situation; whether other barriers apply, and the best ways that these barriers may be overcome.

Summers and Cutting's (2016) *Education for Sustainable Development in Further Education*, provides guidance and examples on institutional change, including infrastructural, staff development and the embedding of ESD in the taught curriculum, as well as ideas around resources, assessment, and teaching approaches. The book concludes with a look at the potential future role of further education in social inclusion and its potential contribution to the SDGs.

Zhan et al. (2015) identified 51 massive open online courses (MOOCs) that focussed on sustainable development education. One important source of these is the *SDG Academy*, an initiative of the UN Sustainable Development Solutions Network. It is an online education platform that provides free, graduate-level MOOCs based on interdisciplinary topics related to the 17 SDGs. As of 2019 it offers 24 courses that are available to students and faculty as either self or instructor paced modules

(SDG Academy, 2019). MOOCs, as well as providing users with an improved understanding of the interrelatedness of the SDGs, can also act as an effective means for understanding public perception of sustainable development issues (Gallagher, 2018).

4 Conclusions and recommendation

The literature review has found that one of the biggest challenges to scaling up action in ESD is buy-in from faculty, and in line with this, a better understanding of the tools needed to overcome faculty resistance and disinterest is required to move beyond individual ESD champions to whole-university adoption of ESD. Further empirical research is required to generate insights into the motivations and barriers to higher level faculty incorporating ESD into curricula. Additionally, research must assess the independent predictor variables driving faculty attitudes, subjective norms, and perceived behavioural control; this can be used as a precursor to implementing a whole-university organisational change for ESD/UNPRME. It may inform future structured, practical guidance on how to target the intentions of faculty, especially business faculty, to incorporate ESD in curricula by focussing on the predictors of attitudes, subjective norms, and perceived behavioural control, rather than solely through the more traditional method of simple knowledge transference. Doing so could enable the prioritisation of intervention methodologies based on attitudes, subjective norms, or perceived behavioural control should any one of these exert a dominant influence.

Fishbein and Ajzen's (2010) RAA, or its predecessor Ajzen's (1991) TPB, are proposed as ideal frameworks to conduct research in this area. They both offer well-defined models that may be used to predict intentions and behaviours of faculty to incorporate ESD into their curricula. The TPB is proposed because it has been used for decades and is therefore well tested. The more recent RAA on the other hand, while not as widely applied, does account for theoretical and methodological concerns that arose from the use of the TPB. Either way, according to the basic premise of these models, behavioural intention precedes actual behaviour. This behavioural intention results from interactions between the subject's personal beliefs about the value and likely consequences of a behaviour (attitude towards the behaviour), their beliefs about what others think about the behaviour (subjective norm) and their perceived level of control over, or ability to, implement the behaviour (perceived behavioural control). Ajzen and Fishbein have provided instructions about the TPB/RAA applicability and implementation including in Ajzen's (1991) original work 'The theory of planned behavior' in *Organizational Behavior and Human Decision Processes* and Fishbein and Ajzen's (2010) follow-up *Predicting and Changing Behavior: the Reasoned Action Approach*. Additionally, Ajzen (2019) published *Constructing a Theory of Planned Behavior Questionnaire* with specific guidance on how a TPB/RAA questionnaire should be developed.

The research to date for this project has not identified any literature that has utilised the TPB model to assess business faculty intentions to incorporate ESD into their curricula. Therefore, any proposed research should evaluate the 'goodness of fit' of the TPB as a model for this type of study. There is no single statistical significance test that identifies a correct model. Therefore, it is necessary to evaluate model fit on the basis of various measures simultaneously. A number of commonly used model-fit measures can

be used, which could demonstrate the potential applicability of the model in further research activities (Bagozzi and Yi, 1988; Bentler, 1990; Cheung and Rensfold, 2002; Garson, 2015; Schermelleh-Engel et al., 2003). Although throughout the literature there is some minor inconsistency about the exact categorisation nomenclature of the various goodness-of-fit statistical significance tests, these include three generic approaches, i.e., absolute fit indices, relative or incremental fit indices, non-centrality-based indices.

If ESD is to become embedded in standard teaching practice, it will be necessary to understand in greater depth the barriers that need to be overcome in order to engage faculty fully in this movement.

