Sustainable Attitudes and Behaviours amongst a Sample of Non-Academic Staff: A Case Study from the Information Services Department, Griffith University, Brisbane.

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Abstract

The success of a resource efficiency programme or conservation programme is highly dependent on the number of people who participate in that programme, and the frequency and effectiveness of that participation. This paper seeks to characterise the pro-environmental attitudes amongst staff within the Information and Communication Technology Services (ICTS) Department of Griffith University, Brisbane. For this study, the recycling attitudes and behaviour of 100 individuals from a cross-sectional sample from the ICTS Department, along with the determinants of pro-environmental behaviours were investigated. Attitudes and behaviours associated with sustainability, recycling and waste minimisation, energy efficiency, water conservation and 'green' purchasing were investigated. The study was delivered via an online survey, which was e-mailed directly to all ICTS staff across Griffith's five campuses. Results showed that people were satisfied with the current efforts by Griffith University to become more sustainable. However, staff identified a number of barriers that should be addressed in order to more comprehensively incorporate pro-environmental practices into the work environment. Significant differences in opinions were more prevalent amongst various demographic groups rather than other characteristics such as department/function within ICTS. Future research is proposed to determine the various psychological and social factors which are significant to people adopting, or choosing to affirm positive attitudes and behaviours in relation to sustainability within the workplace. This will facilitate the development of appropriate interventions to increase recycling, waste

minimisation and energy efficiency, thus modifying internal stakeholder behaviours within

Griffith University and working more effectively towards the sustainable campus objective.

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1.   INTRODUCTION

In recent years, there has been a growing realisation that large organisations can make a significant impact on the natural environment by implementing pro-environmental workplace initiatives. This has led to a number of initiatives designed to protect and conserve natural resources. Sustainable development is the most significant challenge to universities at present (van Weenan, 2001).

Griffith University has an increasing realisation of its social and environmental responsibilities associated with sustainability principles and has made a commitment to 'greening' its campuses in an effort to achieve greater sustainability. The process to achieve 'sustainable campuses' is viewed by Griffith to be a dynamic one, requiring the continuous design and implementation of policy and strategy with full collaboration and the assignment of responsibilities throughout departments (Davis and Wolski, 2007).

In order to be sustainable, Griffith University must reduce its environmental impact via more efficient use of resources, whilst ensuring that all stakeholders are not negatively impacted and continue to benefit from their association with the University.

Globally, universities are dealing with the challenges of sustainable development in diverse ways and at many different levels. The areas of inclusion for sustainable development range from teaching and research, to the core management and marketing of an institution.   Van Weenen (2001) proposed a model for a sustainable university, which included four levels of university engagement. At level 1 it is essential to consider the operations of the university, such as energy and facilities; Level 2 covers inclusion of sustainability in research and

education; Level 3 involves the engagement of university management in formulating new policy and collaboration with external organisations; and finally, Level 4 involves the formulation of a mission statement reflecting the core values which would act as a motivator and support mechanism, highly visible to both internal and external stakeholders.

Although Griffith has effectively achieved Levels 1 and 2 through the monitoring and reduction of resource usage across all of its campuses and has integrated sustainability into both its teaching and research programmes; the challenge is to now achieve Level 3. The first step towards Level 3 has been the formation of a Sustainability Working Group chaired by the Pro-Vice Chancellor of Science, Environment, Engineering and Technology (SEET) in 2007, and the commission of a sustainability assessment across all campuses. This survey aims to assist Griffith in obtaining Levels 3 and 4 through the identification and base-line documentation of employee's attitudes and beliefs, and the development of appropriate interventions to increase pro-environmental and sustainable behaviours.

Griffith University, Queensland, has five campuses (Nathan, Mount Gravatt, Gold Coast, Logan and South Bank). This paper describes the approach taken by Griffith University to move towards sustainably managing its campuses, in particular canvassing the pro-environmental behaviours of its staff in order to determine areas for improvement and to determine effective future strategies for promoting sustainability to staff.

2. THEORY OF PLANNED BEHAVIOUR

There has been recent interest in exploring the use of models from social psychology to provide a theoretical framework for understanding householders' recycling behaviour (Davies et al., 2002) and more recently waste minimisation behaviours (Tonglet et al., 2004; Davis et

al., 2006). The literature indicates that environmental attitudes and situational and psychological variables are likely to be important predictors of pro-environmental behaviour. Further investigation of the influence of these factors requires a theoretical framework, such as that provided by the Theory of Planned Behaviour (TPB) (Ajzen, 1991).

