Influence of sustainability scholarship on competencies – an empirical evidence

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Abstract

Purpose – Curricula is developing from a pure knowledge-based outcome to a more skill-based outcome, with the objective of creating and advancing competencies that meet employer expectations. While the new Sustainable Development Goals (SDGs) demand organisations to change practices and adapt to sustainable goals, there is a lack of understanding in how competencies can enhance these goals. The purpose of this paper is twofold: Study 1 explores competencies related to sustainability required in a work force and examines employer perceptions on the existing literature for competencies. Study 2 empirically tests the influence of sustainability scholarship on non-technical competencies in the work force.

Design/methodology/approach – A mixed method approach was undertaken. A sample of managers from 39 large Australian organisations participated in the scoping study. This was followed by further interviewing executives from 12 multinational corporations in China to assess the validity of competencies and provide deeper understanding of the issues at hand. The quantitative study analysed a sample of executive responses from 229 multinationals in China using factor and regression analysis to test for the effects of mediation.

Findings – The research highlights that the underlying competencies regarding sustainability influences the bigger picture within firms for attaining sustainability. The affective and cognitive growth of sustainability scholarship is governed mainly by a firm’s sustainable values. Core organisational values facilitate the development of non-technical competencies. These relationships and their cumulative effect on competencies provide a theoretical framework for acquiring sustainability within organisations. Employees need sustainability scholarship for enhancing sustainability. Sustainability scholarship reflects high-level learning obtained through universities or training. The research found that non-technical competencies such as professional ethical responsibility mediate between core business competencies and sustainability scholarship.

Originality/value – By exploring employer’s perception of competencies, the study first makes an important contribution in addressing the need to support SDGs by bridging organisational-level competencies and sustainability literacy, which hold significant benefits for practitioners, academia and organisations at large. Second, the theoretical findings strengthen the need for embedding competencies in the curriculum. It conveys the need for sustainability literacy/scholarship to align with organisational training and learning pedagogies, in order to effectively meet industry needs. Third, it provides useful insights on employers’ estimation about workplace competencies and broadens our understanding on the contribution that competencies within organisations make to this end.

Keywords Competencies, Core business competencies, Sustainable competencies, Non-technical competencies, Sustainability scholarship, Professional ethical responsibility

Paper type Research paper
Introduction
The new Sustainable Development Goals (hereafter SDGs) (United Nations, 2015) require organisations to have strategies that support and interconnect sustainability issues and targets for executing them. Therefore, developing students’ competencies in sustainability thinking and its application is imperative for developing employable graduates who can contribute towards business success (Perraton, 2002). Sustainability competencies require effective educational means for transformative actions (Frisk and Larson, 2011). Universities have been unsuccessful in producing graduates with skills, motivation and knowledge that are required to promote sustainability thinking (Blewitt, 2010) and while these competencies are gaining importance in higher education (Jackson and Chapman, 2012b), relatively little is known about sustainability competencies applied within industry. This not only raises important questions for developing sustainability competencies in universities (González-Gaudiano, 1999), but also how sustainability competencies can facilitate organisations to support SDGs through sustainability literacy and scholarship.

The aim of this study is twofold. Study 1 explores the sustainability competencies required in a work force and examines literature-based competencies, whereby survey methods would not adequately capture this complexity. Study 2 empirically tests which non-technical competencies would influence sustainability scholarship to facilitate SDGs. The paper first makes an important contribution in addressing the need to support SDGs by bridging organisational-level competencies and sustainability literacy, which hold significant implications for practitioners, academia and organisations at large. Second, the theoretical findings strengthen the role of competencies and convey the need for sustainability literacy/scholarship to align with organisational training and learning pedagogies. In order to effectively meet industry needs, the research proposes a theoretical framework. Third, it provides useful insights on employers’ estimation about workplace competencies and broadens our understanding on the contribution that competencies within organisations make to this end.

