Attitudes of Undergraduate Business Students Toward Sustainability Issues

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Abstract:
Purpose - This paper reports on findings from the first phase of a longitudinal study of undergraduate business students' attitudes, beliefs and perceptions concerning sustainability issues.

Design/methodology/approach - In order to improve understanding of the potential effects of changes in the curriculum, business students enrolled during the academic year prior to a redesigned, sustainability-informed, curriculum were surveyed. Familiarity with key sustainability terms was tested using a semi-structured questionnaire applied across two campuses of James Cook University, Australia. Quantitative data were complemented by use of open-ended questions that yielded qualitative insight into a range of student knowledge, attitudes, behaviours and normative influences relating to sustainability and climate change.

Findings - Findings reflect naïve awareness of the potential impact of individual contributions to sustainability and environmental challenges. They reveal a tendency to regard major issues as beyond personal control and to view solutions as being the responsibility of others. This is coupled with reluctance to consider major lifestyle changes.

Social implications - Universities are increasing their focus on sustainability related issues and the ways in which these can be effectively communicated via curricula. This article carries implications for this societal agenda, particularly in relation to the need to address disconnections between awareness of issues, personal relevance and effective strategies for addressing sustainability issues.

Originality/value - The findings shed fresh light on the attitudes and behavioural dispositions of undergraduate business students and could help guide the development and delivery of curriculum content.

Introduction

Universities are increasingly recognising that they have a responsibility to help society to move towards more sustainable futures (de la Harpe and Thomas, 2009) and extant literature contains references to the potential role of universities as change agents (see, for example, Mcmillin and Dyball, 2008). Students will acquire both discipline-specific and generic knowledge and skills throughout their programmes of study (Petocz and Dixon, 2011). A shared understanding of sustainability issues and their implications for future business practice is needed in order to: (a) develop effective curriculum which provides appropriate knowledge and skills; (b) challenge students' current perceptions of major issues impacting on sustainability; and, (c) encourage students to take a critical approach to current and future business practices informed by better understanding of the issues.

Literature Review

Although interest in the 'greening' of business school programmes has accelerated in recent years (see, for example, Holt, 2003; Marshall and Harry, 2005; Jabbour, 2010), there is still much scope for embedding sustainability into the business curriculum (Naeem and Neal, 2012; Nemetz, 1999, 2004). Beyond the business school, furthermore, there is a growing body of literature that both challenges and celebrates the successes of integrating sustainability themes into subject-specific and trans-disciplinary teaching. Multidisciplinary contributions to the collection by Stibbe (2009), for example, emphasise the importance of developing 'sustainability literacy', by which is meant a range of practical skills, attitudes, competencies, dispositions and values which go beyond traditional forms of rote learning and, instead, employ active learning techniques to engage students in the kind of real life problem solving required in a resource constrained and ecologically challenged world. Successful learning strategies appear to be grounded in a clear understanding of the knowledge and attitudinal base from which students start studying the themes and how studies change their knowledge, attitudes and beliefs over time (see, for example, Buissink-Smith *et al.*, 2011; Michalos *et al.*, 2011; Stubbs and Schapper, 2011; Stubbs and Cocklin, 2008; Bogner and Wiseman, 2006). These studies have not tracked long-term effects, and there is some evidence indicating that a sustainability orientation may not be reflected in actual behaviours once students enter the workplace (Kuckertz and Wagner, 2010). This area is under researched and requires further investigation.

Any behaviour change messages embedded in the curriculum will be subject to a range of competing messages and social encouragement or discouragement through peer and family influences, perceived and actual behavioural norms (Peattie & Peattie, 2003). Families, through socialization and influence are known to impact the environmentally-relevant behaviours of adolescents (Grønhøj and Thøgersen, 2012), but the magnitude or duration of this influence is unknown as research has been concentrated on under-18 year olds living at home (Grønhøj & Thøgersen, 2009).