The TPB (Ajzen, 1991) allows for systematic investigation of the factors which influence behavioural choices. It can be used to predict, understand and change pro-environmental behaviour and to design programmes to promote pro-environmental activities. There is a need to prepare education and training material for companies that is based upon a sound methodology drawn from such theoretical perspectives. The TPB has been successfully used to predict and explain a wide range of behaviours (see – for reviews). The TPB hypothesises that the immediate determinant of behaviour is the individual's intention to perform, or not to perform that behaviour. Intentions are, in turn, influenced by three factors:

1. Attitude: the individual's favourable or unfavourable evaluation of performing the behaviour.

2. The subjective norm: the individual's perception of social pressure to perform or not to perform the behaviour.

3. Perceived control: the individual's perception of their ability to perform the behaviour.

It is also proposed that perceived control can influence behaviour directly. The TPB has been used in several studies which investigated recycling behaviour (e.g. Boldero, 1995; Chan, 1998; Cheung et al., 1999; Davies et al., 2002; Taylor and Todd, 1995; Terry et al., 1999; Davis et al., 2006) although additional variables have been suggested in order to provide a more comprehensive explanation of pro-environmental behaviours.

This study has incorporated a number of additional variables, including past experience; situational factors; consequences of recycling and attitudes to waste minimisation, energy efficiency, water consumption, and green purchasing.

3.   RESEARCH DESIGN

The questionnaire used to determine pro-environmental behaviours amongst staff at Griffith University was based on a questionnaire previously used in Brixworth, Daventry, Northamptonshire (Tonglet et al., 2004), West Oxfordshire (Davis et al., 2006). These previous studies were used specifically to determine recycling and waste minimisation behaviours amongst Local Council residents. The Griffith questionnaire was expanded to include the additional variables noted above. The survey was split into three sections, the first sought to determine staff environmental behaviours at home before leading into work-based behaviours. The purpose of this was to determine if there was any correlation between home and work-based actions and attitudes. The third section contained demographic questions and open-ended items.

The original Brixworth/West Oxfordshire questionnaire was based on the recycling research literature and previous applications of the TPB (e.g. Beck and Ajzen, 1991; Boldero, 1995; Davies et al., 2002; Tonglet, 2002). Five- and seven-point rating scales were used throughout the questionnaire, with 1 indicating a negative view (*Strongly Disagree)* and higher numbers indicating a positive view (*Strongly Agree*). In addition to the components of the TPB, the current questionnaire contained questions on sustainability issues specific to Griffith University, for example, *I belive that Griffith University is an environmentally pro-active oraganisation..* The respondents were also asked to indicate the extent of their agreement with a number of behaviours relating to their 'home- purchase' of 'green' goods such as

energy and water efficient devices, for example *Have yo uchanged your home energy provider to a greener supplier*. The questionnaire contained the following sections:

• *Personal recycling/energy efficiency and water efficiency behaviours*— for example, frequency of recycling at home, past recycling behaviour.

• *Attitudes towards recycling /energy efficiency and water efficiency/green purchasing behaviours/waste minimisation* – both on a personal level and for Griffith University as an institution.

• *The subjective norm*—the individual's perception of social pressure to recycle.

• *Perceived control*—the individual's perception of their ability to perform the behaviour.

• *Situational factors*—physical factors which may facilitate or inhibit recycling behaviour.

• *Consequences of recycling*—the outcomes of recycling and other resource efficient behaviour.

• *Demographic information*—age, gender, marital status, educational attainment, contract type, occupation within ICTS, and number of children in the household.

Table 1 shows examples of predictors and questions used to assess them.

Table 1: Predictors and Example Questions

Predictor	Example Questions
Subjective Norm	My colleagues think that I should recycle my office paper
Perceived Behavioural Control	I know who to report a water leak to
Situational Factors	Recycling takes up too much time
Consequences of recycling	Recycling saves energy

The survey was delivered online (coded into html and css and uploaded to its own web location by ftp [Dreamweaver and Winscp]). There are numerous advantages to an online format, including the enhanced use of images and colour, which can make the survey more appealing and accessible. The survey could be split into controlled pages, creating manageable sections. Users could not move to a new page without answering all the questions, a feature that can be programmed and guarantees complete responses. This also prevented users from moving ahead and being discouraged from completing the survey due to the number of questions still to be answered.

The electronic nature of the survey made the results easier to collate and process as it reduced user effort, with individual results being saved directly into an Excel spreadsheet. The results could also be directly imported into the required processing software, reducing time and error in data input. The link to the survey was e-mailed directly to all ICTS staff across all five campuses, with a later follow-up by managers who reminded staff about the survey. As an added incentive to encourage survey completion, ICTS offered prizes of a pair of cinema tickets for three participants.

4. RESULTS

4.1. Respondent characteristics

Most participants were male (79%), married or cohabiting (77%), had completed a university degree (83%), had permanent (75%), full-time (97%) employment, had been employed at the University for 5 or more years (67%) and were from one university campus (81%). They were largely employed in scientific (61%) or administrative (33%) positions and 59% were parents. Equal proportions were in the 25-39 years (46%) and 40-64 years (46%) age brackets.

Despite the electronic mode of survey administration, some participants did not respond to all questions, leaving some data missing. However this was minimal, and as there were no more than 5% cases missing from any one variable, values were not imputed. In each of the following analyses, cases with missing values were excluded analysis-by-analysis.

