Green IT and Sustainable Development Strategies: An Australian experience

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Abstract

This paper reports on the development and facilitation of an intensive postgraduate unit (IS6) at Curtin University. IS6 aimed at enhancing Information Systems students' appreciation and awareness of their industry's impact on the environment, and their ultimate responsibility towards their communities and society. Throughout the seminars, students were keen to demonstrate awareness and sensitivity to the importance of sustainable development and business strategies in such a crucial time for people, planet and profits. Indeed, students were able to display an understanding of the fundamentals of Green IT, applying conceptual tools and frameworks to critically analyze and apply business decision-making practices and policies, translating theories, concepts and analytical techniques learnt into practice. The paper reports on quantitative and qualitative data collected throughout the semester from eighteen students, the diverse assessment methods applied, the three written journals, students' individual oral presentations including peer-evaluation and report writing of an IT Sustainable Strategy. This comes in addition to the feedback provided through informal channels and more importantly through 'eVALUate', a feedback system adapted by Curtin University. The preliminary outcome, though limited to Australian higher education, yet reveals a shift in the students' mindsets towards appreciation of the big picture, thus moving from merely concentrating on their software and hardware development into establishing the link between their specific industry and the society and environment.

Introduction

It is time for practitioners and academics to think seriously about the role they play in the world aiming towards acting in a more sustainable manner towards their stakeholders. As Newton (2003) posits sustainable development is seeking to protect and preserve the environment not only for this generation but for the seventh generation. Jagers (2009 , p.182) indicates that sustainable development enhances the means for doing so in a 'manner consistent with their [Word Trade Organization and human rights] respective needs and concerns at different levels of economic development'. In this regard, Epstein & Roy (2001) define five major components for businesses to organize their sustainability and economic matters: (1) corporate and business unit strategy, (2) sustainability actions, (3) sustainability performance, (4) stakeholder reactions, and, (5) corporate financial performance. According to Epstein and Roy, these major components play an important role not only for economic, finance and business structure, but also extend to cover recent attention paid to the power of shareholders. This comes as we are recently reminded by Amann et al. (2009) that sustainable development had 'led shareholders to be more attentive to the concerns of all stakeholders – personnel, clients and suppliers, investors and non-governmental organizations – [which] conveys the expectations of society as well as the environment of the company' (Amann et al. 2009, p.338). Weybrecht (2010) argues that this circumstance had led to huge competition not only between organizations and firms, but also between countries and societies, as majority of organizations and firms started to integrate sustainability into their strategy. Weybrecht highlights the importance of inclusion of sustainability in strategy, noting that organizations and firms who are successful are building a business case for sustainability 'that suits the unique needs of their project, their initiative, their division or even their whole company'' (Weybrecht 2010, p.21).

Sustainable development is unlimited to businesses; higher education, specifically business schools had commenced to very seriously and carefully evaluate and think about the importance of sustainability. This shift in their thinking does not limit the incorporation of sustainable strategies at the higher education institutions' policies, but rather extends to include the introduction of units (courses) aiming at the education of future leaders and employees thus incorporating such topics in their degrees. One of the units (courses) that form a part of the postgraduate studies including the students of Information Systems (IS) and Information Technology (IT) is the subject of this paper. This paper starts with the provision of a brief literature review, and then provides an empirical evidence of students' mindsets shift through the analysis of the quantitative and qualitative data. This data was collected throughout the semester from eighteen students, through diverse assessment methods, the three written journals, individual oral presentations including peer-evaluation and report writing of an IT Sustainable Strategy. All this is coupled with data provided by the feedback through informal channels and more importantly through 'eVALUate', a feedback system adapted by Curtin University.

Background and Literature Review
What is Sustainability?

In 1983, the Sustainability concept was founded and addressed by Gro Harlem Brundtland, from the World Commission on Environment and Development meetings. In 1987, the Brundtland's report was released

to alert the global world to the urgency of marking progress towards economic development, since people have become required to use our world in a way that will not detract from the future. Loorback et al. (2010, p.140) posit that sustainability can be defined as 'work together with suppliers, partners, and clients for a profitable position in the market by applying alternative fuels for sustainable energy and transportation'. While Weybrecht (2010, p.14) indicates that sustainability, for business sector, can be defined as 'adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting sustaining and enhancing the human and natural resources that will be needed in the future'. Therefore, businesses and higher education globally and locally, should consider sustainability innovation in their strategies and curriculum to protect the environment not only for the current generation but also for the seventh generation according to Newton (2003).