Further, Systems Justification Theory suggests that people will strive to maintain a sense of certainty and stability but that in order to maintain the status quo, may fail to accept risks or to acknowledge personal responsibility for contributions to problems (Feygina et al., 2010). There is a disconnection between perceptions of individual actions and global issues (Threadgold, 2012). Altering attitudes and beliefs has been shown to have little impact on willingness to act (Boyes & Stanisstreet, 2012); the gap between reported attitudes towards environmental issues and actual behaviours is well documented in the literature (Ockwell et al., 2009; Lorenzoni et al., 2007, Sheppard, 2005).

Perceived norms have long been recognised as impacting on behavioural decisions (Cialdini, 2003). Recent developments in the study of normative influence have re-categorized norms into 'injunctive' (what is perceived as being approved or disapproved) and 'descriptive' (what appears to be actually occurring) components (Hennessy, 2010). Interventions that stress descriptive norms may not be effective if they reinforce the belief that challenges are too big for individual actions to have any impact on resolving them (Cialdini, 2007; Semenza et al., 2008).The weakness of simply providing information in anticipation of it leading to behaviour change is acknowledged in the extant literature; as are the inadequacies of many current theories in capturing and charting the interaction of these factors across different population groups (Lorenzoni et al., 2007).

Extant literature has found that students "undergo profound changes in epistemological assumptions and in identity during their undergraduate years" (Myers and Beringer, 2010: 51), thus changes in knowledge, attitudes and behaviours regarding sustainability and related issues are possible as students progress through their studies. The nature of these changes has not been studied within the business studies context. The findings reported here indicate that achieving significant long-term changes in behaviours will be a substantial challenge for the revised curriculum.

Research aims and methodology

In response to research gaps identified in the literature review, this article reports on a research project that is aimed at longitudinally tracking the effects of a revised undergraduate business studies curriculum; one that integrates significant sustainability and behaviour change issues at all levels and stages of programmes offered. In order to gain an understanding of the potential effects of changes in curriculum, students enrolled during the academic year prior to an altered curriculum were surveyed.

Data from this survey is to be used as a baseline 'control' against which future impacts of the revised curriculum can be assessed. This first phase of research is intended to establish benchmarks regarding current knowledge, attitudes, perceived norms and the perceived personal relevance of sustainability issues among incoming students. This phase of research will also guide campus intervention development, including choice of message framing and communications channels.

Key aims of the study were to:

- Provide a benchmark measure of incoming undergraduate students' knowledge of, and attitudes towards, a range of sustainability issues and thus inform the development of the revised curriculum for the Bachelor of Business (B.Bus) programmes.
- Use the data obtained to inform subject development (with subsequent phases designed to enable fine-tuning of subject offerings).

Questions were derived from common themes in the literature and previously used instruments, including: Michalos *et al.* (2011); Shephard *et al.* (2009); Kagawa (2007); Lidgren *et al.* (2006); Marcell *et al.*, (2004); Holt (2003); and Kaplowitz and Levine (2005). Familiarity with key sustainability terms was tested, followed by presentation of 34 statements covering a range of knowledge, attitudes, behaviours and normative influences, perceived self-efficacy, and optimism versus pessimism regarding the future. Good internal consistency was evident (α = .89). For the statements, a five-point Likert scale was used, with anchor points of strongly agree and strongly disagree. A sixth option of don't know / not interested was included. This latter option was intended to provide an alternative for those who have only vague understandings or no true opinion on the statements listed (Sturgis and Smith, 2010; Krosnick *et al.*, 2002) rather than forcing an artificial pseudo-opinion (Malone *et al.*, 2010). These statements were followed by a number of open-ended

questions relating to benefits, incentives and actions regarding behaviour change and a further set of prompts inviting questions from respondents regarding a range of sustainability and climate change issues. Familiarity with terms are reported in Table 2, attitudes in response to statements are reported in Tables 4-5, 9-12, open-ended questions are detailed in Tables 3 and students responses reported in Tables 6-9.

