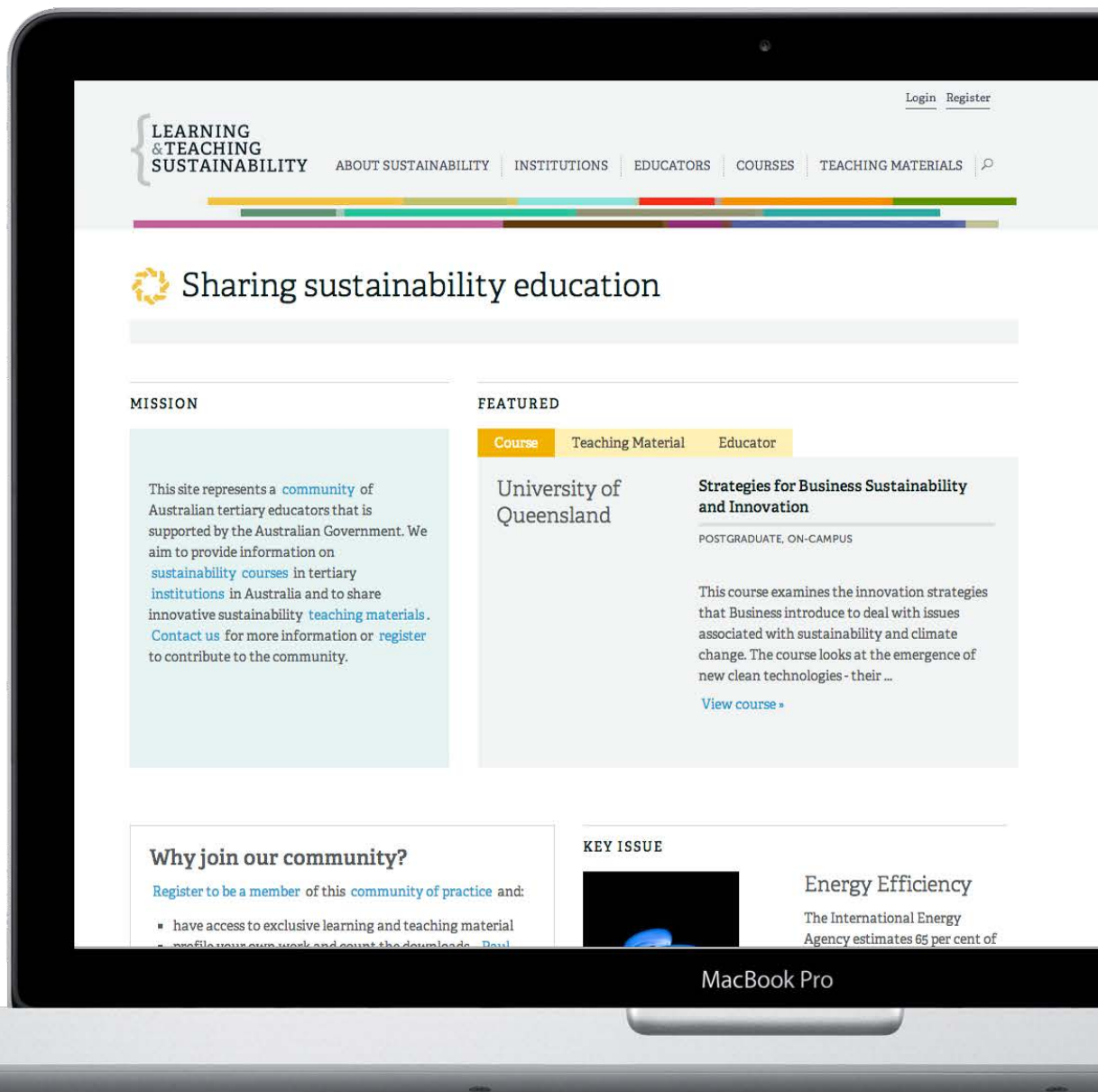


Ongoing Management and Development of the Learning & Teaching Sustainability Website: Sharing Sustainability Education



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Educator

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KEY ISSUE



Energy Efficiency

The International Energy Agency estimates 65 per cent of

MacBook Pro



Ongoing Management and Development of the Learning & Teaching Sustainability Website: Sharing Sustainability Education

Final Report 2014

UTS Business School and the Institute for Sustainable Futures

Project Leader: Professor Suzanne Benn

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www.sustainability.edu.au

Support for the production of this report has been provided by the Australian Government Office for Learning and Teaching. The views expressed in this report do not necessarily reflect the views of the Australian Government Office for learning and Teaching.



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2014

ISBN	978-1-74361-933-9	PRINT
ISBN	978-1-74361-935-3	DOCX
ISBN	978-1-74361-934-6	PDF



Acknowledgements

The report authors acknowledge the following contributions:

Members of the Steering Group: Distinguished Professor Dexter Dunphy, Professor Stuart White, Professor Cynthia Mitchell, Dr Alison Wood (TAFE NSW, Sydney Institute), Professor W. Gladstone (Faculty of Science), Danielle McCartney (UTS Sustainability Manager).

Additional members of the University of Technology, Sydney team, Rosemary Sainty, Seb Crawford and Laurence Wainwright who assisted at various stages.