Study 1: sustainability competencies/skills
When students acquire training in applying sustainability perspectives within university learning tasks, they are more likely to focus on demonstrating sustainability outcomes. This is recognised in the UK where universities assign priority to developing literacy in sustainability as a “core competence” among graduates (Dawe et al., 2005). Others are of the opinion that not many students graduate with an understanding of “how to make a specific contribution to future social and economic development in a sustainable way” (HEFCE, 2005, p. 7). Analytical and problem-solving competencies are broadly sought by businesses but there is an enduring parallel between the competencies required by businesses and those now prompted and planned by universities, such as those relevant to sustainability (Thomas, Hegarty and Holdsworth, 2012). Given the limited paradigmatic framework available for assessing sustainability competencies, Besong and Holland (2015) propose the Dispositions, Abilities and Behaviours framework that profiles sustainability competencies. Several competencies are developed to facilitate students to participate in sustainability initiatives (Rieckmann, 2012), and while some of the research findings within the literature have provided conceptual insights to extend an understanding of sustainability competencies, they only offer an emergent and evolving conceptualisation of the concepts. There is little research examining the types of competencies and their application within industry. We conceptually argue that for sustainability competencies and non-technical competencies to be useful, sustainability scholarship and literacy underpinning the principles of sustainable development is essential for moving forward.
Qualitative analysis

Qualitative research is suggested when the topic under study needs to establish themes, patterns, concepts, insights or understandings (Morse and Richards, 2002). Study 1 uses qualitative research since this kind of research is exploratory by nature. The line of investigation explores a phenomenon with limited understanding, and aims to discover new meanings to potentially generate future research hypotheses (Marshall and Rossman, 2006). Additionally, qualitative research methods bring about a better understanding of competencies related to specific organisational and learning skills. Furthermore, the focus on learning and applying competencies gives a broader context to specific actors and processes under study.

A mixed method approach was undertaken. A sample of managers from 39 Australian organisations participated in the scoping study. Researchers consulted with stakeholders to elicit information about competencies valued within firms (Arksey and O’Malley, 2005). The results showed varied opinions that outlined both sustainable and general learning competencies. The data obtained were descriptive and quantifiable. This was followed by further in-depth interviews with executives from 12 multinational corporations in China to assess the validity of competencies and provide deeper understanding of the issues at hand. Multinationals (thereafter MNCs) ranged from accounting organisations, to media, technology, automobiles, telecom, transportation and logistics, energy and utilities, steel and finance and banking. Convenience sampling and known contacts were the initial starting point; many of the MNCs had some contact with the researchers due to their programs running in China and were able to obtain contacts with key informants such as their C-level executives (high-ranking executives). A few companies were randomly selected from the China Business Directory.

The research uses purposeful sampling, since rich in-depth information was required (Patton, 1990). The analysis approach was inductive and centered on the conceptual framework. The structured interviews ranged from 1 to 2 h. Questions were open-ended, starting with the least sensitive questions, demographics of the firm; and proceeded to more in-depth and affective discussions. The questionnaire assessed several areas of competencies within their organisations, their managerial process, sustainability goals of the organisation, organisational and sustainability learning and other macro factors that generally affect the sustainability of organisations. The interviews were analysed using NVivo qualitative data analysis software using thematic analysis.

Competence in sustainability is perceived as having acquired skills and knowledge to deal with problems, complexities and challenges and providing solutions through a balanced holistic approach that would not only benefit the organisation but also the environment. Competencies determine learning outcomes and they are defined as “a combination of skills, abilities, and knowledge needed to perform a specific task” (Jones and Voorhees, 2002, p. vii). Frisk and Larson (2011) refined sustainability competencies to include several more areas, predominantly in the case of action orientation and change agent skills. Besides key competencies, the authors also provide a transparent common framework for creating distinctive and noticeable profiles of graduates, which can provide an essential reference point for evaluating student learning and teaching effectively (Wiek et al., 2011). Competence-related education focuses on student outputs, rather than the didactic approach of teacher inputs traditionally positioned in schools and higher education (Frisk and Larson, 2011). There seems to be a need to develop a common ground or platform to teach competencies or behaviour (Poeck, 2015).