Providing an endless list of positive consequences when applying sustainable business strategies; Rainey (2006) posits that applying sustainability in business strategies enhances business performance thus contributing to cost reduction and efficiency improvement, which enhances reputation, recruiting and retaining excellent people, gaining better access to investors' capital, and reducing a company's liabilities. Nidumolu, Prahalad & Rangaswami (2009, p.58) argue that sustainability is not the 'burden on bottom lines that many executives believe it to be. In fact, becoming environmentally-friendly can lower your costs and increase your revenues. That is why sustainability should be a touchstone for all innovation'. Henceforth, sustainability innovation should be spread out to organizations' strategies and even to education curriculum to generate future labour and leaders who understand the environment requirements ensuring the safeguard of those sources for the future generation.

The importance of sustainability to business has become an important public concern both locally and globally. This comes as evidence is mounting that the development and application of sustainable business strategies has the ability to provide a high quality of life for the current and future generation. Though literature seems to be over-flowing with ideas, frameworks, tools and models relating to the sustainable business, yet, there seems to be a misunderstanding of the true meaning of sustainability. Blowfield & Murray (2011, p.23) tried to tackle this issue by stating that sustainability as a concept is unlimited to capturing the environmental business rationale, 'but the triple bottom line was developed to add this by encouraging companies to think in terms of adding economic, social and environmental value'.

In conclusion, the expedition towards more sustainable strategies is an essential and a goal of great importance; therefore, businesses should understand where they are now and where they want to go. There is a need for them to understand their goals and objectives prior to developing and applying sustainable strategies for their businesses. Indeed, bearing in mind Kendall & Kendall's (2010) confirmation that sustainability will benefit not only the company's shareholders but the society as well; novel aim contemporary businesses should be aiming towards.

Sustainability and the field of IS and IT?

The field of IS and IT, Green IT, seems to gain favour with business strategists forming a major part of their Information Systems Management Strategy. Sustainability and Green IT are very essential in the Information Systems Management Strategy, since the present generation does not own the planet and its resources, but are allowed to use, holding it in trust on behalf of future generations (Weybrecht 2010). It was noticed that individuals, businesses, communities and societies seem keen to study and address the critical issues behind the current sustainability issues to allow them to move on to prevent the coming critical crisis. This is crucial, especially with Starik et al. (2010, p.377) stating that 'Climate change continues to alter global ecosystems, most obviously resulting in melting icecaps and glaciers. Biodiversity losses are resulting in a mass extinction of species both on land and in the sea, while toxic pollutants, most visibly at the time of this writing; the Gulf oil spill and hazardous waste are becoming ever present not only on land and in the sea, but also in the air we breathe. Human population increases by more than 200,000 net each and every day, primarily in developing countries, while human over-consumption of fossil fuels, potable water, meat and fish, primarily in developed countries, increasingly cause problems both within and around us'.

European Greens (n.d.) suggest that green economic vision puts social and environmental justice and equity within nations and between nations at the centre, just use of the earth's resources (e.g. reducing the gap between rich and poor). Every person has the right to meet their basic needs: clean air, water, food, soil, shelter, energy, health, freedom, every human being has a right to solidarity, democracy, self determination, autonomy, responsibility, dignity, self fulfillment, and the economy should enhance wellbeing rather and not detract from it. Furthermore, the European Greens (n.d.) argue that the green economy should play central role for investments in sustainable development and green technology, and should create new opportunities, in particular on the labour market, making it possible for everyone to exploit his or her talents. Therefore, the key to greening the economy is to make it less intensive in its use of natural resources, but the most essential is to have the proper incentives starting with the appropriate leadership. This leadership that allows for the development and application of sustainable business strategies to all departments within the business including the IS/IT.

This paper provides a simple outline as how the readings, case studies and assessments design of 'IS6' postgraduate unit (course) had played a role in attempting to shift the students' mindsets becoming more aware in respect to sustainability and IT development strategy. The most important aspect was the concluding remarks by students following their attendance and completion of the IS6 unit (course), was their feedback and reflection that organizations and firms should integrate sustainability within their strategy that is aimed at IS/IT department to allow them to be more competitive in the marketplace locally and globally simultaneously.