4.2. Staff Environmental Behaviours at Home

Table 3 summarises respondents' personal recycling, energy and water efficiency behaviours.

Table 2: Reported Frequency (percentage) of Staff Environmental Behaviours at Home

Item	Response Options					
	Never	When I remember to	Monthly	Weekly	Daily	Missing
How frequently do you recycle your waste at home?	3	1	1	16	79	0
How many individual electronic devices do you currently own as an individual?	29	22	12	6	30	1
	No	Yes, one	Yes, two or more	Missing		
Have you purchased any water saving devices in the past 6 months?	33	25	37	5		
Have you purchased any items which were labelled ecologically or environmentally friendly in the past month?	38	20	42	0		
Have you purchased any energy saving devices in the past 6 months?	20	18	62	0		
	No	Yes	Missing			
Have you changed your home energy provider to a greener supplier?	89	10	1			
Do you know what carbon-trading is?	20	78	2			
Do you currently participate in a carbon-trading scheme?	97	3	0			

In order to examine the relationships between home- and work-based actions, summary scores representing the extent of Home-Based Behaviours were created by assigning higher values to endorsement of the items described in Table 3, and adding these. The same approach was taken to create summary scores representing the extent of Work-based Behaviours. Specifically, higher values were assigned to endorsement of the items in Table 4. For these new behaviour variables, higher scores reflect more frequent positive environmental behaviours. The range, mean and standard deviation for the resulting behaviour measures are summarised in Table 5.

4.3. Staff Environmental Behaviours at Work

Table 4 summarises respondents' work-based environmental behaviours.

Table 3: Reported Frequency (percentage) of Staff Environmental Behaviours at Work

Item	Response Options					
	Walk	Public Transport	Bicycle	Car (on your own)	Car pool	Missing
How do you travel to work?	0	13	4	63	19	1
	For all waste paper	Most waste paper	Occasionally	Never		
Do you use the paper recycling facilities within your department?	19	45	25	11		
	Yes	No	Do not know	Missing		
Do you have a box or container in your office that you use for recycling paper?	61	38	0	1		
Do you/ your office have a scrap paper box?	59	41	0	0		
Do you know the procedures for discarding electronic wastes?	34	66	0	0		
Does your computer have a sleep mode activated?	56	30	14	0		
Would it be acceptable for your computer to have an automatic shutdown after 8pm or after 2 hours of inactivity?	53	37	9	0		
	Never	Sometimes	Most of the time	Always	N/A	Missing
How often do you recycle your drinks containers at work?	20	30	29	21	0	0
Do you turn off your computer when leaving the office for the day?	13	9	15	63	0	0
Do you turn off the power switches on the wall when leaving the office for the day?	58	11	8	21	0	2
Do you turn off lights when leaving the office for more than 20 minutes?	32	8	9	6	45	0
Do you turn your air-conditioner/ heater off if leaving the room for	23	3	2	2	70	0

4.4. Gender

Significant differences between males and females were found in relation to several of the specific environmental behaviours described above. In comparison to males, females reported significantly greater use of paper recycling facilities within their department, $F(1,98) = 4.8$, $p = .031$, turned off their computers more frequently when leaving the office for the day, $F(1,98) = 5.5$, $p = .021$, and turned the lights off more often when leaving the office for more than 20 minutes at a time, $F(1,98) = 5.001$, $p = .028$. However, it should be noted that there were uneven sample sizes, with a majority of respondents being male.

4.5. Age

A number of significant differences emerged between older and younger participants. In comparison to the 40-64 year age group, younger participants (25 -39 years) reported that they had purchased fewer water saving devices in the past 6 months, $F(2,92) = 4.934$, $p = .009$; used paper recycling facilities less often at work, $F(2,97) = 3.412$, $p = .037$; were less likely to have a recycling container, $F(2,96) = 3.606$, $p = .031$; and a scrap paper box in their office, $F(2,97) = 4.710$, $p = .011$; and were less likely to turn off the lights when leaving the office for more than 20 minutes at a time $F(2,97) = 4.357$, $p = .015$.

4.6. Family factors

In comparison to single respondents, married respondents were significantly more likely to recycle waste at home, $F(1,97) = 17.462$, $p < .0001$, purchase water saving devices, $F(1,92) = 6.419$, $p = .013$, purchase energy saving devices, $F(1, 97) = 5.116$, $p = .026$, and recycle their drinks containers at work, $F(1,97) = 4.205$, $p = .043$. Similarly, in comparison to those who were not parents, participants who were parents were significantly more likely to recycle

waste at home, $F(1,98) = 7.212$, $p = .009$, purchase water saving devices, $F(1, 93) = 7.061$, $p = .009$, use paper recycling facilities at work, $F(1, 98) = 4.825$, $p = .031$, recycle their drinks containers at work $F(1, 98) = 6.745$, $p = .011$, and turn off their computers when leaving the office for the day, $F(1, 98) = 5.751$, $p = .018$.