The questionnaire was distributed to samples of business students at the Townsville and Cairns campuses of James Cook University enabling a comparison of the student cohorts.

Demographics
Two hundred and twenty-four usable questionnaires were obtained[1], 73% from Townsville and 27% from Cairns. Both samples comprised predominantly Australian students, 87% in Townsville and 73% in Cairns. In Townsville, 2% were from Asia and 5% from other nationalities. In Cairns, 12% came from various Asian countries and a further 7% from countries other than Australia.   While there was a slightly higher percentage of female students in the Cairns sample (77% compared to 68% in Townsville), the difference was not statistically significant. As shown in Table 1, there was, however, a statistically significant difference in age group composition between the two campuses, with Townsville students being younger and thus more likely to have come straight from secondary school.

Table 1: Age group

* Significant difference between campuses P = .008	Townsville %	Cairns %
Under 20 years of age	64	38
20 - 29 years of age	26	43
30 - 39 years of age	5	7
40 - 49 years of age	4	7
50 - 59 years of age	-	2
60 years of age or older	1	3
Total	**100**	**100**

Findings and discussion[2]

Familiarity with key terms
Previous studies (e.g. Kagawa, 2007) have elected to examine only the broad concept of sustainability and sustainable development. Given the multiple dimensions of sustainability (see, for example, Sheth *et al.*, 2011; Timmerman and Metcalfe, 2009) the authors opted to examine three sustainability concepts (economic, environmental and social) separately and to compare familiarity across the terms. This approach is consistent theoretically with consensus concerns regarding the 'triple bottom line' (Elkington, 1998; McDonough and Braungart, 2002; Savitz and Weber, 2006) Understanding of related concepts, such as, conservation and climate change were also explored. Table 2 indicates higher awareness of subjects that are most frequently featured in news items such as energy conservation and climate change adaptation, but also significant differences between the two campuses for three items: social sustainability, conservation and climate change. For the first two, the higher levels of awareness within the Cairns cohort may reflect the greater concentration of small communities in the immediate vicinity and also the higher reliance of the regional economy on tourism, particularly wildlife-based activities and ecotourism.

Table 2: Self-reported familiarity with terms and their meaning
6-point scale where 5= very familiar, 1 = not familiar at all and 0 = don't know / not interested

* = Significant difference between campuses	Townsville		Cairns	
	Mean	Std Dev.	Mean	Std Dev.
Economic Sustainability	3.47	1.19	3.44	1.19
Environmental sustainability	3.79	1.08	3.77	1.10
Social sustainability * p = .000	3.25	1.12	3.77	1.19
Sustainable development	3.45	1.16	3.23	1.15
Conservation * p = .005	3.64	1.21	3.97	1.03
Climate change * p = .023	3.98	1.11	3.54	1.11
Climate change adaptation	4.13	0.97	4.00	1.15
Environmental protection	3.80	1.19	3.51	1.06
Energy conservation	4.25	1.07	3.95	1.02

As previous studies have shown (see, for example, Marcell et al, 2004), familiarity does not necessarily transfer into pro-environmental behaviours.   Low levels of interest were evident for all these topics.   In a series of open-ended questions, respondents were asked what their most important question was for each of the topics. Over 90% of Townsville students and 75% of Cairns students had no questions about the topics. Of the few questions that were listed, most related to what the terms actually meant, how behaviours were to be enacted or what the most effective measures were. Moreover, Table 3 indicates a degree of scepticism about some of the terms.