References

Ajzen, I. (1991) 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, Vol. 50, No. 2, pp.179–211.

Ajzen, I. (2019) *Constructing a Theory of Planned Behavior Questionnaire* [online] https://people.umass.edu/aizen/pdf/tpb.measurement.pdf (accessed 25 June 2019).

Albinsson, P.A., Perera, B.Y. and Sautter, P. (2011) 'Integrating sustainability into the business curriculum through e-learning', *Merlot Journal of Online Learning and Teaching*, Vol. 7, No. 1, pp.117–127.

Bagozzi, R.P. and Yi, Y. (1988) 'On the evaluation of structural equation models', *Journal of the Academy of Marketing Science*, Vol. 16, No. 1, pp.74–94.

Benn, S. and Dunphy, D. (2009) 'Action research as an approach to integrating sustainability into MBA programs: an exploratory study', *Journal of Management Education*, Vol. 33, No. 3, pp.276–295.

Bentler, P.M. (1990) 'Comparative fit indexes in structural models', *Psychological Bulletin*, Vol. 107, No. 2, pp.238–246.

Bloom, B.S. (1956) 'Taxonomy of educational objectives', *Vol. 1: Cognitive Domain*, McKay, New York.

Borg, C., Gericke, N., Höglund, H.O. and Bergman, E. (2012) 'The barriers encountered by teachers implementing education for sustainable development: discipline bound differences and teaching traditions', *Research in Science & Technological Education*, Vol. 30, No. 2, pp.185–207.

Borg, C., Gericke, N., Höglund, H.O. and Bergman, E. (2014) 'Subject-and experience-bound differences in teachers' conceptual understanding of sustainable development', *Environmental Education Research*, Vol. 20, No. 4, pp.526–551.

Botetzagias, I. and Malesios, C. (2012) 'The influence of economic affluence and environmental conditions on an individual's concern for the environment: a Greek case study (2005–2007)', *Local Environment*, Vol. 17, No. 1, pp.93–113.

Bothwell, E. (2018) *The Developing Ranking Based on Sustainable Development Goals* [online] http://www.timeshighereducation.com/news/developing-ranking-based-sustainable-development-goals (accessed 27 May 2019).

Buckler, C. and Creech, H. (2014) *Shaping the Future We Want: UN Decade of Education for Sustainable Development; Final Report*, UNESCO, Paris.

Calder, W. and Clugston, R.M. (2003) 'Progress toward sustainability in higher education', *Environmental Law Review*, Vol. 33, No. 1, pp.10003–10023.

Ceulemans, K. and De Prins, M. (2010) 'Teacher's manual and method for SD integration in curricula', *Journal of Cleaner Production*, Vol. 18, No. 7, pp.645–651.

Cheung, G.W. and Rensfold, R.B. (2002) 'Evaluating goodness-of-fit indexes for testing measurement invariance', *Structural Equation Modeling*, Vol. 9, No. 2, pp.233–255.

Collins, D. and Gannon, A., (2014) 'Walking the eco-talk movement: Higher education institutions as sustainability incubators', *Organization & Environment*, Vol. 27, No. 1, pp.16–24.

De Haan, G. (2006) 'The BLK '21'programme in Germany: a 'Gestaltungskompetenz'-based model for education for sustainable development', *Environmental Education Research*, Vol. 12, No. 1, pp.19–32.

de Medeiros, J.F., Ribeiro, J.L.D. and Cortimiglia, M.N. (2014) 'Success factors for environmentally sustainable product innovation: a systematic literature review', *Journal of Cleaner Production*, Vol. 65, No. 1, pp.76–86.

Deloitte Insights (2018) *The Rise of the Social Enterprise 2018 Deloitte Global Human Capital Trends* [online] https://www2.deloitte.com/content/dam/insights/us/articles/HCTrends2018 /2018-HCtrends_Rise-of-the-social-enterprise.pdf.

Dickson, M.A., Eckman, M., Loker, S. and Jirousek, C. (2013) 'A model for sustainability education in support of the PRME', *Journal of Management Development*, Vol. 32, No. 3, pp.309–318.