4.7. Employment characteristics

Significant differences were found in relation to employee type, with fixed term employees being more likely to have changed to a greener home energy provider, $F(2, 95) = 4.008$, $p = .021$, compared to permanent employees. Those who had been employed for less than one year were significantly less likely to recycle waste at home, in comparison to all other employment categories, $F(4,95) = 4.052$, $p = .004$.

4.8. Attitudes towards efficiency

Respondents were asked to rate the importance of seven different environmental issues such as *Energy Efficiency* and *Ecologically Friendly Products* on a scale of *1= least important* to *5 = most important*. Participants rated the importance of issues from each of two different perspectives, a) to you as an individual (Personal Attitude), and b) within Griffith University as an institution (Work Attitude). Ratings for each perspective were then summed to create measures of Personal Attitude and Work Attitude. Higher scores indicated a more positive attitude towards recycling and efficiency issues. The range, mean, standard deviation and scale reliabilities for the resulting Personal Attitude and Work Attitude measures are presented in Table 5 (the maximum score being 35).

Table 4: Descriptive Statistics for Behaviour and Attitude Measures

Variable	Mean	SD	Range	Cronbach's Alpha
Home Behaviours	12.05	2.73	5-19	n/a

Work Behaviours	12.00	3.51	5-22	n/a
Personal Attitudes	27.93	3.62	14-35	.739
Work Attitudes	26.36	5.95	11-35	.923

Bivariate correlations were examined in order to determine the pattern of associations among the home and work-based attitudes and behaviours. As shown in Table 6, there were significant positive correlations between personal and work-based behaviours, and between personal and work-related attitudes. However, measures of behaviour and attitudes within the home or work context were not significantly related.

Table 5: Correlation Matrix for Home and Work-Based Attitudes and Behaviours

	1.	2.	3.	4.
1. Home Behaviours	1.000	.287*	.041	.051
2. Work Behaviours		1.000	.189	.194
3. Personal Attitudes			1.000	.400*
4. Work Attitudes				1.000

* Correlation is significant at the 0.05 level (2-tailed).

Because the two behavioural measures were positively correlated, these were averaged to form a composite behaviour variable for use in further analyses.

4.9.   Beliefs regarding sustainability issues

An inventory of beliefs towards sustainability issues was included, which required respondents to indicate the extent of their agreement with 32 statements using a 7-point Likert type scale where *1=Strongly disagree* and *7=Strongly Agree.* In accordance with the findings of previous studies and the TPB model, this inventory included items designed to assess participants' subjective norm, perceived behavioural control, situational factors, and the consequences of recycling. To determine whether these four underlying dimensions were

discernible, the 32 item inventory was reduced using the Principle Axis Factoring technique, with oblique rotation.

Assumption checks showed sampling adequacy (Kaiser-Meyer-Olkin = .674) and sufficient correlations for factoring (Bartlett's test χ^2 (496) = 1492.50, p < .0001). Four factors were extracted, and this forced solution explained 43.03% of total variance. After rotation, Factors 1, 2, 3 and 4 accounted for 22.97%, 8.65%, 6.91%, and 4.50% variance, respectively.

The pattern of items loading onto factors was clear and interpretable. Factor 1 included 10 items representing beliefs about the consequences of recycling, for example *Recycling preserves natural resources,* and *Recycling saves energy*. Nine items loaded onto Factor 2, which reflected beliefs about subjective norms, for example *I believe that Griffith University is an environmentally pro-active organisation,* and *Griffith University thinks I should recycle my office paper.* The five items loading onto Factor 3 concerned situational or physical factors which may facilitate or inhibit recycling behaviours, for example *Recycling takes up too much time,* and *I would be more likely to recycle my office paper waste if there were more facilities.* Factor 4 included five items regarding the individual's perception of their ability to perform the behaviour, for example *I have read Griffith's Environmental Policy*, and *I know who to report water leaks to.* As shown in Table 7, all but three items loaded onto one of the four factors with loadings above .30.

Table 6: Factors and Item Loadings for the Beliefs and Attitudes towards Sustainability Inventory