Table 3: Indicative questions regarding key terms

Most important question about Economic Sustainability "How do you integrate this with business and remain profitable?" "How can the economy help to save the environment?' "Why are world governments not taking it seriously enough?"
Most important question about Environmental Sustainability "How do we manage traditional hunting?" "Is the environment more important than living a comfortable life?" "Is it worth the fuss?"   "What is the most effective thing to do to help the environment?
Most important question about Social sustainability "What is the most effective thing to do?"   "From whose perspective Is the judgement?"
Most important question about Sustainable Development "Is my house sustainably designed?"   "Is there a car pooling program available? "Has it been invented?"   "Development can affect climate change (CC), how can it [CC] be eliminated?"
Most important question about Conservation "Why do we need to conserve?"   "Can we save all the natives?" "What type of conservation is more useful to climate change?" "Why is the Government not doing much?"
Most important question about Climate Change "How bad is it?"   "When will it affect us?" "What is the worst case scenario?"   "What are the facts about it actually existing? There is a lot of evidence against it" "What is the best / most reliable theory to believe?"
Most important question about: Climate change adaptation "Is it even happening within Australia?" "Why do we need to adapt?" "How drastic a change?" "How are we investing in future energy sources?" "The larger populated countries are the ones not contributing" "Is it really because of people or is it part of the earth's changes?"
Most important question about: Environmental protection "What are the benefits for protection?" "Can we save all the nature?" How much effort have we put in to protect our environment?' "More tree huggers?" "Why are they not doing more on a global basis to help conservation, forestry and stopping emissions"
Most important question about: Energy conservation "Why do we need to save energy?" "Why do you pay extra for green energy?" "Why has the government and energy companies not got together to make a difference?" "How much energy needs to be conserved before we see results?"

Knowledge (correct or incorrect)

While Table 4 indicates moderate acceptance of human induced climate change and the impact of coal, oil and gas consumption there is much lower recognition of the impact of the use of personal computers, particularly among the Townsville cohort. Pereira Heath and Chatzidakis (2011) note that people do not perceive their own actions as negatively impacting on the environment or accept personal responsibility for environmental damage, yet Sodhi (2011) suggests that 30 – 40% of environmental degradation is due to private household consumption practices. One respondent noted: *"If I turn off the computer, I will die"*. The misconception regarding ozone depletion has been noted in prior US studies (Lombardi and Sinatra, 2010; Marcell *et al.*, 2004) and reflects faulty mental models of causes – and therefore potentially misguided strategies to address problems (Smith and Leiserowitz, 2012). Of interest in the data is the stronger agreement of the Townsville cohort with ozone depletion rather than CO_2 as the cause of the greenhouse effect.

Table 4: Agreement with statements regarding climate change and contributing factors

* = Significant difference between campuses	Townsville		Cairns	
	Mean	**Std Dev.**	**Mean**	**Std Dev.**
4.1 Human induced climate change is occurring at some level	3.83	1.14	3.90	1.03
4.2 Every time we use coal, oil or gas we contribute to climate change	3.75	1.14	3.52	1.27
4.3 My personal computer use contributes to climate change * p = .001	3.08	1.35	3.59	1.42
4.4 Carbon dioxide is the primary gas responsible for the greenhouse effect * p= .029	3.10	1.30	3.66	1.29
4.5 The greenhouse effect is caused by an ozone hole in the earth's atmosphere	3.37	1.36	3.56	1.33

Correlations between items were moderate (i.e. less than .50 level of significance).

Current behaviour regarding sustainability and environmental issues

Unsurprisingly, respondents reported taking actions that required minimal lifestyle changes, such as, switching off lights or using environmentally friendly light bulbs, with the following comments typifying expressed attitudes: *"I will live my life as sustainably as possible as long as it's not too inconvenient"*; and, in regard to likely future actions intended, *"the ones that take little effort, turning off switches, buying [environmentally] friendly appliances".* This is consistent with previous studies (see, for example, Schuetz *et al.*, 2011), and, as shown in Table 5, likely to be motivated more by financial savings than environmental concerns (Lorenzoni *et al.*, 2007). The only high correlation (.659) in this set of statements is, unsurprisingly, between items 5.6 and 5.7. Correlations between statement 5.1 and other statements in this set were low (less than .30); all other statements were moderately correlated with each other (between .30 and .49).