Competencies raise questions pertaining to how they develop and resonate pedagogies in the workplace and what are employers’ general perceptions regarding sustainable competencies. Which competencies take priority; how sustainability scholarship and literacy integrate to enhance sustainable performance for organisations? Understanding
the gap between developing sustainable competencies determined through learning outcomes and how can they apply within organisations is clearly an imperative academic and organisational objective. Thus, this study draws upon the framework addressed by Wiek et al. (2011) and Frisk and Larson (2011) and their views on competencies related to sustainability, as well as non-technical competencies described by Jackson and Chapman (2012b).

**Results and discussions**

This section elicits information on how employers perceive sustainability competencies, such as: Describe your role with relevance to competencies required. What are the most notable competencies you are able to deliver during your experience? How do you view sustainable competencies, given that we have a list of competencies (description of sustainable competencies) – how do you see yourself or your organisation having these competencies? What other types of competencies do you observe in your employees? How would your company identify with the following non-technical competencies?

The key competencies for sustainability challenges are distinct and have identifiable qualifications (Wiek et al., 2011). They differentiate competencies from key competencies, suggesting that key competencies can be crucial for sustainability efforts. Although regular competencies like critical thinking and basic communication skills are important for sustainability; “key” is regarded essential for sustainability. Key competencies have been conceptualised and discussed in several articles (Byrne, 2000; de Haan, 2006; Barth et al., 2007; Sipos et al., 2008; Segalàs et al., 2009; Willard et al., 2010) but only Wiek et al. (2011) were able to synthesise the literature on sustainability competencies into a comprehensive overarching framework.

Wiek et al. (2011) claim that there is limited, if at all any, empirical evidence that sustainability competencies allow real-world sustainability research and problem solving; graduates lack specific skills to deal with sustainability problems and most of all there is a gap in theoretical justification for key competencies in sustainability. Hence, their review on sustainability literature identified several key sustainability competencies. They are: systems thinking; anticipatory; normative; strategic; and interpersonal. Students require an in-depth proficiency in one or two of the above key competencies and a firm foundation in others, more particularly, when it comes to problem solving, these competencies make it possible to co-create knowledge and action for sustainability (see Wiek et al., 2011).

Similarly, prior research has also focused on four key sustainability concepts, namely (for detailed information see Frisk and Larson, 2011), systems thinking and an understanding of interconnectedness (Garrett and Roberson, 2008); long-term, foresighted reasoning and strategizing (Pepper and Wildy, 2008; MacKay and McKiernan, 2004); stakeholder engagement and group collaboration (Segalàs et al., 2010); and action orientation and change agent skills (Wiek et al., 2011; Sipos et al., 2008; de Haan, 2006).

Not all respondents were familiar with the key competencies, which influence the work force more particularly key sustainable competencies; this is in parallel with findings from the scoping study. Even though competency frameworks, as a foundation for workplace learning initiatives, are considered popular in organisations (Garavan and McGuire, 2001), many of the respondents took them for granted. Respondents did not readily categorise themselves or their organisations as having several of these key sustainable competencies but all believed that these competencies were useful from an organisational-level perspective. Many respondents also within the scoping study confirmed that competencies determining learning outcomes cover a range of skills, knowledge, attitudes and experiences that employees have and that can add value to the organisation (Gorsline, 1996). They unanimously agreed that these competencies should be taught within education/organisational systems.
Systems thinking
Organisations identified with systems thinking and believed that it is important in terms of addressing sustainability. Sustainability reporting standards required by governments were also important to several firms. Systems thinking is an understanding of interconnectedness (Garrett and Roberson, 2008). The concepts involves “interconnections between the environment, economy, and society, including impacts, trade-offs, feedbacks, and unintended consequences of individual and collective actions” (Frisk and Larson, 2011, p. 13). Most agreed that system thinking is a common pedagogical structure (Hammond, 2003; Senge, 1990). It gives students a perspective on how subsets of entities fit within larger entities, which comprise of natural and manmade surroundings that encompasses a whole (Porter and Córdoba, 2009). Suggestions from some organisations showed that internal and external systems are needed to be interconnected in practical and operational settings through a holistic educational viewpoint for sustainable performance. For instance, research has shown that for entrepreneurship educators there is a need to reassess their pedagogical methods to incorporate systems thinking as more holistic educational outlook (Wyness et al., 2015).