	Factor 1	*Factor 2*	*Factor 3*	*Factor 4*
Eigenvalue (Rotation)	6.13	4.52	2.53	3.23
Item	Loadings			
Recycling preserves natural resources	.838			
Recycling saves energy	.822			
Recycling creates a better environment for future generations	.817			
If I recycle my office paper waste I will be helping to conserve natural resources	.778			
Recycling saves money	.728			
Conserving natural resources is important	.651			
Conserving resources at work by recycling paper and saving energy and water helps the environment	.573			
I believe that my individual behaviours (for example, turning off the lights in the office if I am the last to leave or turning off the photocopier) can have a direct influence on the resource usage within my department and the University	.482			
Saving energy helps protect the environment	.447			
Electronic items still use energy during their stand-by mode	.310			
Saving water is important				
My colleagues always turn off their computer at the end of the day				
I believe that Griffith University is an environmentally pro-active organisation		.850		
I believe that Griffith University is serious about working towards sustainability across all of its campuses		.809		
I believe that management is supporting the principles and processes of environmental sustainability		.799		
Griffith University thinks that I should recycle my office paper		.683		
My colleagues think that I should recycle my office paper		.448		
Griffith University provides enough separate paper recycling bins		.396		
There is a strong sense of "community spirit" in the department where I work		.379		
Electronic items consume a lot of energy during their operation	.332	.371		
E-Wastes represent a threat to the environment through their disposal		.341		
Recycling takes up too much time			-.869	
Recycling takes up too much room			-.832	
I am too busy to recycle my office waste			-.564	
I would be more likely to recycle my office paper waste if there were more facilities (such as recycling bins)			.370	
I would be more likely to recycle my office waste if I was more aware of the benefits of recycling			.309	
I have read Griffith's Environmental Policy				.744
I regularly refer to the Green Office Guide for information on recycling and energy saving measures				.629
If I found a water leak I would report it				.490
I am concerned with maintaining an environmentally friendly place to work				.468
I know who to report water leaks to				.434
I believe sustainability is important				
Scale Reliability (Cronbach's alpha)	.896	.820	.707	.666

The factor solution was generally consistent with the components of the TPB; Consequences of Recycling (Factor 1), Subjective Norm (Factor 2), Situational Factors (Factor 3), and

Perceived Control (Factor 4). Therefore, four sub-scales were created by averaging together participants' scores on those items loading most strongly onto each factor. The alpha reliabilities for these four sub-scales, shown at the bottom of Table 7, indicated good internal consistency among the items.

4.10. Prediction of Behaviour

A multiple regression model was tested to determine whether environmental behaviour could be explained by knowledge of an individual's Attitudes towards recycling and sustainability issues and their beliefs relating to subjective norms, perceived behavioural control, consequences and situation factors. The Behaviour variable described above was the criterion. Behaviour scores were normally distributed. In accordance with the TPB, the Attitudinal predictors included both home-based and work-based Attitude measures as described in Table 4, and the four subscales: Subjective Norms, Perceived Behavioural Control, Consequences of recycling, and Situational factors. Table 8 presents the summary statistics for these predictors. Zero-order correlations among the criterion and predictors are shown in Table 9. There were a number of significant positive correlations among the Attitude subscales, however only scores on the Perceived Behavioural Control variable were significantly correlated with Behaviour.

Table 7: Descriptive Statistics for Attitudinal Variables

Variable	95% CI of the Mean	Range
Subjective Norm	4.89 – 5.25	2.30 – 7.00
Perceived Behavioural Control	4.41 – 4.85	1.60 – 7.00
Consequences of recycling	5.85 – 6.16	2.50 – 7.00
Situational Factors	3.29 – 3.75	0.80 – 7.00

Table 8: Correlation Matrix for Behaviour and Predictors

	1.	2.	3.	4.	5.	6.	7.
1. Behaviour	1.000	.163	.154	.114	.253*	-.068	-.015
2. Work Attitude		1.000	.400*	.402*	.343*	.316*	-.091
3. Personal Attitude			1.000	.324*	.506*	.475*	-.072
4. Subjective Norm				1.000	.269*	.375*	-.099
5. Perceived Control					1.000	.356*	.019
6. Consequences						1.000	-.240*
7. Situational Factors							1.000

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Assumptions of normality, linearity, and homoscedasticity were met. Three participants had high leverage values. Analyses were conducted with and without these participants. There was only a slight difference in the variance explained, so results for the whole sample are reported here. Predictors were entered simultaneously to examine the total shared variance accounted for and any unique variance components that each predictor explained. The regression model is summarised in Table 10. The six predictors in combination explained 12.1% (6.4% Adjusted) of variability in Behaviour scores. The model bordered on significance, $F (6, 93) = 2.127$, $p = .057$. Perceived Behavioural Control and Consequences of Recycling were significant predictors, explaining 4.5% and 5% unique variance in pro-environmental behaviours, respectively.

Table 9: Multiple Regression Model Predicting Behaviour

Source	B	SE B	β	t	sr
Work Attitude	0.038	0.048	.089	.789	.077
Personal Attitude	0.063	0.086	.090	.724	.070
Subjective Norm	0.212	0.309	.076	.685	.067
Perceived Behavioural Control	0.581	0.266	.254	2.182*	.212
Consequences of Recycling	-0.858	0.374	-.273	-2.294*	-.223
Situational Factors	-0.139	0.221	-.064	-.630	-.061

$p < 0.05$, $R^2 = .121$ ($R^2_{adj} = .064$)

4.11. Responses to Open-Ended Questions

4.11.1. Suggestions for increasing sustainability in the workplace
Respondents had a number of suggestions for increasing sustainability in the workplace.