The Digital Eskimo team under the direction of Dave Gravina and Duncan Underwood.

Those participating sustainability educators who shared their teaching materials and courses on the <sustainability.edu.au> website, readily offered their feedback and engaged in sustainability education forums and workshops.

Luiz Robiero, Dr Colin Hocking and the catalysts in the participating universities for their collaboration in developing and implementing strategies to engage sustainability educators.

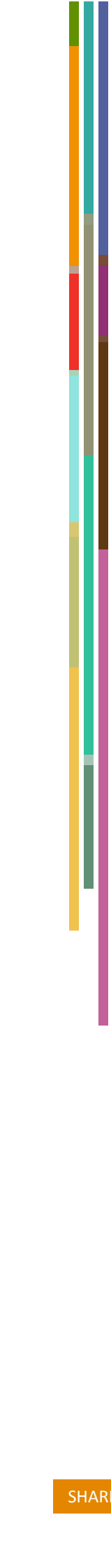
The Green Gowns team, especially Sue Hopkins, for her collaboration on the L&T award.

The UTS Business School and the Sustainability Working Party for their ongoing support of sustainability education and the project team.



List of acronyms used

AACSB	
CoP	Community of Practice
CoPs	Communities of Practice
DE	Digital Eskimo, the design studio
EfS	Education for Sustainability
IMS	Information Management System
ISF	Institute for Sustainable Futures
L&T	Learning and Teaching
L&T site	Learning & Teaching Sustainability website < http://sustainability.edu.au >
NFEE	National Framework for Energy Efficiency
NoP	Network of Practice
OLT	Office for Learning and Teaching
UTS	University of Technology, Sydney
UX	User Experience
VET	Vocational Education and Training



The CoP has ensured its resilience through the adoption of a strategy designed to support the co-creation of knowledge. The strategy has been enabled via the sustainability issues pages, through the sub-community pages such as the Education for Sustainability community page and through discussion of teaching materials in the LinkedIn group. Co-creation of knowledge has also involved engaging with the National Framework for Energy Efficiency, which funded the energy efficiency issues page.

Working with Australian Campuses toward Sustainability (ACTS), in 2013 and 2014 the project co-hosted the Green Gown Award in recognition of sustainability L&T excellence. The award was presented at ACTS annual conferences in 2013 and 2014. A public awareness campaign about sharing sustainability education has commenced with one article published in the Higher Education section of The Australian newspaper.

Recommendations

Ensuring that a website is more than a repository of static information requires ongoing enabling and connecting strategies to be implemented. Keeping the knowledge content vital and maintaining the credibility of the L&T site requires a degree of administrative control. After trialling experiments designed to test user engagement with the site through devolving control, the following recommendations should be followed to sustain the L&T site and its associated community:

1. Devolving access to reputable users enables content co-creation and maintains vitality and currency of the L&T site.
2. An online community manager supports development of sharing behaviours to expedite membership and content acquisition.
3. An online community manager facilitates the spread of L&T news and the latest research between members through social media and newsletters.
4. An online community manager enhances the status and reputation of the site and publicly awards reputation and status credits to contributing members and high-profile academics.
5. A curriculum content manager regularly oversees site content, facilitates the development and sharing of teaching materials and incentivises educators, catalysts and disciplinary/issue experts to update content.
6. The L&T site connects to structural incentives and rewards systems to encourage pro-sharing behaviour.
7. The L&T site is used to audit sustainability education by regulatory and voluntary compliance bodies that require sustainability integration for course accreditation.
8. To make online L&T sites self-sustaining, fundamental shifts towards openness, development of norms that foster a culture of sharing, need to be encouraged at the individual and organisational levels
9. To maintain integrity to the .edu.au site name an administrative body should be established containing members of the reference group, and nominated or elected representatives of contributing universities.



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Chapter 1: Inclusive Design

The purpose of the Learning & Teaching Sustainability website (L&T site) is to enable communities of tertiary educators concerned with sustainability to connect and share knowledge. Our project aim was to manage the ongoing redevelopment of the site such that it would be sustaining. To achieve this aim the main strategy was to re-design the website such that it would not be a static repository, but rather an interactive portal where educators could share Learning and Teaching (L&T) knowledge. This required the adoption of an inclusive and iterative design approach facilitated by various enabling, connecting and sustaining strategies. The enabling strategies complement the connecting strategies and together these sustain the community engagement with the L&T site. The general design approach is outlined in this chapter. Figure 1.1 below provides a visual representation of the overall project approach. It depicts how the enabling and connecting strategies are interrelated and together these sustain the educator communities through the L&T site. Enabling strategies are outlined in detail in Chapter 2, connecting strategies in Chapter 3 and sustaining strategies in Chapter 4.