Anticipatory competence
Anticipatory thinking refers to thinking scientifically about the future and future problems. Generally anticipatory competences are intended to “address key issues of sustainability, including unintended harmful consequences and intergenerational equity” (Wiek et al., 2011, pp. 207-208). Several organisations found anticipatory thinking useful but made a weak difference to sustainability performance due to lack of governance. Yet, at the same time, the respondents were more emotional about the future.

Normative competence
Normative competence provides a balance between socio-ecological activities and environmental capacities (Wiek et al., 2011). This is in addition to improving socio-economic actions and environmental capabilities (Swart et al., 2004).

This was useful but not clearly applicable. Respondents would not go beyond their means to address and balance ecological considerations but believed that organisations required building resilience and compromise.

Strategic competence
Strategic concepts are applied, such as adaptation and mitigation; efficiency and effectiveness; transformative governance; and social learning for a sustainable future. Strategic competence requires “an intimate understanding of strategic concepts such as intentionality, systemic inertia, path dependencies, barriers, carriers, alliances and others. Overall, these skills are tailored to address key issues of sustainability, enabling transitions toward a sustainable future” (Wiek et al., 2011, p. 10).

In other words, finding solutions to the complexities with sustainability problems and involves transitioning towards transformational changes (Loorbach, 2007). Many organisations believed strategic competencies supported their corporate social responsibility plans.

This was found to be very useful for improving firm performance in sustainability. Respondents reported that organisations formed a link with their strategic plans and goals. Here again, a balanced approach had been discussed. More specifically, organisational learning was strongly recommended.

Interpersonal competence
Derived from various other studies, Wiek et al. (2011) propose that interpersonal competence skills are “the ability to motivate, enable, and facilitate collaborative and participatory
sustainability research and problem solving. [...] All of these skills are particularly important for successful stakeholder collaboration and a necessity for the majority of methods assigned to previous competencies” (p. 210).

Most organisations found interpersonal competence very useful and they strongly believed that it would make a difference. This was the most preferred competence and some believed practical skills involving networking was also important. Sustainability challenges affect various actors and require associations and negotiations from stakeholders.

*Long-term, foresighted reasoning and strategizing (Pepper and Wildy, 2008)*

It was also considered to add value. The concepts involves “future orientation in terms of achieving inter-generational equity, in minimizing the long-term impacts of human actions, realizing societal visions of the future and developing transition strategies and evaluative techniques” (Frisk and Larson, 2011, p. 13). While this was useful to all organisations as this hinges around SDGs, there was lack of determination to learn about sustainability on a long-term basis.

*Stakeholder engagement and group collaboration (Segalàs et al., 2010)*

The concept involves “democratic decision making, including intra-generational equity in participation and consideration of plural perspectives and transdisciplinary collaborations” (Frisk and Larson, 2011, p. 13). Respondents suggested aligning parent company views was also required in order to sustain this competence. Some are of the opinion that basic green knowledge and implementing sustainability requires integration with stakeholders. For example, new mechanisms in learning and development encompassing green knowledge also require involvement and engagement, autonomy and trust, cooperation and collaboration between professions, trades and various stakeholders (Blewitt, 2010).

*Action-orientation and change agent skills (Wiek et al., 2011; Sípos et al., 2008; de Haan, 2006)*

This concept involves “transformational consumer actions, along with civic and community engagement” (Frisk and Larson, 2011, p. 13). Most firms believed that this was significant. Respondents believed that they could engage in sustainability skills as agents of environmental protection and change.