These generally consisted of the following categories:

1. Increased use of energy-efficient technology (e.g., Eco cars, recycled paper, water-efficient bathrooms, lower power consuming computers such as Core2 processors, more efficient software such as Linux based terminals instead of Windows to extend the life of existing computers, solar panels in roof spaces, video conferencing, water tanks, more recycling bins, bike track from Kessels Road (Nathan Campus), LCD instead of CRT monitors, virtual classrooms and improved online content and teaching resources).

2. Increased use of energy-efficient strategies (e.g., computer shutdown overnight and sleep mode, turning off lights, reduced printing, double-sided printing, more efficient bus service between Nathan and Mt Gravatt campuses, running air conditioners one degree cooler in winter and one degree warmer in summer, monitoring of staff paper use, recycling electronic waste, replacing paper documents for staff and students with electronic documents where appropriate).

3. Incentives for energy efficiency (e.g., free parking for Eco cars on campus, free parking for car pool participants, no charge for recycling bins, free shuttle [max 10 minutes wait] pickup/drop-off from/to the nearest major transit hub).

4.11.2. Perceived barriers to increasing sustainability in the workplace

Respondents listed a range of factors that they perceived as barriers or problems to be addressed in order for sustainability practices to be successfully implemented throughout the workplace.

1. Cost;

2. Level of commitment from management and staff (e.g. the need for a coherent, university-wide strategy);

3. Support and infrastructure needed;

4. Negative attitudes and lack of knowledge as to responsibilities and appropriate strategies.

5.   CONCLUSIONS

The present research sought to characterise the current pro-environmental attitudes and actions of a cross-sectional sample of staff within a Griffith University department, to investigate several determinants of pro-environmental behaviours, and to formulate recommendations for effective future strategies for promoting sustainability to Griffith University staff.

The online format of the survey worked well, producing a high response rate. The questionnaire was effective in generating knowledge of a broad range of participants' home and work-based behaviours. Scales accessing participants' personal beliefs and attitudes towards efficiency showed good internal consistency and range.

With regard to the frequency of pro-environmental behaviours surveyed, the occurrence of differences was much higher in sex and age groups than across other categories. Although several specific behaviours differed by demographic factors, the present effects might not be

robust in light of unequal variances and uneven sample sizes. Tucker (2003) identified the problem of not knowing '*a- priori* what the actual demographic influences might be'. Vencatasawmy and Ohman (2000), found further links between demographic groups and propensity to recycle, for example, the propensity to sort waste increases with age. In the present sample, the majority of participants were older, male, university educated, full-time employed, and were located at one campus (Nathan).

Participants' beliefs and attitudes towards sustainability reflected four distinct but related components of environmental attitudes and situational factors: the individual's perception of social or institutional pressure to recycle and minimise waste at work, the consequences of recycling behaviour, situational factors which might facilitate or inhibit recycling behaviour, and the individual's perceived behavioural control. These dimensions are consistent with components of the TPB, and can be used in the prediction of behaviours. In particular, knowledge of participants' perceptions of control over recycling and sustainability behaviours, and beliefs about the consequences of pro-environmental actions explained unique components of variability in recycling behaviours in the present sample. There is potential for further refinement of the attitudinal subscales for use in future research. Further confirmatory analysis on a larger sample would assist in validating and developing this measure. Findings also highlight the need to increase respondents' awareness of inconsistencies between their reported attitudes and behaviours at home and at work and to provide information about how to maintain consistency in all aspects of life.

Respondents appeared to be well-informed in relation to strategies for increasing sustainability in the workplace, with suggestions falling into three broad categories: (a) increased use of energy-efficient technology; (b) increased use of energy-efficient strategies;

and (c) incentives for energy efficiency. They were also aware of a range of potential barriers to implementing such strategies with most issues involving (a) cost; (b) level of commitment from management and staff; (c) support and infrastructure; and (d) negative attitudes and a lack of knowledge.

The results from this study can be used to help inform other Universities and university departments who are considering the development of their recycling and efficiency schemes in terms of the likely participation based on an appreciation of their own socio-demographic profile, and organisational structure. It also highlights the importance of keeping a recycling, waste minimisation or energy efficiency system convenient and easily accessible to participants. For Griffith University, the findings of this initial investigation have implications for a) expansion of existing energy efficiency measures, and b) future strategies for promoting sustainability to staff. Respondents have called for increased sustainability in the university workplace, for example:

> "Implement power saving mode on all Griffith PCs and fitting automatic lighting and air conditioning controls. Funding and installing solar power arrays".

> "Massively decrease the number of paper forms and handouts required throughout the student lifecycle. This includes electronic submission, mandatory laptops for students, laptop facilities in lecture rooms/ classrooms for note taking, video/audio versions of lectures, digitized handouts and required reading"

Respondents have also identified a need for commitment from Griffith at a management/ institutional level:

"Management, Government and Griffith are no different, it's something they want done, but they want someone else to do it and pay for it, and in all cases this becomes the poor employee that ends up wearing the cost of the change.   This happens by reduced income or hours, more stress due to less staff and/or resources and pressure on them to perform as well as cover the management commitments to being green.   The VC and Management need to lead by example and show staff the way to be environmental sustainable".