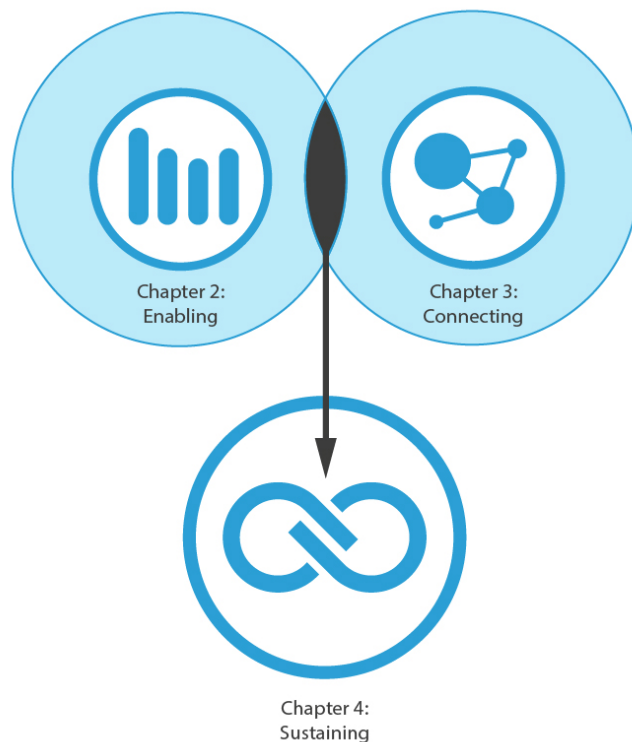


Figure 1.1 Overall Project Approach

For instance one enabling strategy was to devolve administrative control in the redesign of the website so that universities and sustainability educators could co-create L&T site content. This has resulted in participation from 57 institutions with institutional ‘catalysts’ updating profiles and course listings (1380 courses are currently listed) and 250 sustainability educators – including many prominent scholars

and a selection of high profile international scholars - who have shared 130 teaching materials on the site. Therefore this enabling strategy, a key feature of the L&T site redesign, complements the connecting strategy to engage site users. On average the site receives 1407 visitors per month during peak semester times – having built up from 200 visitors per month when the site was taken over in 2011.

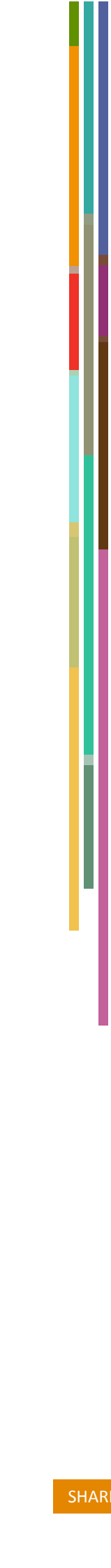
In this report we outline the various project outcomes at the start of each chapter and detail the critical success strategies. Overall we found enabling techniques were most successful when educators receive personal contact with project team members and successful connecting strategies relied on accurately identifying the needs of educators. We found the key needs were to exchange knowledge in regard to resources (in the form of teaching materials) and courses. The iterative design approach allowed the team to develop, evaluate, disseminate and reiterate the enabling and connecting strategies through the course of the project. In this way evaluation was ongoing and the external evaluator for the project was included in the process as a member of the community. We therefore present the project as a case study. While the project relates specifically to sustainability education, the insights and recommendations developed over the project life can be generalised and applied more widely to the higher education sector. In this way, the findings from this case project can be applied to any website that acts as an interface for sharing knowledge and connecting a community of academics to progress best practice in L&T.

1.1 Devolving control to enable sharing

Project objectives were interrelated and relied on linkages being developed and enhanced between sustainability educators and the redesign of the L&T site as an interactive platform to realise these linkages. Figure 1.2 (below) shows the original L&T site that acted only as an information repository in which all site content was controlled by the site administrators.



Figure 1.2 Original L&T site

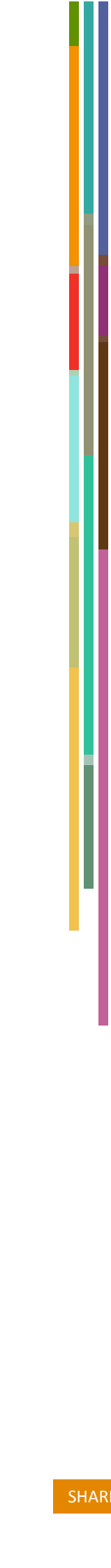


At the commencement of the project, the L&T site did not have functionality to allow users to interact with one another, or to create and share content. Instead the L&T site had been designed as a directory that required the site administrators to create and control all content. The site provided a useful overview of all sustainability course listings, and served as a repository for leading sustainability reference materials, mostly in the form of reports and links to other websites.

Meeting the overall project aim of enabling a self-sustaining community of practice through a user-friendly website required an inclusive and iterative design process. Such an approach enabled the project team to co-create, design, test and refine the L&T site with ongoing engagement and feedback from the sustainability education community. In the broad vein of an open source, a 'sharing economy', the new L&T site design philosophy was influenced by principles to enable sharing and empower users with access to an online platform where they could co-create the site content. The sharing economy can be defined as a peer-to-peer system of information exchange, popularly termed as 'collaborative consumption' (Botsman and Rogers, 2010), and has been cited by TIME magazine as one of the 'ten ideas that will change the world' (Walsh, 2010). The basic assumption of exchange relationships in sharing economy models is to enable asset-sharing (material, energy or information) that is usually facilitated through an enterprise and/or a virtual platform. The redesign of the L&T site as an interactive platform where sustainability educators and professionals can openly and freely exchange knowledge and information related to sustainability education was inspired by the emergent sharing economy.