The disconnection between awareness of issues and actions reported is evident in comparing the correlations between the statements in Tables 4 and 5. Only statement 4.3 regarding the impact of personal computers has a moderate correlation with item 5.6, the importance of sustainability in product choices. All other statements in the two tables have low correlations (less than .30).

Table 5: Current behaviours regarding sustainability and environmental issues

* = Significant difference between campuses	Townsville		Cairns	
	Mean	Std Dev.	Mean	Std Dev.
5.1 I save water by taking a shower instead of a bath (in order to spare water).	3.28	1.48	3.28	1.38
5.2 I always switch the light off when I don't need it.	4.05	1.16	4.20	1.31
5.3 I walk or bike to places instead of going by car * p = .047	2.28	1.32	2.59	1.50
5.4 At home I try to recycle as much as I can	3.44	1.32	3.52	1.42
5.5 I have changed to environmentally friendly light bulbs	3.40	1.37	3.87	1.43

* p = .021				
5.6 Sustainability is important to me in making choices about which products or services I choose * p = .016	3.04	1.21	3.43	1.32
5.7 I avoid buying from a company which shows no concern for the environment	2.78	1.32	3.23	1.30

We then investigated how 'sustainability' considerations informed respondents' choices with respect to products or services. Table 6 indicates that, for the majority of students, sustainability is not a major part of their decision-making processes, with the following comments typifying some of the key attitudes:

"I am a student, I buy quality and affordable products"

"Is in the background but easy to forget"

"Which products are environmentally friendly?"

"If two products are generally the same, I would choose the one with sustainability practices in place"

Table 6: How sustainability is used in making choices about products and services

Significant difference between campuses p = .002	Townsville %	Cairns %
Not used	12	12
Buy from sustainable companies / labels	4	8
Buy on price only	3	2
Buy Australian made products	1	5
Only buy sustainable products if no price difference	1	10
Grow own food	-	3
Avoid products using unsustainable products / animal tested	3	5
Purchase energy efficient products	2	1
Lifestyle - supporting sustainability	2	3
No comments made	72	51
Total	**100**	**100**

The financial imperative driving resource-use behaviours is evident in the responses to an open-ended question regarding perceived benefits of turning off electric appliances, as shown in Table 7 below, with financial savings or incentives to convert to renewable energy - such as solar power - being the primary motivator to reduce future electricity use. Intended future actions also reflect this, with recycling and energy / water use reduction signalled as the most likely actions.

Table 7: Benefits, incentives and likely actions

No significant difference between campuses	Townsville %	Cairns %
Perceived benefits of turning off computers, radios or TVs when not in use		
Financial savings	15	28
Benefiting environment / reducing emissions / reducing climate change	10	11
Both financial and environmental	16	13
Power / energy saving	29	28
No benefits or minimal benefits perceived	1	2
No benefits specified	29	18
Total	**100**	**100**
Incentive most likely to make respondent reduce electricity use		

Financial savings or incentives for solar	37	33
Clean energy alternatives / environmental benefit	2	5
Financial and environmental benefits	2	7
Increasing costs of electricity	8	13
Automatic systems to turn things off	2	-
Already doing it / have energy efficient appliances	4	11
Advertising / Media coverage to remind	1	-
Nothing	2	-
No response	43	31
Total	**100**	**100**
Actions respondent is most likely to take to reduce the impact of climate change		
Recycling	4	5
Use less power / water / buy energy efficient products	29	25
Recycle and reduce energy / water use	8	18
Reduce resource use / grow own food / plant trees	2	2
Install solar panels	1	2
Walk, cycle or use public transport more	4	6
Unsure / don't know	3	3
Not much or nothing	6	11
No response	43	28
Total	**100**	**100**