Eccles, R.G., Ioannou, I. and Serafeim, G. (2014) 'The impact of corporate sustainability on organizational processes and performance', *Management Science*, Vol. 60, No. 11, pp.2835–2857.

Exter, N., Grayson, D. and Maher, R. (2013) 'Facilitating organizational change for embedding sustainability into academia: a case study', *Journal of Management Development*, Vol. 32, No. 3, pp.319–332.

Ferrer-Balas, D., Adachi, J., Banas, S., Davidson, C.I., Hoshikoshi, A., Mishra, A. and Ostwald, M. (2008) 'An international comparative analysis of sustainability transformation across seven universities', *International Journal of Sustainability in Higher Education*, Vol. 9, No. 3, pp.295–316, DOI: 10.1108/14676370810885907.

Firth, R. and Smith, M. (2013) 'As the UN decade of education for sustainable development comes to an end: what has it achieved and what are the ways forward?', *Curriculum Journal*, Vol. 24, No. 2, pp.169–180.

Fishbein, M. and Ajzen, I. (2010) *Predicting and Changing Behavior: the Reasoned Action Approach*, Psychology Press, New York.

Franzen, A. and Meyer, R. (2010) 'Environmental attitudes in cross-national perspective: a multilevel analysis of the ISSP 1993 and 2000', *European Sociological Review*, Vol. 26, No. 2, pp.219–234.

Gallagher, S. (2018) 'Development education on a massive scale: evaluations and reflections on a massive open online course on sustainable development', in McCloskey, S. (Ed.): *Policy & Practice: A Development Education Review*, Ireland, Centre for Global Education, pp.122–140.

Garson, G.D. (2015) *Structural Equation Modeling. Statistical Associates 'Blue Book' Series Book 14*, Statistical Associates Publishers, USA.

Gelissen, J. (2007) 'Explaining popular support for environmental protection a multilevel analysis of 50 nations', *Environment and Behavior*, Vol. 39, No. 3, pp.392–415.

Godemann, J., Haertle, J., Herzig, C. and Moon, J. (2014) 'United Nations supported principles for responsible management education: purpose, progress and prospects', *Journal of Cleaner Production*, Vol. 62, No. 1, pp.16–23.

Godemann, J., Herzig, C., Moon, J. and Powell, A. (2011) *Integrating Sustainability into Business Schools – Analysis of 100 UN PRME Sharing Information on Progress (SIP) Reports*, No. 58-2011, International Centre for Corporate Social Responsibility, Nottingham.

Hines, J.M., Hungerford, H.R. and Tomera, A.N. (1987) 'Analysis and synthesis of research on responsible pro-environmental behavior: a meta-analysis', *The Journal of Environmental Education*, Vol. 18, No. 2, pp.1–8.

Holdsworth, S. and Thomas, I. (2015) 'Framework for introducing education for sustainable development into university curriculum', *Journal of Education for Sustainable Development*, Vol. 9, No. 2, pp.137–159.

Jones, P., Selby, D. and Sterling, S.R. (2010) *Sustainability Education: Perspectives and Practice across Higher Education*, Earthscan, UK.

Juárez-Nájera, M. (2015) *Exploring Sustainable Behavior Structure in Higher Education: a Socio-Psychology Confirmatory Approach*, Springer, Switzerland.

Klewitz, J. and Hansen, E.G. (2014) 'Sustainability-oriented innovation of SMEs: a systematic review', *Journal of Cleaner Production*, Vol. 65, No. 1, pp.57–75.

Kollmuss, A. and Agyeman, J. (2002) 'Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?', *Environmental Education Research*, Vol. 8, No. 3, pp.239–260.

Lambrechts, W., Mulà, I., Ceulemans, K., Molderez, I. and Gaeremynck, V. (2013) 'The integration of competences for sustainable development in higher education: an analysis of bachelor programs in management', *Journal of Cleaner Production*, Vol. 48, No. 1, pp.65–73.

Lee, K.H., Barker, M. and Mouasher, A. (2013) 'Is it even espoused? An exploratory study of commitment to sustainability as evidenced in vision, mission, and graduate attribute statements in Australian universities', *Journal of Cleaner Production*, Vol. 48, No. 1, pp.20–28.