Sharing sustainability courses and teaching materials was enabled through a creative commons licence securing that knowledge flows could openly and freely occur. All knowledge and information shared through the sustainability website is shared through the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Australia licence. Co-creating knowledge pools was facilitated through allowing users to provide feedback and commentary on teaching materials, allowing registered users to create profiles within the site, and reaching out to users to contribute to the development of sustainability issues pages and news items through social media.

Enabling these practices within the L&T site meant devolving content control to users. The challenge posed to the project team was to maintain the integrity and quality of the site in order to build its credibility and reputation while supporting user engagement. To encourage site usage, educators and universities required assurance of the reliability and security of aspects of the site related to their profiles, courses and knowledge content. The key task for the project and design teams was to develop the site to enable users to be co-creators, while still maintaining administrative control. How this challenge was met is discussed in further detail in Chapter 2.



1.1.1 Inclusive and iterative design principles

Project objectives were refined and tested in ‘sprints’, short time periods of typically 3 to 4 months. During these periods, the project team would collaborate with users and the design studio, Digital Eskimo (DE), to co-create, design, implement, test and refine aspects of the L&T site and outreach strategies. The overall design principles of the L&T site are outlined in Chapter 2. The following is an overview of the inclusive and iterative project design principles.

Inclusive design refers to having used a design-led approach where each sprint was informed by inductive research involving consultation with contributing L&T site members, various communities of practice and public site visitors. Contributing L&T site members are those professional staff (‘catalysts’) and academics (‘educators’) in universities who were registered and authorised to receive log-in credentials so that they could create site content, and access and share courses as well as L&T materials. Members of communities of practice (CoPs) are specifically targeted site members and unregistered users who have a shared interest in a specific aspect of sustainability education and who visit the site to access and share materials and information. The word ‘communities’ indicates that sustainability education is not comprised of a singular CoP, while public site visitors are untargeted users who access the site. For the various sprints, users were targeted to provide feedback to inform the design of the L&T site features as well as to provide feedback after features had been implemented. Given the broad scope of sustainability education, a wide range of stakeholders were consulted throughout the life of the project, including academics from a diverse range of disciplinary backgrounds, L&T professional staff, sustainability project officers, sustainability student networks and sustainability careers advisors. Such an inclusive approach is in line with a whole-of-campus approach to embedding sustainability in higher education.

Iterative design refers to the various strategies and objectives implemented in sprints following an action-research, abductive methodology that combined both deductive and inductive techniques. Sprints were designed and implemented in collaboration between the project team and the design studio. Inductive methods preceded the deductive methods in each sprint. That is, inclusive techniques above were used to inductively gather insights from users or the expert advisory panel through interviews, focus groups, workshops or qualitative surveys. Based on these insights, a technical L&T site feature or community outreach tactic would be designed and prototyped. Once the design team and the project team had trialled the prototype feature or tactic, it would be implemented. After implementation, deductive techniques would be used to test the assumptions of the feature or tactic. These deductive findings would feed into the design process of the subsequent sprint to refine its aims. Each sprint can therefore be considered a contained experiment, informing future developments. The overall aim was to closely match the needs of the users with the L&T site design features and outreach strategies.



1.1.2 Project design strategies

Enabling strategies denote a collection of targeted objectives to satisfy the aim of transforming the L&T site into a user-friendly interactive repository to connect CoPs of sustainability educators in higher education. These strategies followed an overall design principle to enable community members to manage their own site usage such that they could build their individual profiles as sustainability educators while simultaneously adding to the collective pool of sustainability resources. The guiding design principle was to devolve control of content and knowledge creation within the L&T site from the site administrators to the site users. The enabling strategies were iterative and implemented in short sprints. These strategies and related objectives are outlined in Chapter 2 alongside the key findings.

Connecting strategies describe the rationale for a set of targeted objectives to satisfy the aim of outreach to attract site participants in an ongoing manner. Various communities of practice were identified under the broad concept of sustainability education. The design of the connecting strategies recognised the need to connect L&T site users as a network of communities of practice rather than a single community of practice. Various different connecting strategies were trialled in an iterative manner as deliberative practices by the project team to connect diverse networks to the L&T site. Specifically, the project team aimed to engage Australian and international educators, professional university staff, professional networks, and existing sustainability CoPs and interest groups. A broader media and social media strategy was implemented to attract site visitors from the general public and encourage interaction between site members. The aim was to acquire new members as active creators of site content, to attract general visitors to engage with sustainability knowledge and community engagement tactics designed to encourage discussion regarding sustainability education. These strategies are outlined in Chapter Three along with the key findings. Appendix G shows a highly visible outcome of the broader media strategy that resulted in an article published in The Australian.

Bringing the enabling and connecting strategies together, the overall objective of the project was to enable a self-sustaining L&T site. We term all activities related to this broad aim the *sustaining strategies*. Sustaining the site encompasses both its ongoing management and development as well as the associated virtual and face-to-face outreach activities. Additionally, sustaining relates to the reputation of the L&T site as a nationally and internationally recognised source of sustainability education information. As a longer-term objective, we evaluate the opportunities and threats of the current project phase in Chapter Four.