Sustainability, Green IT and Education – The design of IS6 unit (course)

The economic crisis in 2008/2009, did not only raise the alarm about lack of sustainable practices in our finances, but had alerted businesses towards issues beyond finance and profit, who started to struggle coping with the increased IT/IS cost and their environmental footprint influence. Arevalo (2010) urges businesses to pay more attention to the issue of sustainability and global social responsibility. Arevalo providing empirical evidence, argues that relationships between environmental and economic dimensions of sustainability have been solidly specified, but relatively little attention has been given to the social sphere concluding that there is a transformative effect on citizenship that can result from the teaching and learning that is facilitated by voluntary corporate social responsibility initiatives. These initiatives can only become serious and acted upon if they are incorporated within the company's strategy. Kaefer (2009, p.4) indicate that 'IT contributes 2% of world wide CO_2, and IT energy consumption is growing at 12% annually while a Google search needs on a average the same energy as a 11W energy saving lamp in one hour (11Wh)'.

Therefore, businesses seem to have started moving and quickly towards adopting a sustainable strategy, this is coupled with actions by higher education to incorporate sustainability and Green IT as parts of their teaching and learning materials, acknowledging their importance for the global and local businesses. This interest by businesses and higher education has come in the form of introducing some new concepts. For example, 'Green IT', is a concept that brought with it the 'ecological impact of IT into the public and academic focus' (Schmidt et al. 2009 , p.400). Marques (2009) reviews an important paradigm shift that is currently spreading amongst humanity, instigating a critical analysis of the way we used to perceive matters in past centuries, and encouraging an entirely opposite way of approaching the essentials of contemporary life. To clarify this perceptional change, Marques discusses different areas such as education, and economics amongst others. In this respect Walck (2009) confirms that majority of academics globally and locally are shifting towards green and sustainability in the management and Information Systems curriculum.

These specific units (courses) must be mapped properly, ensuring the proper linkages are established between the material provided, assessments and the unit (course) outcomes. Designers of such units (courses) should always pose the questions, as to what outcomes might be desirable from this unit (course), and what assessments should be included in these units (courses) to meet students, university and marketplace requirements simultaneously. This has increased in its importance especially with the latest developments in the market, and environment that pose great challenges to the humankind. To meet these increased challenges, and at Curtin University, the IS6 unit was designed providing pointers to and examining the strategic development issues that need to be taken into account to allow the future IT business leaders to act responsibly towards achieving their goals as stewards of the planet, people, and their profit.

The aims of IS6 unit were: (1) to provide students with some understanding of issues relevant to Organizational Sustainable Strategy, (2) to provide students with some understanding of issues relevant to Green IT, and, (3) to establish the link between the two areas. As for the learning outcomes of IS6 unit those were: (1) students to demonstrate initial awareness and sensitivity to the importance of sustainable development and business strategies in such a crucial time for people and planet and ultimately profit, (2) students to display an understanding of the fundamentals of Green IT, and, (3) students to apply some of the ever-increasing and changing conceptual tools and frameworks to critically analyze and apply business decision-making practices and policies in a comprehensive manner that would allow to issues other than profit to be considered, and, (4) students display proper abilities to translate theories, concepts and analytical techniques learnt into practice.

The IS6 unit (course) topics were: (1) the changing landscapes history and strategic implications – Green IT, (2) overview: Risk society, stewardship, strategic thinking and business strategy for the digital world, (3) stewardship and financial decision-making (in relation to IT), (5) strategic thinking and sustainable business development strategy (sustainability, innovation, change), and, (6) sustainable development and business success (benefits and limitations) security issues and concerns. In addition, assessments were designed to ensure that the unit's (course) aims and objectives were achieved. This will be elaborated upon later in the paper.

Method
Research question and objective
This paper will answer the question: 'what are the benefits and consequences of teaching Sustainability and Green IT for Postgraduate students of IS and IT?' The main purpose of this paper is to report on data collected

during the teaching of sustainability and Green IT for Postgraduate students in Australia and whether such teaching will change students' attitudes towards the subject of sustainability in there IS/IT field. This data was collected through the assessments that were originally set to assist the IS6 postgraduate students to achieve the unit outcomes.