**Generic and non-technical competencies**

Jackson and Chapman (2012b) develop an extensive set of industry-relevant competencies compiled from a wide analysis of international employer founded studies. Respondents were given these competencies and how they seem to fit within their organisational structures. From the analysis of the recordings and interviews revealed that these competencies could be further classified under five distinct headings.

Many of the respondents referred to managerial type of competencies that are related to skills and attitudes, along with several generic competencies like problem solving, reflective learning, projects and teamwork, communication and critical thinking. While not many responded to having specific competencies, their responses indicated overarching appreciation of all personal values and future employees having a sense of sustainable altruism and values. Respondents viewed business competencies as the fundamental requirement of performance for their job; these were related to technical skills and generic competencies.

**Sustainability scholarship and sustainable development**

Sustainability scholarship is seen as encompassing a higher level of learning within sustainability. The following question was asked: How would you like to see your company attain sustainable development? How do competencies impact on sustainability
scholarship? Reed et al. (2006) suggest that if company’s goals, strategies or practices are not consistent with the principles of sustainable development, then participation may fail to augment sustainability. Similarly, Sterling and Thomas (2006) identified a hierarchy of learning involving the principles of sustainable development, where progressively students can learn more by applying them at different cognitive levels from awareness to transformation. They propose that if a student completes only one subject related to sustainable development, then some component is accomplished. Education for sustainable development (ESD) engages in broad domains of knowledge and if ESD is at the minimum “integrative” it will have achieved more than survival skills for employment. Since these learning approaches would influence a certain degree of competencies that make graduates “work ready”, we complied these questions to examine employer’s perspectives.

Respondents unanimously concurred that all competencies, not only sustainable competencies, should influence principles of sustainable development and sustainability scholarship. Top management should be strongly committed and accountable, irrespective of their companies’ goals and constant training to be given. Training regarding impact on the environment was rated moderate and there was talk about sustainable development. From the discussions, it was clear that pollution was their major constraint and they had government policies to comply but required stricter governance.

The final theme was clear in that full-fledged non-technical competencies combined with sustainability competencies would increase the effectiveness and profitability of an organisation. They require a culture for learning and applying sustainable development by getting employees to identify best practices in sustainability.

It was observed that even though through learning students become competent in applying the principles of sustainable development, yet, as employees they need to be very passionate to drive sustainability. This supports Shrivatava’s view on managing sustainability with passion involving critical thinking skills, multiple perspectives, practical techniques of management, physical stamina and a deep commitment to goals that sustain motivation and desire for work. Behavioural was rated more on individual characteristics than what people bring to the job.

Conclusions
Given that the aim of Study 1 was to capture sustainability competencies and its importance within organisational goals and learning, we recognise sustainability competencies as the main theme. In fact, deep knowledge of sustainability is required and learning is essential for all types of sustainability competencies, which aligns with their organisational goals. Core organisational values lead to strengths of an organisation and have the potential for building capacity for change. With this framework, non-technical competencies were relevant. Non-technical competencies require organisational learning to support goals, as they are inherent and central to the organisation.

The organisations did not provide distinct sustainable competencies as many of the respondents were not aware of key sustainable competencies but organisations reported they had goals that are based on sustainable development. Many of the respondents aligned their goals with organisational values and sustainable values.

Given in Figure 1 is the integration and the emergent concepts for conceptualising this research: the analysis reveals that learning is relevant to obtaining SDGs and influences the translation of different types of competencies that are required by businesses.

Two factors that interconnect with organisational goals are sustainability values and core organisational values, which draw on the culture of an organisation. Both are required to support organisational values and constitute the overarching organisational goals. These relationships and their cumulative effect on the competencies provide a theoretical framework for acquiring sustainability in organisations. Employees need sustainability
literacy for enhancing sustainability. Since they reflect high-level learning obtained through universities or training, employees require to be trained in that domain. Low-level learning reflects organisational learning and generic competencies, skills and knowledge mainly acquired through experience within the organisation. Non-technical competencies included both high- and low-level learning. Competencies in sustainability should be flexible to adapt to the evolving environment and allow for responsive programme designs, which are broad and inclusive (Vincent and Focht, 2009).