1.2 A conceptual framing of sustainability

Sustainability education is presented here as a practice designed to facilitate the embedding of sustainability principles across the domestic higher education sector. Broad and ambitious, the terms of reference for the L&T site were to include sustainability courses and educators across all disciplines and all Australian tertiary and vocational, education and training (VET) institutions. Sustainability education became the foundation concept to fulfill the terms of reference.

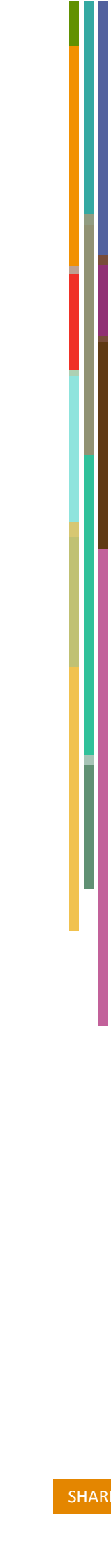
1.2.1 What is sustainability education?

Building on the widely used definition of sustainable development initially set out in the Brundtland Report (World Commission on Environment and Development, 1987), sustainability education can be understood as a body of knowledge that meets the sustainability needs of current and future generations. Associated pedagogical practices can vary widely between different disciplines and professional occupations.

The term sustainability education refers to an institutional logic of sustainability in education that goes beyond Education for Sustainability (EfS). Education for Sustainability links environmental, social and economic thinking with an expanded emphasis on holistic thinking, futures, and ecological and social justice. Institutional logics are vocabularies of practice that influence people in according sense to their experiences and motivations (Thornton, Ocasio & Lounsbury, 2012). Sustainability education as a guiding logic was deliberately adopted in this project to extend the variety of ways sustainability is interpreted in diverse educational disciplines, with the hope that the L&T site might engage the interest of a growing and diverse assemblage of sustainability educators.

1.2.2 EfS and sustainability education

In elaborating the difference between these two terms it is useful to imagine that EfS is a set of clearly defined principles that effectively shape and guide curriculum design. Box 1 below outlines the key principles of EfS. It is obvious that these principles are specifically designed to outline a pedagogical approach. Such EfS principles particularly resonate with educators who are dedicated to the crucial undertaking of developing holistic pedagogical approaches.



Envisioning a better future – establishes a link between long-term goals and immediate actions, and motivates people to action by harnessing their deep aspirations.

- Identifies relevance and meaning for different people.
- Explores how to achieve change.
- Offers direction and energy to take action.
- Results in ownership of visions, processes and outcomes.

Critical thinking and reflection – challenges us to examine and question the underlying assumptions that shape our world, knowledge and opinions by looking beneath the symptoms of unsustainable practices.

- Develops the ability to participate in change.
- Provides a new perspective.
- Promotes alternative ways of thinking.

Participation – goes beyond consultation, involving people in joint analysis, planning and control of local decisions.

- Puts decision-making and responsibility for outcomes in the hands of the participants.
- Creates a greater sense of ownership and commitment to action.
- Builds capacity for self-reliance and self-organisation.
- Empowers individuals to take action.

Partnerships for change – strengthens ownership of and commitment to sustainability actions through formal and informal opportunities for learning.

- Builds a shared vision among a diverse range of stakeholders.
- Motivates and adds value to initiatives.

Systemic thinking – recognises that the whole is more than the sum of its parts, and is a better way to understand and manage complex situations.

- Identifies connections and relationships.
- Shifts thinking from ‘things’ to ‘processes’.
- Integrates decision-making and adaptive management techniques.

Source: <http://aries.mq.edu.au/publications/aries/efs_brochure/pdf/efs_brochure.pdf>

Box 1.1: Principles of EfS

The underlying principle of EfS is to motivate students to engage in change for improved sustainability outcomes. Sustainability education is a broader approach that is not advocacy-based and applies to education that can be either about or for better sustainability. Sustainability education not only relates to the pedagogy of sustainability, but also includes how sustainability principles shape:

- knowledge content in courses
- L&T work practices
- application of sustainability regulatory and compliance standards at the organisational level
- the strategic objectives, policies and overall mission of the education institution.

Given that the scope of the L&T site was to connect broadly with sustainability educators across all disciplines, adopting a conceptual framing of sustainability education as an all-encompassing term proved the most appropriate interpretation.

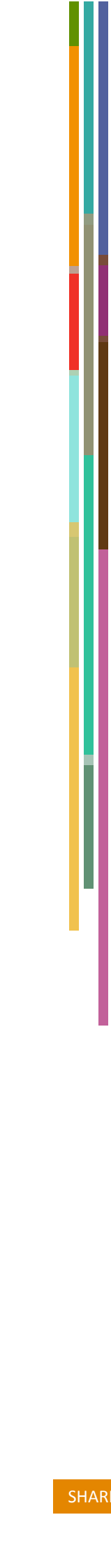
1.2.3 L&T site as boundary object

In enabling cross-disciplinary CoPs, we saw benefits in the explicit incorporation of *boundary objects*. These are artifacts of practice that are agreed to and shared across intersecting social worlds yet ‘satisfy the informational requirements of each of them’ (Star and Griesemer, 1989, p. 393). Star and Griesemer (Star, 1987–9; Star and Griesemer, 1989) list four types of boundary objects: repository (e.g. library); ideal type (e.g. atlas); coincident boundary (e.g. political boundary of a state); and standardised form (e.g. template forms). Wenger (2000) classifies boundary objects into artifacts (e.g. models), discourses (such as that provide a common language) and processes.