Methodology

The mixed-method approach was deemed appropriate for the analysis and reporting of data in this paper. A mixed method approach allows researchers to reduce the gap in the finding, since the qualitative research and quantitative have their place in research and each have their strengths and weakness (Teddlie & Tashakkori 2009). Kumar (2005, p.13) indicates that researchers should not 'lock' themselves into solely quantitative or qualitative research, and 'neither one is markedly superior to the other in all respects'. The teaching and learning feedback should be only gathered through the mixed-method approach. Furthermore, Walker (1997) and Green (2008) confirm that each of the techniques has its shortfalls, and in combining both the shortcomings of each will be reduced.

In this paper, data was collected through the quantitative and qualitative techniques, from our records, and students' feedback (both formal and informal). The students' feedback was collected over two periods in the semester. The first was through the informal feedback while students were still undertaking the unit (course). This 'informal feedback' is a teaching and learning initiative, when during the semester students, were asked to provide their anonymous feedback on the unit using the model 'Continue, Stop, Start' (CSS). By completing the CSS students are usually given the chance to provide their comments of what they want the lecturer to continue, to stop and to start doing, thus providing the chance for both the students and the lecturer to benefit from the course, enhancing the methods of teaching and learning. The second was at the end of the semester through the University's formal feedback (eVALUate). This 'eVALUate' is applied at Curtin University at the end of each semester, when students voluntarily and anonymously provide their feedback on the unit and the teaching staff.

Through the analysis of the collected data it was noticed that students were interested in and keen to study the material that formed the IS6 unit, which, according to them had enhanced their knowledge, challenged their beliefs, and encouraged them to seek more articles and material to support the ideas that have been planted through the first session of this unit. What became apparent that students came to enhance their abilities, including critical thinking to their writing and reading skills? Some of students' comments (informal and formal feedback) will be elaborated upon in the discussion section of this paper.

Participants

The IS6 participants were a mix of students, where some have a solid work experience in the field, while others were students who have elevated through their undergraduate studies at the university without any exposure to work in their field. This in itself was a challenge that the lecturers had to deal with, through the scaffolding offered to those who were finding it difficult to think of the practicality of the issues under discussion. Another challenge was the different backgrounds of these students. Some students completed their undergraduate studies moving into post-graduate studies at the same university, while others had only joined the university merely to obtain their post-graduate qualifications bringing with them diverse ideas and real-life experiences relevant to culture. Students were also derived from different majors.

Table 1 shows some demographic details of the IS6 students (e.g. qualification types, students' number, gender, nationality, work experience etc...).

Table 1: Demographic details of IS6 students

Qualification	Number	Gender	Nationality	Work Experience	Final Unit
Master of Commerce (IS)	2	None	Asia, Mauritius	1Middle, 1 Low	None
Master of Information Systems	8	1 Female	6 Asia, 2 Middle East	1 Middle,7 Low	5
Honors	1	None	Asia	1 Middle,	None
Postgraduate Diploma of Commerce (IS)	6	1 Female	5 Asia, 1 South Africa	1 High, 5 Low	2
Master of Logistics	1	None	India	1 High	1
Total	18				

Gender and Nationality were key variables when it came to comparing students' participation, oral presentations and reports writing. Differences were noticed, female students' participation, oral presentations and reports writing were of a higher quality when compared to the majority of male students in the class. Nonetheless, the experienced male students were able to add value to the class debates and discussions (either face to face or online) through sharing their experiences, videos and articles. As for students' nationality, this

was another interesting difference, especially with students sharing their countries' perspectives in relation to sustainability as a whole, sharing their stories, videos, and articles in the discussion forums on the blackboard.

To properly examine as to whether IS6 has achieved its aims and outcomes, assessments were designed. These assessments were all required to be submitted on individual basis. This was coupled with several group activities throughout the semester in the classroom. As the IS6 was discussing sustainability, no paper was used in this unit, but rather electronic drop box facility was provided for students to drop their assignments in and lecturers feedback was communicated in the same manner, in addition electronic blackboard provided the readings and case studies material. These assessments were: (1) three reflective accounts/journals to be done individually, (2) individual oral presentations of an IT Sustainable Strategy proposal, and, (3) reports writing of the IT Sustainable Strategy that students proposed in their second assignment using the frameworks and tools provided, and most importantly those that the students themselves were able to locate through their ongoing research throughout the semester. Table 2 provides a breakdown of the marks allocated to each of these assessments.

