FOUNDATIONS FOR EFFECTIVE SUSTAINABILITY EDUCATION

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ABSTRACT

Universities are increasing their focus on sustainability and related issues, and the ways in which these can be effectively communicated via curricula. While many issues have significant implications for future business practices and individual lifestyles, simple communication of information will not be sufficient to change student's attitudes, beliefs and, ultimately, behaviours. There is increasing concern regarding a number of aspects of sustainability and the disjuncture between issue-awareness and individual actions that might address sustainability challenges. The identification of key barriers to and enablers of behaviour change to reduce sustainability problems is of particular pedagogical and public policy importance. This paper investigates undergraduate students' perceptions, attitudes and beliefs regarding sustainability. It explores perceptions of their own contributions to sustainability problems and barriers to, and enablers of, behaviour. Findings reveal naïve awareness of the potential impact of, and individual contributions to, sustainability and environmental challenges. Respondents exhibited a tendency to regard major issues as 'beyond personal control', and solutions as being the 'responsibility of others'. These perceptions are coupled with a reluctance to consider major lifestyle changes. The findings of the study have multiple uses including guiding the development and implementation of curriculum content. They will also provide the foundation for the development of intervention strategies and tactics that should be considered in order to achieve long-term positive behaviour change.

INTRODUCTION

Universities are increasingly recognising that they have a responsibility to help society to move towards more sustainable futures (de la Harpe & Thomas, 2009). Successful educational strategies appear to be grounded in a clear understanding of the knowledge and attitudinal base from which students start studying the themes and how their studies change their knowledge, attitudes and beliefs (Buissink-Smith et al., 2011). The main drivers for the increased focus on sustainability within curricula are widespread (not universal) agreement that sustainability and climate change are major issues facing society (Peattie & Peattie, 2009) and recognition that continued pursuit of economic growth based on exploitation of finite resources is unsustainable (Burroughs, 2010). These concerns have yet to be reflected in the majority of standard business texts and other pedagogical material. Of further concern is the indication that sustainability orientation "vanishes with business experience" in some European countries (Kuckertz & Wagner, 2010: 524). The fact that education alone will not change behaviours was signalled as far back as 1990 (Hungerford & Volk, 1990) and knowledge will not be used unless real benefits are perceived (Lourenço et al., 2012).

COMPLEXITY AND LACK OF CLARITY

There is an erroneous assumption among policy makers of "spillover effects", i.e., small and simple behaviour changes will act as catalysts for wider behavioural change (Corner & Randall, 2011). The challenges presented by climate change and sustainability are not 'single issues' and consumer perspectives are complex. If comparison and purchase process is too complex, sustainability criteria are likely to be disregarded (Jones, Clarke-Hill & Comfort, 2008). Further research is needed into how these factors vary across population segments and in the types of potential programmes that will engage students and the wider public in the issues in order to change individual and community behaviours sufficiently to adapt to changing environmental conditions and more sustainable societies.

Sustainability Defined

There is a lack of clarity on what the term sustainability means and a lack of clear strategies by which it can be achieved. The following illustrate different perspectives:

- *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (*World Commission on Environment and Development, 1987: 55).

- *"Sustainability ... translates into a 'triple bottom line' responsibility, with the implication that assessment of business results should be based not only on economic performance but should take into account the environment and social impact as well" (*Sheth, Sethia, & Srinivas, 2011: 21).

Persuading both students and business personnel of the legitimacy of a commitment to environmental, as opposed to economic, sustainability will require integrated, sustained effort, with a danger that over emphasis on negative business examples may increase student cynicism about the validity of environmentally sustainable behaviours (Thomas, 2008).

Attitude-behaviour gap and the Deficit Model of information provision

A lack of knowledge (i.e. 'information deficit') is cited as causing misconceptions and apathy (Owens & Driffill, 2008). Knowledge, including formal education, is necessary, but not of itself sufficient to change behaviour. A gap between reported attitudes towards environmental issues and actual behaviours is well documented in the literature (Ockwell et al., 2009). Attitudes are multi-factored and interact with a number of other key factors in influencing behaviour, especially norms and self-efficacy (Fishbein, 2008). A major reason for the inability of attitude change alone to be effective in achieving sustained behaviour change is that a focus on individual voluntary change ignores financial, social, structural environmental and institutional barriers to behaviour change (Ockwell et al., 2009).