Where boundary objects appeared to be particularly effective in promoting learning and knowledge flows across CoPs was through developing shared understandings around teaching sustainability practice (Benn, Edwards and Angus-Leppan, 2013). The L&T site has acted as a repository boundary object (Star and Griesemer, 1989) providing a categorised common information system useful for integrating learning processes regarding teaching best practices. Lists of sustainability issues as a means of categorising information on the site acted as boundary negotiating artifacts. These issues (e.g. energy efficiency, food or sustainable business) are significant across multiple disciplines and enabled educators from different disciplinary backgrounds to share ideas. Similarly, teaching tools and processes, such as stakeholder engagement, became a way of prompting shared understanding. Educators interviewed during the project highlighted that the recontextualisation underpinning such exercises may generate the critical awareness relevant to each individual’s understanding which is essential for the development of new insights into the interdisciplinary aspects of sustainability. These various teaching tools and discourses achieved more than just provide a common language – they acted as a boundary object because they prompted decontextualisation at the boundary between the unitary disciplinary and interdisciplinary approaches, allowing for recontextualisation into a more holistic set of understandings around sustainability.

Our research during the project also indicated the difficulty in institutionalising learning around sustainability in the form of new routines, strategies and systems that would embed interdisciplinary or holistic approaches. As recognised by Lee (2005), boundary objects, such as protocols and formal documentations, used to standardise processes across organisations, can limit the application of the creativity developed through the CoP. It is a challenge for further research to think of boundary objects that would embed and institutionalise practices without limiting the creative aspects of the overall learning process.

Another apparent obstacle to knowledge flows is ownership of the information and knowledge. This problem was raised by one interviewee, a leading educator for sustainability, when discussing the potential for a CoP formed around a sustainability website where different disciplines across different universities would share curricula. While boundary objects can be put to certain political uses (Oswick and Robertson, 2009; Kimble et al., 2010), their downside is that in some forms they may also be too mechanical and unable to assuage the politics of interactions. We found this in relation to the tension between curriculum and community. While educators may



theoretically agree with the principles of the open sharing of sustainability curricula, boundary objects in the form of institutional standards or protocols relating to intellectual property may act as a barrier.

1.3 Sustainability education as a CoP?

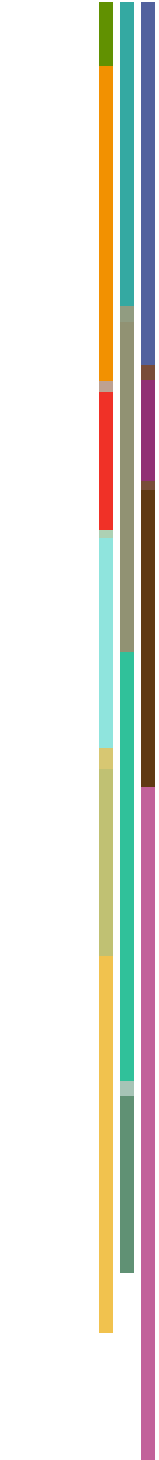
According to Ostrom (1990, 2000) there are several design principles that enable endogenous collective action towards cooperative behaviour. The primary principle is the existence of clear boundary conditions that define who is part of the community and the shared sense of what is to be shared. Sustainability remains a complex and values-based concept with a range of interpretations (Benn and Martin, 2010) that may be understood along a spectrum from anthropocentrism to ecocentrism (Shrivastava, 1995). Academics often include sustainability-related concepts within the bounds of their specific disciplines while they themselves embody the cognitive assumptions of their disciplinary training. Yet it is widely acknowledged that sustainability is an interdisciplinary concept. For example, in the context of management, Shrivastava (2010) states that ‘sustainability issues in the context of management and organising are holistic, bound neither by disciplinary boundaries nor by cognitive performance. If and indeed how the technical understanding of sustainability knowledge related to a specific discipline is recontextualised in different disciplinary settings is not widely agreed.

Given the multidimensionality and interdisciplinarity of sustainability education, attaining a clear boundary that encourages cooperative pro-sharing behaviour because members share common purpose may not be attainable. Given this, the approach for framing sustainability education as a CoP needed to be reconceptualised.

1.3.1 From a CoP to CoPs or NoPs

Where there is sensitivity to the purpose and scale of the community, the traditional notion of a CoP becomes challenged. This is particularly significant in the case of sustainability education where the purpose of the education is multifaceted and contextually defined. Furthermore, connectivity between sustainability educators and professionals within institutions is often disperse. This dispersion is furthered when considering connections across universities being geographically dispersed over more than 50 higher education institutions across Australia. Contemporary studies of CoPs have referred to the erosion of community in geographically disperse settings, and where the practice may be temporary and project-based, or the members connected through online interfaces (Roberts, 2006). Given this complexity, a better framing of the practice community that could be connected through a website such as the L&T site envisions a network of communities of practice or a network of practice.