Table 2 – Assessment Activities for IS6 unit

No.	Assessment Activity	Percentage %
1	Three Reflective Journals	30%
2	Individual Oral Presentations of a IT Sustainable Strategy	20%
3	Reports Writing on Your IT Sustainable Strategy	50%
	Total	100%

The three-part reflective accounts/journals (individual assignment) were designed to provide student(s) with valuable experience in critically, creatively and reflectively, reviewing and recording key points and their thoughts about material from textbook(s), journal articles and the internet. In addition, this assessment encouraged student(s) to always endeavor to keep themselves up-to-date with their readings and their ongoing search in the World Wide Web in relation to the topics under study. It is worthwhile to note here that the reflective accounts/journals were not meant to only form a summary of the readings but student(s) were encouraged to provide their own opinions, and reactions to the material provided in these sources, reflecting on the contents and providing additional evidences from the literature they sought. The fact that these were three-part reflective accounts/journals has played a positive role, as students built on the feedback provided to them on their first and second to provide, and especially those who needed scaffolding throughout, a well-written account/journal on their third submissions.

The second assessment was in the form of oral presentation. This individual oral presentation was designed to promote student presentation skills and their arguments abilities as they were faced with questions from the audience (classmates and lecturers). These presentations provided a brief, concise and succinct account of their major IT sustainable development strategy for a company of their choice. The method adopted in running those presentations also enhanced the learning of those students. Thus, and in order to achieve this aim, and maintain interest, students were provided with marking guides to assess their peers' performance allocating marks. These marks were taken into account when evaluating the overall mark of each of the students. The fact that students were allowed to assess their peers was taken seriously by students, who were also generous with their remarks on what went well, wrong, and who could have been done better.

The third individual assignment aimed at providing students with the ability to write professionally and academically. The proper way to achieve such aim, communicating with their lecturers was through writing a report enhancing their analysis of the company's present strategy, their recommendations through the use of different frameworks, tools and models. In some cases students were courageous to even suggest the deletion of stages in some of the models, and addition of others. All this was derived from solid research and understanding. In this paper, only the first assignment of these course assessments (i.e. reflective accounts/ journals by students) will be explored.

Discussion

Using reflective journals, individual oral presentations, and reports writing assessments for IS6 was considered an effectual way to encourage students to participate, engage, and to understand the main concepts of IS6 unit (course). The development and the facilitation of IS6 was a great challenge not only for students but lecturers. At the beginning of the semester, and following the ice-breaker activity, it became evident that the majority of students were unaware of the role that IS/IT might play in the increase of carbon footprints, and how their sustainable strategies might reduce such an impact. It seemed hard to convince and influence students about the importance of the sustainability and green IT concepts in the business and education sectors. One of the students comments sums up this suspicion:

'Please don't get me wrong, I support green IT, but there is something that I am still unsure about green IT. Guess that you still haven't brain washed me to that extent …..' (IS6 Student 1).

The individual reflective/accounts journals were considered a valuable tool to engage students in the learning activities, to improve their understandings of IS6 objectives, and to improve their communication skills as the same time. This echo Clarke (2003, p.5) that reflective/accounts journals promote professional development of students, and enables them to make the links between theory and practice and 'encourages them to evaluate their teaching performance'. Furthermore, Cunliffe (2004, p.408-418) posits that using this method in business education can develop 'collaborative, responsible and ethical ways of managing organizations', 'and not thinking about thinking, but thinking about self from a subjective process'. This was evident in some of the comments provided by the students either in their individual reflection specifically in their conclusions. From these comments:

'The learning experience helps me to improve communication skills and start to think more critically'. (IS6 Student 2).

'I was taught a lot of things about green IT and some new aspects in these seminars.' (IS6 Student 3).

Following the introduction of IS6 to our postgraduate students with a request to students to read and search for articles, in relation to sustainability and Green IT, it was revealed to the lecturers/unit leaders that students started to change their way of thinking becoming more aware of how businesses should integrate sustainability into their core business strategy and practices. Following the examination of their first individual reflections, the lecturers/unit leaders adopted new techniques and tools to enhance students understanding of Sustainability and Green IT encouraging them to extend their research gaining more insights into the topic and the meanings of those concepts. Students appreciated this fact commenting:

'Our brain has been washed to green'. (IS6 Student 4).

'Improve [our] reading skills, analyzing and reflecting from journal readings. (IS6 Student 5).