Car use is identified in the literature as a difficult area in which to achieve significant behaviour change (Andersen *et al.*, 2009; Guy, 2009; Steg, 2005). As CO^2 emissions from private vehicles is recognised as a major contributor to greenhouse gases, the study investigated student perceptions of environmental impact from personal vehicle use and incentives that might encourage reductions in use.   The results, shown in Table 8, indicate some of the challenges faced in provincial centres that lack suburban tram or train infrastructure. The lack of enthusiasm for cycling perhaps reflects local conditions, such as, the tropical climate and limited availability of dedicated cycling lanes. Comments made by respondents included:

"Need to drive – live too far out of town to walk"

"public transport in Townsville is horrible so I will always drive"

"I'd like to bus, walk, ride but it's too far to hike 2 young children. Car only option"

"I cycle / walk for fitness and to save money, not for environmental reasons"

"In Cairns public transport is terrible – they need to change that"

Table 8: When and how does environmental impact play a part in respondent transport decisions?

* Significant difference between campuses: p = .032	Townsville %	Cairns %
It doesn't	38	33
Choice of car / restrict driving / clean fuel	3	3
Use public transport	2	6
Cost is main factor	4	8
Walk or bike	1	5
Don't use car for short trips / non-urgent things	1	7
No response	51	38
Total	**100**	**100**

Few student questions addressed sustainable transport, with most centring on practical issues. The following extracts were typical:

"What would be the most sustainable transport?"

"Will people actually use it?"

"When will we see the first solar / alternative hybrid public transport?"

"Why are V8 cars still on the road?"

"I need my car to get places. What can I do to still be sustainable?"

Interest and norms
There is an inconsistency between students' declared interest in environmental issues, especially among the Cairns cohort, and their relative lack of awareness of signs of environmental damage (as shown in Table 9). If students express concerns for the environment one might expect, following a principle of rational consistency, that this would be reflected in a greater awareness of environmental damage. That it is not suggests there may be non-rational elements affecting the relationship between these variables. Perception of the interest levels of family and fellow students (as shown in Table 9) is consistent with prior studies that reflected a lack of perceived personal relevance of potential climate change impacts (Adger *et al.*, 2009; Lorenzoni *et al.*, 2007; Marcell *et al.*, 2004).   Correlations between statements 9.1 – 9.3 are moderate: correlations between statements 9.4 and the other statements are low. Correlations with statements in Table 4 are moderate or low. For statement 9.4, all correlations are very low (less than .10), suggesting a disconnection between individuals' self reported actions and those they believe others to be undertaking.

Table 9: Personal interest and perceived norms

* = Significant difference between campuses	Townsville		Cairns	
	Mean	Std Dev.	Mean	Std Dev.
9.1 Environmental issues are very important to me * p = .001	3.30	1.25	3.92	1.13
9.2 I often look for signs of ecosystem deterioration * p = .012	2.13	1.26	2.56	1.38
9.3 My friends and family believe they should alter their behaviour to prevent global climate change	2.83	1.26	3.0	1.25
9.4 The average JCU student is not at all concerned with the issue of climate change	2.96	1.29	2.6	1.34

The apathy and relative disengagement with the issues suggested by the data combined with an apparent determination on the part of respondents to live life the way they wanted to is consistent with other findings (Nerlich *et al.*, 2010; Lowe *et al.*, 2006; Moser and Dilling, 2004).

The authors also examined attitudes and beliefs that underpin students' views.

Responsibility
Wray-Lake *et al.* (2010) note that US adolescents see that responsibility for environmental problems rest with government rather than individuals; views consistent with those expressed by the cohorts in this study (see Table 10). Agreement with collective and societal environmental stewardship rather than individual action is also consistent with previous studies, e.g., Schuetz *et al.* (2011). Statements 10.2 and 10.3 and 10.2 and 10.4 are, perhaps unsurprisingly, highly correlated (.524 and .571 respectively) as are statements 10.3 and 10.4 (.642). All other correlations are moderate. Correlations between statements in Table 5 and Table 10 are moderate to low.