A pluralistic conceptualisation of CoP is relevant given the complexity of sustainability education. Rather than seeking to create a singular community of practice, we sought to leverage, engage and facilitate cross-fertilisation between existing communities of practice. Targeting high-profile sustainability educators in specific disciplines and



encouraging their contribution to site content was one such strategy. Another was the workshops with CoP leaders to acquire potential new contributors to a specific issue. These connecting strategies are further detailed in Chapter 3.

A Network of Practice (NoP) is typically characterized by the following features:

- geographical dispersion
- focus on connecting individuals through shared practices
- those engaged in shared practices may not know one another
- those engaged in shared practices may never meet face-to-face or such meetings are infrequent
- rules and norms regarding how to engage in the network are not usually binding or obvious
- inter-organisational NoPs are typically led by someone, but networks may be self-organising (Soekijad et al., 2011)

A NoP facilitates networking, communicating and sharing information rather than starting with a pre-existing interacting community. It is most suited when 'organisations (and knowledge) tend to be geographically distributed' (Soekijad et al., 2011, p. 1005).

When understanding the CoP through this prism of a NoP, the types of connecting strategies focus on brokering and buffering connections through an inter-organisational approach, rather than focusing on a tightly connected community within an organisation. Furthermore, the commonalities between diverse individuals are best established through seeking to identify commonalities of shared practices rather than a shared common purpose or shared knowledge.

In the remainder of this report, through analysis of the various strategies used to engage people in and develop an online platform for sharing to facilitate the spread of sustainability education, we draw out the opportunities for progressing sustainability education in the tertiary education sector. Specifically, each section of this report draws out particular findings that allude to the mechanisms for sustaining ongoing interaction through the L&T site. These key findings are reported below.

Key findings

- As the UNESCO decade of Education for Sustainable Development (UNESCO, 2005) draws to a close we propose that the open sharing economy presents the opportunity to further develop sustainability education. Co-creation of sustainability knowledge through the L&T site is one way to enable this.
- Co-creation of sustainability knowledge through platforms such as the L&T site requires enabling mechanisms that allow sharing, facilitated through connective outreach strategies to keep the community vital.
- The L&T site needs to have a broad conceptual framework to attract a broad assemblage of sustainability educators.



Chapter 2: Enabling

Enabling strategies are designed to provide the means for sustainability educators to connect and co-create sustainability education. These strategies were shaped by the principles: (1) to enable a means for open sharing of sustainability knowledge flows between educators in a CoP; (2) to create an interactive platform to connect sustainability educators; and (3) to make it easy to access and co-create relevant and contemporary sustainability knowledge.

The enabling strategies used in this project address the following two aims. Firstly, to enable active professional CoPs. And secondly, to redesign the L&T site as a user-friendly interactive repository allowing users to upload materials or connect to their own websites. This chapter outlines the sprints that we implemented to satisfy these objectives.

2.1 Who is in the community?

The broad and complex conceptualisation of sustainability education was an essential framework to meet our terms of reference. It provides the potential to encompass and appeal to a wide range of sustainability educators and a diverse body of knowledge. This conceptual framing complements the whole-of-campus sustainability approach that seeks to involve more than educators alone by including professional staff, students and interested community members in sustainability practices. However, this all-encompassing inclusiveness presented a dilemma. If such a wide range of people could potentially be included in the CoP, where are the lines drawn to attract them to identify with and engage openly with the CoP?

2.1.1 What is a CoP?

The principles underlying a CoP include three key elements: (1) actors with a shared area of practice or capability; (2) a means for collective learning between these actors; and (3) a shared set of resources (Wenger 2000, 2006). Resources may be in the form of language or artifacts that enable actors from different backgrounds to share aspects of knowledge yet build more specific understandings within their own areas of practice (Benn and Martin, 2010). Early research on CoPs focused on such communities as emergent spheres of interaction concerned with knowledge sharing between actors from different roles and disciplinary backgrounds. But as some critics have more recently pointed out, much of this research has focused on the communities rather than the practices (Orlikowski and Scott, 2008). Wenger (2000, 2006), for example, has concentrated on defining the characteristics of the actors in the community. In our work we are interested in how these actors understand sustainability practice and what needs to happen to enable a web-based technology to facilitate the holistic understandings that characterise sustainability.

Our interest in web-based technology links to recent research on socio-materiality, or the notion that social and material worlds are ‘a mangle of practice’ (Pickering, quoted in Orlikowski and Scott, 2008, p. 459). This stream of research is based on the concept that people and things, such as technologies, artifacts and equipments, only exist in relation to each other. They constitute each other in that each is defined by the relationship between them and, in effect, they can be said to ‘saturate each other’ (Orlikowski and Scott, 2008, p. 462).

In the first step towards understanding how our selected web-based technology – the L&T site – and educators, students and other stakeholders may interact to form an effective CoP around sustainability, we need to ascertain how these stakeholders make sense of the ambiguous sustainability concept. We can then recommend actions that need to occur if key actors are to interact in a ‘mangle’ of sustainability practice with the site, developing the shared stories that evolve into the community resources.