Liu, J., Mooney, H., Hull, V., Davis, S.J., Gaskell, J., Hertel, T., Lubchenco, J., Seto, K.C., Gleick, P., Kremen, C. and Li, S. (2015) 'Systems integration for global sustainability', *Science*, Vol. 347, No. 6225, pp.965–972.

Lozano, R. (2006) 'Incorporation and institutionalization of SD into universities: breaking through barriers to change', *Journal of Cleaner Production*, Vol. 14, Nos. 9–11, pp.787–796, DOI: http://dx.doi.org/10.1016/j.jclepro.2005.12.010.

Lozano, R., Ceulemans, K. and Seatter, C.S. (2014) 'Teaching organisational change management for sustainability: designing and delivering a course at the University of Leeds to better prepare future sustainability change agents', *Journal of Cleaner Production*, Vol. 106, No. 1, pp.205–215.

Lozano, R., Lukman, R., Lozano, F.J., Huisingh, D. and Lambrechts, W. (2013) 'Declarations for sustainability in higher education: becoming better leaders, through addressing the university system', *Journal of Cleaner Production*, Vol. 48, No. 1, pp.10–19.

Maletič, M., Maletič, D. and Gomišček, B. (2018) 'The role of contingency factors on the relationship between sustainability practices and organizational performance', *Journal of Cleaner Production*, Vol. 171, No. 1, pp.423–433.

Maletič, M., Maletič, D., Dahlgaard, J.J., Dahlgaard-Park, S.M. and Gomišček, B. (2014) 'Sustainability exploration and sustainability exploitation: from a literature review towards a conceptual framework', *Journal of Cleaner Production*, Vol. 79, No. 1, pp.182–194.

Maloni, M.J., Smith, S.D. and Napshin, S. (2012) 'A methodology for building faculty support for the United Nations principles for responsible management education', *Journal of Management Education*, Vol. 36, No. 3, pp.312–336.

Mulà, I., Tilbury, D., Ryan, A., Mader, M., Dlouhá, J., Mader, C., Benayas, J., Dlouhý, J. and Alba, D. (2017) 'Catalysing change in higher education for sustainable development: a review of professional development initiatives for university educators', *International Journal of Sustainability in Higher Education*, Vol. 18, No. 5, pp.798–820.

Parkin, S., Johnston, A., Buckland, H., Brookes, F. and White, E. (2004) *Learning and Skills for Sustainable Development: Developing a Sustainably Literate Society: Guidance for Higher Education Institutions*, Higher Education Partnership for Sustainability, Forum for the Future, London [online] http://www.heps.org.uk, http://www.forumforthefuture.org.uk (accessed 25 June 2019).

Reid, A. and Petocz, P. (2006) 'University lecturers' understanding of sustainability', *Higher Education*, Vol. 51, No. 1, pp.105–123.

Roorda, N. (2010) *Sailing on the Winds of Change. The Odyssey to Sustainability of the Universities of Applied Sciences in the Netherlands*, PhD thesis, Maastricht University.

Rusinko, C.A. (2010a) 'Integrating sustainability in higher education: a generic matrix', *International Journal of Sustainability in Higher Education*, Vol. 11, No. 3, pp.250–259.

Rusinko, C.A. (2010b) 'Integrating sustainability in management and business education: a matrix approach', *Academy of Management Learning & Education*, Vol. 9, No. 3, pp.507–519.

Ryan, A. and Tilbury, D. (2013a) *Flexible Pedagogies; New Pedagogical Ideas*, The Higher Education Academy, New York.

Ryan, A. and Tilbury, D. (2013b) 'Uncharted waters: voyages for education for sustainable development in the higher education curriculum', *The Curriculum Journal*, Vol. 24, No. 2, pp.272–294.

Schaltegger, S., Lüdeke-Freund, F. and Hansen, E.G. (2012) 'Business cases for sustainability: the role of business model innovation for corporate sustainability', *International Journal of Innovation and Sustainable Development*, Vol. 6, No. 2, pp.95–119.

Schermelleh-Engel, K., Moosbrugger, H. and Müller, H. (2003) 'Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures', *Methods of Psychological Research Online*, Vol. 8, No. 2, pp.23–74.