Table 10: Responsibility for action

* = Significant difference between campuses	Townsville		Cairns	
	Mean	Std Dev.	Mean	Std Dev.
10.1 The government should take an active role in the global effort to curb the problem of rapid climate change	3.68	1.28	3.84	1.25
10.2 We must set aside areas to protect endangered species * p = .016	3.96	1.17	4.25	1.33
10.3 Economic development, social development and environmental protection are all necessary for sustainable development * p = .001	3.70	1.24	4.07	1.48
10.4 Overuse of our natural resources is a serious threat to the health and welfare of future generations * p = .002	3.71	1.19	4.20	1.24
10.5 Taxes on polluters should be increased to pay for damage to communities and the environment	2.97	1.30	3.43	1.36
10.6 We, as a society, should radically change our way of living to offset the danger of climate change	3.29	1.12	3.28	1.47

Unrealistic optimism / risk denial

Of more concern, perhaps, is evidence in Table 11 of unrealistic optimism and risk denial which, as noted earlier, are resistant to change (Morton and Duck, 2001). While there is low agreement regarding unlimited resources and nature's ability to restore itself, there is over-optimism regarding society's ability to solve problems, and evidence that concerns are perceived as exaggerated. As discussed earlier, this is likely to result in overuse of resources and failure to recognise the negative impacts of doing so (van Vugt, 2009; O'Neill and Nicholson-Cole, 2009; Grothmann and Patt, 2005). A further barrier to change may also be a perception that changing one's own behaviour will not make any difference to the impact of climate change (Semenza *et al.*, 2008). The levels of agreement with these statements must therefore give cause for concern.

There is high correlation between statements 11.3 and 11.4 (.538) and 11.5 and 11.6 (.582). All other correlations between statements 11.2 – 11.8 are moderate: correlations between statement 11.1 and all other items in this table are low (less than .30). When comparing the set of attitudes and beliefs in Table 11 with those regarding self-reported actions in Table 5, all correlations are low (less than .30). Statements 11.4, 11.5 and 11.6 show slight negative correlations (-.027, -.057 and -.032 respectively) with item 5.5 (changing to environmentally friendly light bulbs).

Table 11: Unrealistic optimism / risk denial

* = Significant difference Townsville / Cairns	Townsville		Cairns	
	Mean	Std Dev.	Mean	Std Dev.
11.1 Society will continue to solve even the biggest environmental problems	3.22	1.22	3.23	1.31
11.2 Worrying about the environment often holds up development projects	3.19	1.23	3.10	1.39
11.3 Our planet has unlimited resources	1.94	1.27	1.61	1.10
11.4 Nature is always able to restore itself	2.40	1.31	1.98	1.22
11.5 Humans have the right to change nature as they see fit	2.22	1.24	1.85	1.24
11.6 People worry too much about pollution	2.46	1.26	1.87	1.16
People worry too much about climate change * p = .031	2.62	1.30	2.02	1.25
11.7 The so-called 'ecological crisis' facing human beings has been greatly exaggerated	2.98	1.33	2.82	1.32
11.8 There is little action that I can take to reduce the threat of climate change	2.69	1.31	3.10	1.42

Alarmism

We tested for evidence of acceptance or resistance to alarmist perspectives (Nerlich *et al.*, 2009) and the types of apocalyptic messages and catastrophic 'tipping points' portrayed in both the news and entertainment media (O'Neill and Nicholson-Cole, 2009; Russill and Nysssa, 2009). Table 12 indicates moderate disagreement that climate change rates cannot be changed, but moderate agreement with potential consequences. There is moderate correlation between statements 12.1 and 12.2. Statement 12.3 shows low negative correlation (-.06) with item 12.1 and low positive correlation with statement 12.2 (.091). All statements in Table 12 have low (less than .30) correlation with the items in Table 5.