Communication Effects and Effectiveness

The way that climate change science is communicated has been criticised, with the suggestion that current strategies result in "islands of knowledge in a sea of ignorance" (Meinke et al., 2006: 101). There is a need for salience, legitimacy and credibility to also be considered in communications. Amotivated people cannot see the link between behaviour and its outcomes, therefore do not see the point of taking action (Cooke & Fielding, 2009). Further, some 40% of the population of developed countries have limited functional literacy capacity, making it difficult for them to comprehend and act on complex information (ABS, 2006). Other factors that makes comprehension difficult for those who lack specialised scientific knowledge include the invisibility of climate change causes, a tendency to discount the impact of distant events, lack of immediacy, disbelief about the impact of people overall and the efficacy of any individual action, uncertainty, perceptual limits and self-interest (Moser, 2010). Climate change deniers also appear more accomplished at communicating their message to the public than the climate scientists (Washington & Cook, 2011).

Strength of Social Norms

Behaviour change messages will not occur in isolation, but instead be subject to a range of competing messages and social encouragement or discouragement (Peattie & Peattie, 2003). Social norms may override knowledge and even individual desire to change behaviour, particularly if this would be at odds with observed peer behaviour. Norms may be injunctive or descriptive; the former focuses on perceptions of what behaviours would typically be approved or disapproved; the latter on perceptions of what behaviours are typically performed (Nolan et al., 2011). Decisions regarding which type of norms to stress can have unintended consequences for message effectiveness. For example, interventions that have attempted to use injunctive norms may have inadvertently have reinforced descriptive norms and the belief that individual actions will not have any impact on the problem (Cialdini, 2007).

Improving Communication Effectiveness

A key factor that needs to be considered in terms of facilitating effective communications is whether messages are framed in terms of potential losses or gains to an individual. Research exploring the effects of different types of message framing has led to conflicting results (Rothman & Salovey, 1997). The level of personal involvement in a message topic impacts on the efficacy of message framing. Evidence suggests that in low-involvement conditions positive messages are more effective, whereas the reverse is true for high-involvement conditions (Donovan & Jalleh, 1999). People are reluctant to act in response to information that contains ambiguity or uncertainty and that high uncertainty combined with negative framing, i.e., stressing potential harm or loss, decreased individual's intentions to adopt pro-environmental behaviours (Morton et al, 2011).

Negative framing – fear appeals. Fear appeals are a specific subset of negative framing. Those who have responded to past fear-based campaigns appear to be better educated and more affluent than average, and thus better able to respond to the persuasive message (Hastings et al., 2004). For climate change and environmental protection, fear appeals appear effective only when they convey a sense of personal relevance and vulnerability and are coupled with ways of building or reinforcing

self-efficacy and present solutions that involve low response costs and social support (Spence & Pidgeon, 2010). Alarmist messages, a subset of fear appeals, are ineffective as they contradict beliefs in a stable world. This may explain the lack of long-term impact of Hollywood movies that have used disaster and apocalyptic narratives to portray the potential impact of climate change (Howell, 2011).

Reactance and Boomerang Effects, Unrealistic Optimism / Personal Risk Denial

Factors such as reactance, unrealistic optimism and risk denial are significant barriers to behaviour change. The theory of psychological reactance states that direct or potential perceived threats to personal freedom, such as engaging in particular behaviours, may be resisted. People may become motivated by the perceived threat itself to assert their freedom and regain control of their own decision making and, thereby, of their threatened freedom (Ringold, 2002). An additional challenge relates to unrealistic optimism, bias and denial of personal risk, whereby individuals estimate their own risk of negative outcomes as lower than the wider population (McMath & Prentice-Dunn (2005). People also tend to overuse resources due to underestimation of the damage their actions may be doing to the environment (Grothmann & Patt, 2005). Protection Motivation Theory (Floyd et al., 2000) may explain why some responses may actually be maladaptive, reinforcing existing behaviours rather than positive behaviour change. The theory suggests that where a threat is not seen as severe and an individual does not feel high levels of personal vulnerability, the threat will be disregarded. Maladaptive responses may result from individuals feeling that they cannot take effective action. Responses may include apathy, denial, anger and counter-productive behaviours such as buying an SUV in anticipation of environmental challenges – although SUVs are less fuel efficient than other vehicles (Moser & Dilling, 2004).

Trust and legitimacy are important potential barriers or enablers of communication effectiveness and there is a growing body of research showing declining trust in government sources. Passive acceptance of government information or advice is no longer assured, particularly when it merely reiterates existing policy stances (Stroud, 2005). Source expertise is known to directly influence perceived credibility of a message (Blackstock et al., 2010) and evaluation of the credibility of information has moved from passive acceptance of authority-based information, to judgement based on the synthesis of input from multiple sources, including consumer / news media (Lankes, 2008) . Lack of trust leads to both reactance and risk denial (Gifford, 2011; 2008). There is therefore a clear need to determine who the trusted information sources for different population segments are and what the implications are if their messages are incorrect or disputed.