**Study 2**
While Study 1 explored the underlying technicalities of competencies, Study 2 further explores non-technical competencies since respondents believed that they should influence SDGs through sustainability scholarship. Non-technical competencies required high- and low-level learning; these competencies are also linked to organisational learning.

The drive towards developing non-technical competencies has resulted in moving towards competency-based education (Jackson and Chapman, 2012b). Jackson and Chapman (2012a, p. 541) regard non-technical competencies as “cognitive and soft skills required to successfully and innovatively apply disciplinary knowledge in the workplace”. Similarly, others have suggested that non-technical competencies “go beyond the disciplinary expertise or technical knowledge that has traditionally formed the core of
most university courses” (Bowden et al., 2000). Researchers within other disciplines such as medicine have found that the fundamental cause in failures is with non-technical skills rather than inadequate technical expertise. They indicate that while technical skills are critical, they are not enough to retain high performance levels over time (Yule et al., 2006). In parallel, with changes in company culture, curricula are influenced by moving from a pure knowledge-based outcome to more skills-based outcome, with the objective of developing skills that suit employer’s expectations (Mather et al., 2011). In light of this, the influence of non-technical competencies within a sustainable framework and the nature upon which employers’ perceive these non-technical competencies raises important questions. Since non-technical competencies are also critical for facilitating sustainability, the research question is:

*RQ1.* Which non-technical competencies will influence sustainability scholarship to facilitate SDGs?

**Method**

We build on Jackson and Chapman’s (2012b) research work to examine non-technical competencies influence on sustainability scholarship within business firms. They obtained their competencies from conducting a summative review of employer-based studies on industry-relevant graduate competencies. They identified 45 operational behaviours and clustered them into 20 competencies based on previous empirical studies or theoretical associations. In their study, they derived profiles based on academic perceptions that would represent the types of business graduates academics employers would favour and attempted to highlight the relative significance of natural subgroupings of specific cognitive and soft competencies. Based on our thematic analysis, we grouped them as per how employers perceive they would best be represented. We generated five sub-competencies that are as follows: specific managerial competencies, generic competencies, professional ethical responsibility, personal competencies and core business competencies.

Scale items drawn from the study of Jackson and Chapman (2012b) are modified to suit our research questions. Thomas and Day (2014) support Barrie’s (2006) hierarchy of conceptions in relation to attributes and propose a hierarchy for sustainability based on Sterling and Thomas’ (2006) work. This was included in this study under sustainability scholarship. Respondents were asked to rate their responses on a five-point Likert-scale ranging from 1 strongly unimportant to 5 strongly important. The questionnaire was translated into Chinese and back-translated into the original version; the two original language styles were compared. It was further tested on a group of English-speaking Chinese for accuracy before proceeding.

An international professional market research company who had offices *in situ* was used to conduct the survey in China. A soft launch with 38 MNCs in China was conducted before proceeding; few questions were modified for reflecting accuracy. A sample of 229 MNC executives in China was contacted by the market research company. The sample comprised of senior managers, directors/CEOs, C-level executives and owners of the organisations. Entry-level and mid-level employees were not considered for this survey. According to Hair et al. (2006), the sample size is appropriate for this study. The research firm checked for quality standards, cross-referencing of the sample profile data with survey responses, data cleaning, data validation (edits) and reducing/eliminating data errors. Responses were loaded into a SPSS database. Around 32 per cent of the businesses were located in Shanghai, 20 per cent Beijing, 16 per cent Guangzhou, 7 per cent Shenzhen and the rest of the minority were from Chongqing, Tianjin, Wuhan, Chengdu, Hangzhou and a few other (2 per cent).