"We also need to be proactive in establishing an e-Waste policy and again advertise and raise awareness of how we as an institution can help. I haven't read the Environment Policy and couldn't find it on the Policy Library so it needs to be re-launched and driven from top/down if you want buy in from staff".

The survey findings indicate that promotional and educational materials should be aimed at increasing knowledge of specific behaviours such as how to discard electronic wastes, changing to green energy supply, and participation in carbon-trading schemes. The demographic differences in behaviours suggest that educational materials should particularly appeal to younger, unmarried persons (25-29 years).

Future research will seek to determine the various psychological and social factors which are significant to people adopting, or choosing to affirm positive attitudes and behaviours in relation to sustainability within their workplace.

9. ACKNOWLEDGEMENT

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APPENDIX A

INS/ICT Staff Questionnaire to determine Staff Behaviours with regard to Sustainability

Griffith University is committed to 'greening' its campuses and working toward the philosophy of sustainable campuses. As a key stakeholder your opinion is important to Griffith University. The ICTS Sustainability Working Group has been working with Dr Georgina Davis from the Griffith Centre of Environmental Systems Research to develop a survey to ascertain ICTS staff opinions on sustainability issues. Please assist us in our goal of making Griffith more sustainable and take 10 minutes to complete this survey. Completed surveys will be entered into a draw to have one of three chances to win cinema passes for two people (i.e. there will be three draws).

All answers will be held in confidence, all comments will be de-identified in the report and quantitative data will only be presented in aggregate form. Your assistance in piloting the survey/programme is greatly appreciated. Please answer the following questions as accurately as possible.

Section 1

The next few questions are about your environmental behaviours at home. Please select one to answer each question.

1. How frequently do you recycle your waste at home? (eg, how many times do you put items into a recycle bin?)
Daily Weekly Monthly When I remember to Never

2. Have you purchased any water saving devices in the past 6 months? (eg, water tank, pool cover, shower head etc.)
Yes, one Yes, two+ No

3. Have you purchased any energy saving devices in the past 6 months? (eg, energy saving bulb, timers, new appliances)
Yes, one Yes, two+ No

4. Have you changed your home energy provider to a greener supplier?
Yes No

5. Do you currently purchase household appliances or products which carry an eco-label?
Yes No Unsure

6. Have you purchased any items which were labelled ecologically or environmentally friendly in the past month?
(eg, washing powders, home cleaners)
Yes, one Yes, two+ No

7. How many individual electronic devices do you currently own as an individual? (i.e. mobile phone, iPod, Electronic Organiser)
One Two Three Four Five+

8. Do you know what carbon-trading is?
Yes No

9. Do you currently participate in a carbon-trading scheme?
Yes No

10. How important are the following environmental issues/measures to you as an individual?

	Least Important	Unimporta nt	Somewhat Important	Important	Most Important
Energy Efficiency					
E-Waste (waste from electronic sources eg, PCs)					
Sustainability					
Water Consumption					
Recycling of Wastes (i.e. paper, glass, cans, plastics)					
Emissions from Transport					
Ecologically Friendly Products					

Section 2

The next few questions are about your work behaviours.

11. Work behaviours - Please rank how important you feel the following environmental issues/measures are within Griffith University (i.e. how important do you feel these issues are to Griffith as an institution).

	Least Important	Unimportant	Somewhat Important	Important	Most Important
Energy Efficiency					
E-Waste (waste from electronic sources eg, PCs)					
Sustainability					
Water Consumption					
Recycling of Wastes (i.e. paper, glass, cans, plastics)					
Emissions from Transport					
Ecologically Friendly Products					

12. Please indicate the extent of your agreement with the following statements.

	Strongly disagree	Mod. disagree	Slightly disagree	Neither/No Opinion	Slightly agree	Mod. agree	Strongly Agree
1. I believe sustainability is important							
2. I have read Griffith's Environmental Policy							
3. I regularly refer to the Green Office Guide for information on recycling and energy saving measures							
4. I believe that Griffith University is an environmentally pro-active organisation							
5. I believe that Griffith University is serious about working towards sustainability across all of its campuses							
6. I believe that management is supporting the principles and processes of environmental sustainability							
7. I believe that my individual behaviours (for example, turning off the lights in the office if I am the last to leave or turning off the photocopier) can have a direct influence on the resource usage within my department and the University							
8. Conserving resources at work by recycling paper and saving energy and water helps the environment							
9. Recycling preserves natural resources							