RESEARCH OBJECTIVES AND METHODOLOGY

Rationale for Student Focus

A university student sample was chosen, as students are recognised as trendsetters with reported influence over the purchasing decisions of not only their immediate peers but also family members (Beard, 2003). The point at which adolescents leave high school also reflects a lessening of parental influence regarding many lifestyle behaviours (Baranowski et al., 1997). Young adults may be critical in "reorienting consumption patterns towards sustainability" and making "sustainable consumption 'fashionable" (Fien et al., 2008: 56 & 58).

The key aim was to provide a benchmark measure of new incoming undergraduate students' knowledge of, and attitudes towards, a range of sustainability issues and thus inform the development of a revised undergraduate curriculum. Questions were derived from common themes in the literature and previously used instruments, including: Michalos et al. (2011), Shephard et al. (2009) and Kagawa (2007). Familiarity with key terms was tested, followed by 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 ($\alpha = .89$). A five-point Likert scale was used, with anchor points of strongly agree and strongly disagree. A 6th option of don't know / not interested was included to provide an alternative for those who have only vague understandings or no true opinion on the statements listed (Sturgis & Smith, 2010) 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 open ended questions regarding questions respondents had regarding a range of sustainability and climate change issues. The questionnaire was run across two North Queensland campuses (Townsville and Cairns) as different societies are known to react differently to pressures on the environment (Lee, Barlowe & McNabb, 2005). Over 25% of employment within Cairns but only 17% within Townsville is within the tourism-focussed sectors of accommodation, food and retail. Townsville also has a considerably

larger public administration and safety employment base and a substantial Defence presence (Deloitte Access Economics, 2011).

Demographics

Two hundred and twenty-four usable questionnaires were obtained, 73% from Townsville and 27% from Cairns. Both samples comprised predominantly Australian students, 87% in Townsville and 73% in Cairns. There was a non-significant difference in percentage of female students (77%) in the Cairns sample compared to 68% in Townsville. 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.

ANALYSIS

Familiarity with Key Terms

Previous studies (e.g. Kagawa, 2007) have opted to examine only the broad concept of sustainability and sustainable development. Given the multiple dimensions of sustainability noted in the earlier sections of this document (see, for example, Sheth et al., 2011; WCED, 1987), we opted to examine the three sustainability concepts (economic, environmental and social) separately and to compare familiarity across the terms and also against related terms such as conservation and climate change. Table 1 indicates higher awareness of subjects that are most frequently featured in news items and 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 activity. In common with previous studies (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. Of the few questions that were listed, most related to what the term actually meant, how it was to be responded to and what the most effective actions might be.

Knowledge (correct or incorrect)

While Table 2 indicates moderate acceptance of human induced climate change and the impact of coal, oil and gas, 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. The misconception regarding ozone depletion has been noted in prior US studies (Marcell et al., 2004) and reflects faulty mental models of causes (Smith & Leiserowitz, 2012). Of interest here is the stronger agreement of the Townsville cohort with ozone depletion rather than CO_2 as the cause of the greenhouse effect.

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 being provided: *"I will live my life as sustainably as possible as long as it's not too inconvenient"*. This is consistent with previous studies (see, for example, Schuetz et al., 2011), and likely to be motivated more by financial savings than environmental concerns (Lorenzoni et al., 2007). We then investigated how respondents actually used sustainability in making choices about products or services. For the majority of students, it is not a major part of their decision processes, with the following comments being made by respondents: *"I am a student, I buy quality and affordable products"; "Is in the background but easy to forget"; "If two products are mostly the same, I would choose the one with sustainability practices"*. The financial imperative driving resource-use behaviours was also evident in the responses to an open-ended question regarding perceived benefits of turning off electric appliances, 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.

Car use is identified in the literature as a difficult area in which to achieve significant behaviour change (Andersen et al., 2009). As CO_2 emissions from private vehicles is recognised as a major contributor to greenhouse gases, we investigated, via two open-ended questions, consideration of environmental impact from students' personal vehicle use and incentives that would encourage reductions in use. The results indicate some of the challenges faced in provincial centres without suburban tram or train options. The lack of enthusiasm for cycling also reflects both climate and the limited availability of dedicated cycling lanes. Among the comments made by respondents were: *"Need to drive – live too far out of town to walk"; "public transport is horrible so I will always drive"; "I cycle / walk for fitness and to save money, not for environmental reasons".* Few questions were asked about sustainable transport, with most centring on practical issues as the following quotes indicate*: "What would be the most sustainable transport?";"Will people actually use it?";"When will we see the first solar / alternative hybrid public transport?"; "I need my car to get places. What can I do to still be sustainable?"*

Interest, Norms and perceived Responsibility

There is a contradiction between the student's declared interest in environmental issues, especially among the Cairns cohort, their lack of active seeking of signs of environmental damage, and their perception of the interest levels of family and fellow students as shown in Table 3. This is consistent with prior studies that reflected a lack of perceived personal relevance of potential climate change impacts (Lorenzoni et al., 2007; Marcell et al., 2004). The apathy, disengagement with the issues shown above and determination to live life the way they want is consistent with the literature (Moser & Dilling, 2004). Wray-Lake et al. (2010) note that US adolescents see that responsibility for environmental problems rests with government rather than individuals, views reflected by the cohorts in this study. Agreement with collective societal environmental stewardship rather than individual action is consistent with previous studies, e.g. Schuetz et al., 2011).