The change did not stop in shifting the students' mindsets, but rather it was very interesting to read in their accounts/journals that they feel the importance of the topics covered in this unit calling for a change into the way businesses are conducted.

'Commitment and cooperation is a major factors that will influence successfulness of sustainability whether it is from the inside of the company such as top management, staff or even other organization could help promote and increase credibility toward the sustainability plans and process'.(IS6 Student 6).

Patenaude (2011, p.270) posited the need for a 'proportion of academic research to become informed by real world problems as faced by communities and businesses, inter-institution spaces for the incubation and exchanges of ideas, innovations and people, as well as neutral hubs of research, teaching and expertise are needed'. Sustainability and Green IT should not be limited to businesses but rather to higher education, who should contribute to society's eagerness to understand, develop and implement sustainable business strategies by introducing new units (courses) including these aspects. This has the potential in changing students' perceptions towards sustainability, a percentage of which will become the future chief executives. Therefore, higher education has the responsibility to apply sustainability philosophy into their units (courses) including Accounting, Marketing, Management, Information Systems, Economic and Business in general. This was a call by IS6 students:

'…Each and every one of us will have roles to play in helping environment, but it will needs to start with understanding the big picture which can be done through education and proper realization of the result so they can feel what they earned even though most of them is intangible.(IS6 Student 7).

'There are many helpful tools and aspects of environmental issues in terms of learning sustainable business IT strategies. This unit helped us to improve the research skills by

reading many articles concerning on the environmental, social, political and technological issues. As we've done some case studies during the seminars…' (IS6 Student 8).

Table 3 **eVALUate Full Unit Report**

eVALUate quantitative items	Unit Agreement (%)
The learning outcomes in this unit are clearly identified.	80%
The learning experiences in this unit help me to achieve the learning outcomes.	90%
The learning resources in this unit help me to achieve the learning outcomes.	90%
The assessment tasks in this unit evaluate my achievement of the learning outcomes.	90%
Feedback on my work in this unit helps me to achieve the learning outcomes.	90%
The workload in this unit is appropriate to the achievement of the learning outcomes.	90%
The quality of teaching in this unit helps me to achieve the learning outcomes.	90%
I am motivated to achieve the learning outcomes in this unit.	100%
I make best use of the learning experiences in this unit.	100%
I think about how I can learn more effectively in this unit.	100%
Overall, I am satisfied with this unit.	90%

Table 3 above provides the quantitative items of 'evaluate', the students' overall satisfaction was 90% which is well above the satisfaction rate at the university level. Though the students expressed, and verbally, their concern about the number of readings and assessments the above table provides a 90% satisfaction with the workload, feedback and assessments. This is a testimony that students have appreciated the efforts exerted by the unit controllers in developing and facilitating the unit.

Finally, and in light of the comments detailed above, an issue such as sustainability and business strategies directed to the IS/IT is of great importance. Thus academics and practitioners should engage in a dialogue on how best higher education can serve organisations in enhancing their understanding of such an important topic during uncertain times. Though the topic is challenging, and might be met with suspicion and cynicism by students at start, yet when evidence is provided change happens. One final issue, the lecturers/unit leaders should be keen and have the conviction of the necessity of sustainability, displaying knowledge and passion, otherwise it would prove to be difficult to become agents of change.

Conclusion
This paper presented an Australian higher education perspective in relation to Sustainability and Green IT concepts. From the analysis of the quantitative and qualitative a shift in the students' mindsets was witnessed towards the knowledge, awareness and importance of sustainability and green IT including the necessity to develop sustainable business strategies, ensuring their implementation in businesses. The data provided evidence that the design of IS6 assessments that took into account the Curtin graduate attributes had enhanced students' understanding of the main concepts of 'Sustainability' and 'Green IT'. Indeed, had changed their

minds towards the necessity of sustainability in the IS/IT field. Further, the way these assessments were designed allowed students to enhance their communication skills from critical thinking, written, oral presentations, and research and information technology skills. Comments from students, some of which were highlighted in this paper are strong evidence on this conclusion.

Now, the responsibility lies in the hands businesses and the top management of higher education to continue their engagement and efforts to protect, sustain, and enhance the human and natural resources which are needed in the future through becoming aware of the necessity of development and implementation of sustainable business strategies including those directed to IT/IS. Further research will be carried out when this unit (course) is run again at Curtin University, which is expected in semester 2, 2011, which might provide strength to such empirical evidence.

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