Item parcelling was used for single-factor extraction procedure for the fixed factors based on employer perceptions, since the levels under study are the only levels of interest.
The factors were extracted accordingly. Principal components analysis was found suitable since the aim was to identify and compute composite scores for the factors. Those items that failed to meet minimum criteria of having a primary factor loading of below 0.5 were eliminated. Cronbach’s $\alpha$ was used to examine internal consistency for each of the scales. The $\alpha$s ranged from moderate to high (see Table I); no items were deleted to increase the $\alpha$ levels.

The research uses multiple regression to analyse the data for identifying the relationships of $RQ1$.

The $R^2$ shows the model, which suggests a moderate explanatory power, explaining 38 per cent of the variance of sustainability scholarship. The ANOVA tests identify that multiple $R$ is significant $F(5, 223) = 26.735, p < 0.001$.

Table II shows that except for professional ethical responsibility, none of the non-technical competencies predictors directly influences sustainability scholarship. The $\beta$ standard coefficients explains the relative strength of this predictor ($\beta = 0.342; \text{sig} = 0.001 > 0.05$); Tolerance value VIF are well within the range (Tabachnick and Fidell, 2001) which indicates the absence of multicollinearity.

We further tested mediation relationships for core business competencies. Since increasing shareholder value and competitive advantage is associated with companies that pursue sustainable development, there are risks from unsustainable business practices (Curzons et al., 2001) and thus adequate knowledge in sustainability will be required to manage and accomplish the goals of sustainable development. It is also important to develop business-relevant criteria for ecological equity (Dyllick and Hockerts, 2002). Similarly, in a professional undertaking ethical responsibility is exercised to consider environmental impacts of products and processes, business design and management practice (Beamon, 2005). Rules surrounding corporate responsibility, particularly for MNCs, go beyond maximising shareholder’s wealth to incorporate extended environmental and social responsibilities. Based on the above theoretical rationale, we hypothesise core business competencies directly affects sustainability scholarship through the mediating function of professional ethical responsibility (see Figure 2; mediating effects).

Andrew Hayes PROCESS was used to identify mediating effects and test the hypothesis; professional ethical responsibility mediates the effect of core business competencies and sustainability scholarship. Results indicate that core business competencies is a significant predictor of professional ethical responsibility, $\beta = 0.817, \text{SE} = 0.038, p < 0.05$, and that professional ethical responsibility is a significant predictor of sustainability scholarship, $\beta = 0.473, \text{SE} = 0.094, p < 0.05$. Core business competencies was no longer a significant predictor of sustainability scholarship after controlling for the mediator, professional ethical responsibility, $\beta = 0.114, \text{SE} = 0.094$, was non-significant, which is consistent with full mediation. Approximately 26 per cent of the variance in sustainability scholarship is accounted for by the predictor ($R^2 = 0.251$). The indirect effects were tested using a bootstrap estimation approach with 5,000 samples. The measure for the indirect effect of core business competencies on sustainability scholarship shows the effect size of 0.3870, with a 95% confidence interval which did not include zero (CI = 0.2383, 0.5458).

This finding of professional ethical responsibility mediating the influence between core business competencies and sustainability scholarship provides beneficial insights. This is consistent with the literature on corporate social responsibility. Professional ethical responsibility could account for a significant amount of variance in the influence of core business competencies for influencing sustainability scholarship. This is an important finding in terms of making graduate “work ready” allowing for their transformation of the SDGs through non-technical competencies and a noteworthy need for sustainability scholarship encompassing learning outcomes.
### Table 1. Factor loadings and α

<table>
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<th>Competency Type</th>
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<th>Factor Loading</th>
<th>α</th>
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<td>Specific managerial competencies</td>
<td>Leadership-1</td>
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<td>Confidence-1</td>
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<td>Sus3-integral to best practice</td>
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**Cronbach’s α**: 
- α = 0.849
- α = 0.787
- α = 0.714
- α = 0.797
- α = 0.774
- α = 0.645

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Discussions and conclusions
What appears to be accomplished in this research was based on the need to identify what businesses would want from graduates and recognising what they require in terms of graduate sustainability skills (Gitsham and Clark, 2014). Based on the literature and the qualitative interviews conducted, both technical sustainable competencies and non-technical competencies have provided potential answers to those questions.