Unrealistic Optimism / Risk Denial and Alarmism

Of more concern is evidence in Table 4 of unrealistic optimism and risk denial which, as noted earlier, are resistant to change (Morton & 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 so doing (Grothmann & 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 this statement must therefore give cause for concern. We tested for evidence of acceptance or resistance to alarmist perspectives and the types of apocalyptic messages and catastrophic 'tipping points' portrayed in both the news and entertainment media (O'Neill & Nicholson-Cole, 2009) and found moderate disagreement that climate change rates cannot be changed, coupled with moderate agreement with potential consequences.

DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH

The disconnection between (partial) awareness and concern is totally consistent with the attitude-behaviour gap noted earlier (Owens & Driffill, 2008) and represents a substantial barrier to meaningful behaviour change (see, for example, Ockwell et al., 2009). Information provision alone is not likely to overcome the complex combination of psychological, social and institutional barriers that exist (Lorenzoni et al., 2007). The findings reflect the need to move sustainability education from prescription to real-world practice and to reflect the types of sustainability problems and challenges that current students will face in the 'real world' (Everett, 2008). 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 communication issues discussed in this paper personally relevant in terms of immediacy and significance of local impacts. In addition, communications must address social norms and habits, reflect the way that personal values and beliefs impact on the way that information is interpreted, and be sensitive to cultural and contextual differences (Nisbet and Scheufele, 2009).

In this study, we focussed only on new entrants to university. The extant literature indicates that students "undergo profound changes in epistemological assumptions and in identity during their undergraduate years" (Myers & Beringer, 2010: 51), thus changes in knowledge, attitudes and behaviours regarding sustainability and related issues are likely to occur as students progress through their studies. For these reasons, future phases of research will extend the current study, following the students who commenced under the 'old' curriculum through their studies, and comparing them to students who commence under the 'new' curriculum that contains considerably more explicit sustainability content as an integrated theme throughout

their programme of study. The longitudinal design will also extend to following the cohort into the workforce in order to understand how their workplace experiences influence their attitudes and beliefs towards sustainability.

Table 1: 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

Table 2: Agreement with statements regarding climate change and contributing factors

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

Table 3: Personal Interest, perceived norms and perceived responsibility

* = Significant difference between campuses	Townsville		Cairns	
	Mean	Std Dev	Mean	Std Dev
Environmental issues are very important to me * p = .001	3.30	1.25	3.92	1.13
I often look for signs of ecosystem deterioration * p = .012	2.13	1.26	2.56	1.38
My friends and family believe they should alter their behaviour to prevent global climate change	2.83	1.26	3.0	1.25
The average JCU student is not at all concerned with the issue of climate change	2.96	1.29	2.6	1.34
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
We must set aside areas to protect endangered species * p = .016	3.96	1.17	4.25	1.33
Economic development, social development and environmental protection are all necessary for sustainable development * p = .001	3.70	1.24	4.07	1.48
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
Taxes on polluters should be increased to pay for damage to communities and the environment	2.97	1.30	3.43	1.36
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

Table 4: Unrealistic Optimism / Risk Denial and Alarmism

* = Significant difference Townsville / Cairns	Townsville Mean	Townsville Std Dev.	Cairns Mean	Cairns Std Dev.
Society will continue to solve even the biggest environmental problems	3.22	1.22	3.23	1.31
Worrying about the environment often holds up development projects	3.19	1.23	3.10	1.39
Our planet has unlimited resources	1.94	1.27	1.61	1.10
Nature is always able to restore itself	2.40	1.31	1.98	1.22
Humans have the right to change nature as they see fit	2.22	1.24	1.85	1.24
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
The so-called 'ecological crisis' facing human beings has been greatly exaggerated	2.98	1.33	2.82	1.32
There is little action that I can take to reduce the threat of climate change	2.69	1.31	3.10	1.42
Humankind will die out if we don't live in tune with nature	3.19	1.34	3.54	1.29
If things continue on their present course we will soon experience a major ecological catastrophe	3.18	1.28	3.25	1.44
We cannot slow the rate of climate change	2.59	1.34	2.15	1.23

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