SDG Academy (2019) *What We Do: the SDG Academy* [online] http://unsdsn.org/what-we-do/education-initiatives/ (accessed 28 May 2019).

SDGKP (2019) *Stakeholders E-Consultation on the Sustainable Development Goals (SDGs) Under Review at the 2019 High Level Political Forum on Sustainable Development (HLPF)*, Sustainable Development Goals Knowledge Platform [online] https://sustainabledevelopment. un.org/hlpf/2019/econsultation (accessed 27 May 2019).

Shephard, K. and Furnari, M. (2013) 'Exploring what university teachers think about education for sustainability', *Studies in Higher Education*, Vol. 38, No. 10, pp.1577–1590.

Sleurs, W. (2008) *Competences for ESD (Education for Sustainable Development) Teachers, A Framework to Integrate ESD in the Curriculum of Teacher Training Institutes*, Comenius, Brussels.

Srivastava, M. (2014) 'Profiling sustainability curriculum in AACSB schools', *SAGE Open*, Vol. 4, No. 2, DOI: 10.1177/2158244014528917.

Sterling, S. (2012) *The Future Fit Framework*, The Higher Education Academy, New York.

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

Summers, D. and Cutting, R. (2016) *Education for Sustainable Development in Further Education*, Palgrave Macmillan, London.

Thomas, I., Hegarty, K. and Holdsworth, S. (2012) 'The education for sustainability jig-saw puzzle: implementation in universities', *Creative Education*, Vol. 3, Special Issue, pp.840–846.

Tilbury, D. (2011) 'Higher education for sustainability: a global overview of commitment and progress', *Higher Education in the World*, Vol. 4, No. 1, pp.18–28.

Tilbury, D. and Ryan, A. (2013) *A Guide to Quality and Education for Sustainability in Higher Education* [online] http://efsandquality.glos.ac.uk (accessed 24 September 2015).

UNESCO (2014) *UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development*, United Nations Educational, Scientific and Cultural Organization, Paris.

UNESCO Executive Board (2013) 'Proposal for a global action programme on education for sustainable development as follow-up to the united nations decade of education for sustainable development after 2014', *UNESCO General Conference, 37th Session*, Paris [online] http://unesdoc.unesco.org/images/0022/002223/222324e.pdf (accessed 24 September 2015).

UNGC (2019) *United Nations Global Compact* [online] http://www.unglobalcompact.org (accessed 28 May 2019).

Wals, A. and Blewitt, J. (2010) 'Third-wave sustainability in higher education: some (inter)national trends and developments', in Jones, P., Selby, D. and Sterling, S. (Eds.): *Sustainability Education: Perspectives and Practice across Higher Education*, pp.55–74, Earthscan, London.

Wals, A.E. (2014) 'Sustainability in higher education in the context of the UN DESD: a review of learning and institutionalization processes', *Journal of Cleaner Production*, Vol. 62, No. 1, pp.8–15.

Weybrecht, G. (2015) *State of Sustainability in Management Education. PRME Annual Assembly Outcomes (Global Fora & Summits) – 2015 Global Forum for Responsible Management Education – 6th PRME Assembly (23–24 June, New York)* [online] http://www.unprme.org/resources/display-resources-sub.php?scid=42.

Wiek, A., Withycombe, L. and Redman, C.L. (2011) 'Key competencies in sustainability: a reference framework for academic program development', *Sustainability Science*, Vol. 6, No. 2, pp.203–218.

Wood, B.E., Cornforth, S., Beals, F., Taylor, M. and Tallon, R. (2016) 'Sustainability champions? Academic identities and sustainability curricula in higher education', *International Journal of Sustainability in Higher Education*, Vol. 17, No. 3, pp.342–360.

Zabkar, V. and Hosta, M. (2013) 'Willingness to act and environmentally conscious consumer behaviour: can prosocial status perceptions help overcome the gap?', *International Journal of Consumer Studies*, Vol. 37, No. 3, pp.257–264.

Zhan, Z., Fong, P.S., Mei, H., Chang, X., Liang, T. and Ma, Z. (2015) 'Sustainability education in massive open online courses: a content analysis approach', *Sustainability*, Vol. 7, No. 3, pp.2274–2300.