The study explores the need for sustainable learning to design competencies in the workplace, which involved two complementary studies that make a theoretical contribution within the sustainability competencies domain. Study 1 found that key sustainable competencies are lacking in most organisations and can be attained through universities or specifically designed organisational training programs. While non-technical competencies are equally important for improving sustainability, emphasis should be placed on professional ethical responsibility.

Study 2 empirically tests non-technical competencies with sustainability scholarship and found that professional ethical responsibility was a significant. It further tested professional ethical responsibility and found that it mediates core business competencies with sustainability scholarship. Core business principles and professional ethical responsibility provide the foundation for building graduate attributes/competencies within the area of sustainability whereby academics and practitioners can use these competency mandates to train management by developing sustainability programs.

The question raised is how to learn these competencies as competencies are characterised as “learnable but not teachable” (Barth et al., 2007, p. 418). Universities are required to incorporate key sustainability competencies in their courses, educating for sustainability competencies should be flexible, as the more complex and uncertain the business systems get, learning needs to become non-linear, creative and emergent (Blewitt, 2010).

Courses that capture, formalize and build upon the available knowledge for sustainability will be required to rethink in terms of developing competencies. Some suggest proposals made towards reformist approaches to the curriculum rather than introducing radical transformational models in terms of cross-disciplines and opening these boundaries (Hopkinson and James, 2010). Science, technology, engineering, law, economics and mathematics will have their own methods for introducing key sustainability competencies that support SDGs and are likely to make use of cross-disciplines to introduce

<table>
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Table II. Significance of independent variables

Figure 2. Mediating effects
non-technical competencies that underpin sustainability. Some disciplines that are more suited to influence broader public and policy debates should continue to refine their sustainability competencies to train employees.

Limitations and future research
This research has some limitations. A larger sample would confer a broader perspective. The results may have been diverse if more local Chinese businesses were included in the study. Self-reported measures are subjective and reflect social desirability bias. This research supports the view of having differences in adopting modern management principles between competency profiles of eastern and western countries (Velde, 2009), but they are for a different rationale. For instance, MNCs in China were supportive of the western culture; however, there can be differences in competencies between the parent company and the host country. Their organisational goals can differ based on regulations and governance. Future research could investigate this further. It also opens opportunities for further exploring the sustainable competencies required under the VET system and their competency-based training that rely on training packages for delivery (Kosbab, 2003). This research showed that the impacts of sustainable problems faced in China have increased the severity of addressing sustainability more from an emotional and emphatic need. This also opens avenues for further research into intrapersonal and interpersonal sustainability skills, which are neglected by professional graduate education, even though it is a requirement that employees have highly developed interpersonal skills (Jaeger, 2003).

Faherty (2015) draws on enterprise skills through using summative peer assessment to develop enterprise skills and while affirming that enterprise skill is a multifaceted development (Deignan, 2011), it involves innovative teaching methods (Gibson, 2011), assessing practice (Brown, 1999) and assessments that do not include established frameworks (Wilson, 2012). There is an overlap of these skills with both in sustainability competence and non-technical skills; future research in this area can investigate skills that are more specific. In addition, future research should also expand on entrepreneurial skills such as self-employment or entrepreneurial. For instance, those wishing to create employment, rather than seek employment, these skills are well embedded but need to be differentiated (Faherty, 2015; Jones et al., 2012).

In conclusion, this research has found that the underlying competencies regarding sustainability influence the bigger picture within firms and their processes in connecting with sustainability. The affective and cognitive growth of SDGs is governed mainly by a firm’s sustainable values and is facilitated through sustainability scholarship. This study is only the primer in the type of competencies that are essential to determine whether there is evidence for non-technical competencies to become the forefront for sustainability in teaching and training environments.

References


Further reading


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