Table 12: *Alarmism*

No significant difference Townsville / Cairns	Townsville		Cairns	
	Mean	Std Dev.	Mean	Std Dev.
12.1 Humankind will die out if we don't live in tune with nature	3.19	1.34	3.54	1.29
12.2 If things continue on their present course we will soon experience a major ecological catastrophe	3.18	1.28	3.25	1.44
12.3 We cannot slow the rate of climate change	2.59	1.34	2.15	1.23

Of course, students' knowledge about, and attitude towards, climate change results from a complex process of socialization, including their exposure to information that they have received from a variety of sources. Future phases of this study will examine where cohorts obtain their information about climate change from. This will assist in gaining an understanding of one important dimension of influence on the development of attitudes towards climate change.

Conclusion and directions for future research

The disconnection between (partial) awareness and concern is highly consistent with the well documented attitude-behaviour gap (Owens and Driffill, 2008) and represents a substantial barrier to meaningful behaviour change (see, for example, Ockwell *et al.*, 2009; Costello *et al.*, 2009; Semenza *et al.*, 2008). Information provision alone is not likely to overcome the complex combination of psychological, social and institutional barriers that exist (Lorenzoni *et al.*, 2007). In line with the 'active learning' agenda explored by MacVaugh and Norton (2011), findings reflect the need to move sustainability education from mere prescription to engagement with everyday practices, embedding the types of sustainability problems and challenges that current students will face in the 'real world' (Everett, 2008; Stibbe, 2009). The authors are using findings from this baseline study to inform redesign of the business curriculum at James Cook University in such a way that it addresses identified misconceptions and barriers to change such as personal relevance and effective sustainability strategies. This will develop out of previous curriculum redesign initiatives that have taken up the challenge (Holt, 2003; Jabbour, 2010; Marshall and Harry, 2005).

The findings also identified a number of significantly under-researched areas that warrant systematic investigation. For example, there is a clear need to investigate potential enablers of behaviour change and the most effective media channels and message types that will make communications about the issues discussed in this article *personally* relevant in terms of immediacy and significance of local impacts. In addition, this activity must address social norms and habits (Arbuthnot, 2009) as well as reflecting the way that personal values and beliefs will impact on the way that information is interpreted, whilst recognising that these will differ across cultures and settings (Nisbet and Scheufele, 2009).

In this study, the focus was exclusively on new entrants to university. This was done with the specific purpose of ensuring that students could be tracked beyond their university studies and into the world of work. This will enable us to examine if, and in what ways, sustainability knowledge,

attitudes and beliefs are impacted by workplace experiences and how this compares to the influences of their higher educational experience.

As noted in the literature review, Myers and Beringer (2010:51) found that students experience profound changes in their epistemological assumptions and identity during undergraduate years. It seems reasonable to infer therefore that changes in knowledge, attitudes and behaviours regarding sustainability are likely to be evident as students progress through their studies. Accordingly, future phases of this research will extend the current study longitudinally and contrast differences between an existing conventional business curriculum and a revised, 'sustainability aware' one. In other words, the research team will follow the students who commenced under the 'old' curriculum through their studies, comparing them to students who commence under the 'new' curriculum that contains considerably more explicit sustainability content. The study will also follow graduates from these programmes into the workforce in order to better understand how their workplace experiences influence their attitudes and beliefs towards sustainability.

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Notes

[1] The sample was drawn from the intake of new students on the Business Studies programme. Although relatively small it is representative of this intake. The authors acknowledge that the sample size may pose challenges for the longitudinal research design as there is a danger of attrition as students progress through the programme. However, strategies will be devised to mitigate this risk and maximize future response rates.

[2] Tabulated statistical data relating to structured elements of the survey are *descriptive* and based on non-parametric assumptions. Non-parametric statistics were used to test for significant differences between cohort responses. The tabulated qualitative data are intended to illustrate typical student responses.