	Strongly disagree	Mod. disagree	Slightly disagree	Neither/No Opinion	Slightly agree	Mod. agree	Strongly Agree
10. Recycling saves energy		- 30 -					
11. Recycling saves money							
12. Recycling creates a better environment for future generations							
13. Recycling takes up too much time							
14. Recycling takes up too much room							
15. I am too busy to recycle my office waste							
16. Saving energy helps protect the environment							
17. E-Wastes represent a threat to the environment through their disposal							
18. Electronic items consume a lot of energy during their operation							
19. Electronic items still use energy during their stand-by mode							
20. My colleagues always turn off their computer at the end of the day							
21. Saving water is important							
22. If I found a water leak I would report it							
23. I know who to report water leaks to							
24. I am concerned with maintaining an environmentally friendly place to work							
25. There is a strong sense of "community spirit" in the department where I work							
26. If I recycle my office paper waste I will be helping to conserve natural resources							
27. Conserving natural resources is important							
28. My colleagues think that I should recycle my office paper							
29. Griffith University thinks that I should recycle my office paper							
30. Griffith University provides enough separate paper recycling bins							
31. I would be more likely to recycle my office paper waste if there were more facilities (such as recycling bins)							
32. I would be more likely to recycle my office waste if I was more aware of the benefits of recycling							

13. How do you travel to work?
 Walk Public Transport Bicycle Car (on your own) Car (share/pool)

14. Do you use the paper recycling facilities within your department (red and blue 240 litre wheeled bins etc)?
For all paper waste Most paper waste Occasionally Never

15. Do you have a box or container in your office that you use for recycling paper?
Yes No

16. When photocopying or printing, do you print double sided?
 Yes, all the time When technology permits/Where Possible Occasionally Never

17. Do you/your office have a scrap paper box?
 Yes No

18. I think the recycling of waste office paper is:

For each of the following statements, please select a number on each scale that corresponds with your views.

	1	2	3	4	5	6	7	
bad								good
a waste of time								useful
not rewarding								rewarding
not responsible								responsible
not sensible								sensible
a hassle								easy

19. I think the use of energy saving devices is:

For each of the following statements, please select a number on each scale that corresponds with your views.

	1	2	3	4	5	6	7	
bad								good
a waste of time								useful
not rewarding								rewarding
not responsible								responsible
not sensible								sensible
a hassle								easy

20. How often do you recycle your drinks containers at work?
Never Sometimes Most of the time Always

If yes, how?
Special bins on-campus Take them home Other, please specify _____

21. Do you know the procedures for discarding electronic wastes (i.e. computer, printers etc.)
Yes No

22. Does your computer have a sleep mode activated? (please note that this is not the same as a screen saver, where the machine is still on full power)
Yes No Do Not Know

23. Do you turn your computer off when leaving the office for the day?
Never Sometimes Most of the time Always

24. Do you turn off the power switches on the wall when leaving the office for the day?
Never Sometimes Most of the time Always

25. Would it be acceptable for your computer to have an automatic shutdown after 8pm or after 2 hours of inactivity?
Yes No Don't Know

26. Do you turn your lights off when leaving the office for more than 20 minutes?
Never Sometimes Most of the time Always N/A joint office

27. Do you turn your air-conditioner/heater off if leaving the room for more than 20 minutes?
Never Sometimes Most of the time Always N/A joint office/inbuilt system controls with no local control switch

Section 3

Please select the option that applies to you.

28. Sex: [required]
    Male Female
29. Age: [required]
    18-24 25-39 40-64 65 and over
30. Marital status:
    Single Married/cohabiting
31. Educational Attainment:
    less than Yr 11 Yr 12 TAFE University
32. If technical/hands-on, please indicate either:
    Technical/Scientific Administrative Academic Research Other
33. Type of Employment Contract:
    On-going/Permanent Fixed Term Contract Casual
34. Working Hours:
    Part-time Full-time
35. Duration of Employment at Griffith University:
    less than 1 year 1-2 years 3-5 years 5-10 years more than 10 years
36. Which campus do you work on: [required]
    Nathan Mt.Gravatt Logan South Bank Gold Coast QCA QCGU
37. Which division do you work for: [required]
    RCS CTI EIS NCS EITS Other
38. Are you a parent?
    Yes No Section 4

39. What does environmental sustainability means to you?
_____
_____

40. What do you believe are the main barriers to environmental sustainability within Griffith University?
_____
_____

41. Please list the two highest priority actions which Griffith University can undertake immediately to make its campuses more sustainable.
_____
_____

Submitting the form Prize Draw

Your time and cooperation is valued. Completed surveys will be entered into a draw to win a cinema pass for two.

Statement of Privacy

To ensure confidentiality, your contact details will be separated from your survey responses before analysis and stored in such a way as ensures your responses cannot be attributed to you. All material will be held in confidence, all comments will be de-identified in the report and quantitative data will only be presented in aggregate form.

For further information consult the University's Privacy Plan at www.griffith.edu.au/ua/aa/vc/pp/.

Informed Consent: Completion of the survey will be interpreted as consenting to participate in the survey.

Please enter your name and email address if you wish to go in the Prize Draw.

Name_____ Email Address _____

If you have any queries regarding the survey or green office initiatives, please contact Dr Georgina Davis on g.davis@griffith.edu.au.