2.1.2 How do stakeholders in sustainability education understand sustainability?

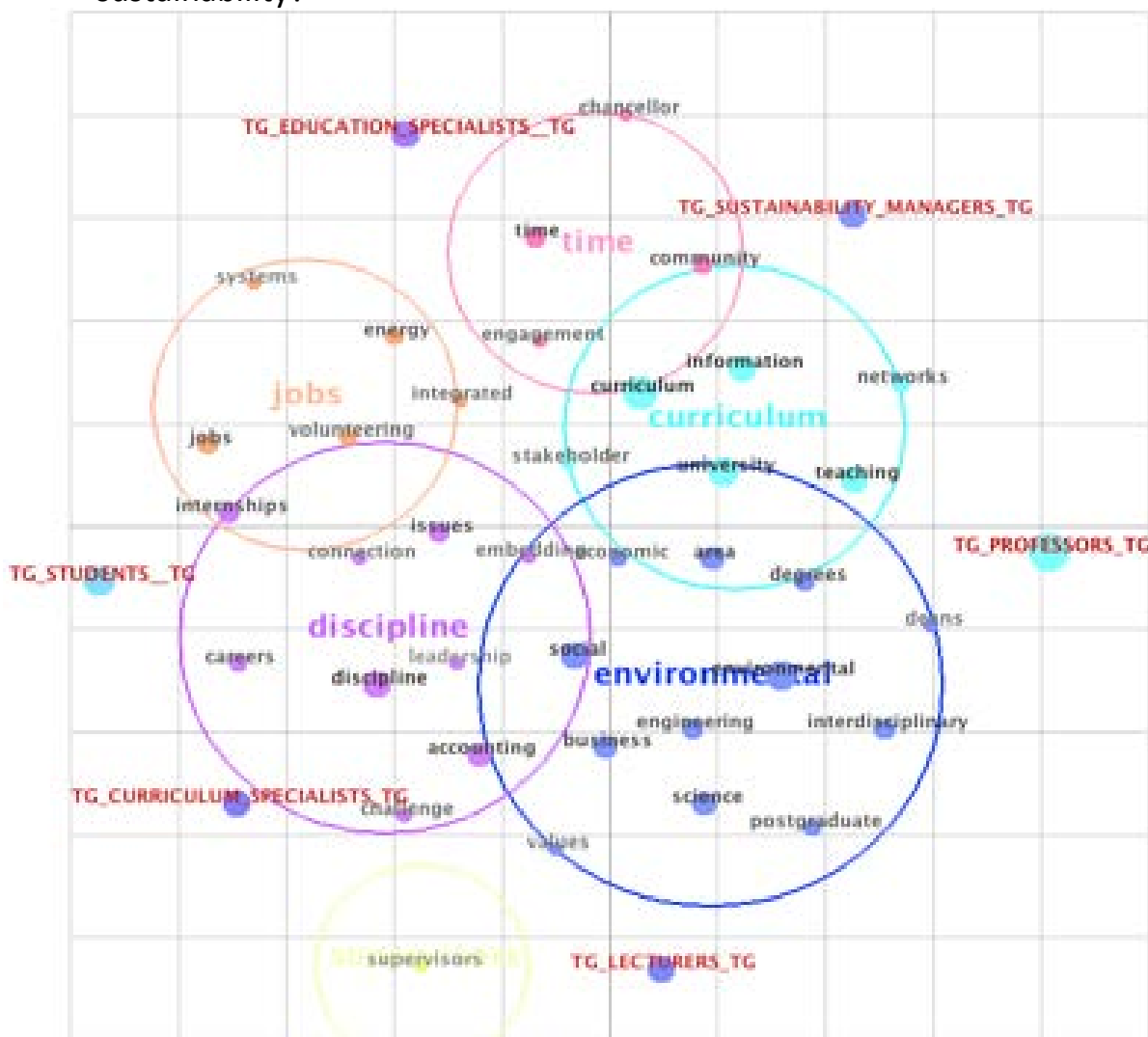
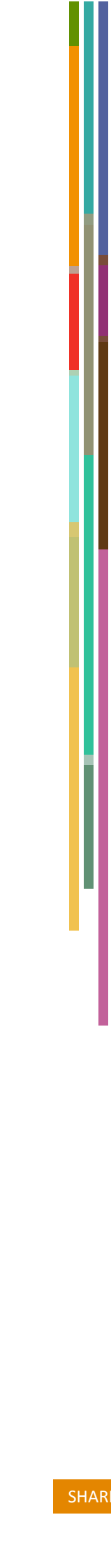


Figure 2.1: Leximancer map showing diverse understandings of sustainability education among stakeholders involved in L&T sustainability in Australian universities



Between January and May 2012 we interviewed on-campus sustainability managers, sustainability curriculum specialists (i.e. those university staff given the task of increasing sustainability curriculum across the university), education specialists, professors, lecturers and students – the stakeholders involved in L&T around sustainability – about their understanding of sustainability education.

The findings are summarised in Figure 2.1 above, showing a map of the concepts and themes generated from textual analysis software. Figure 2.1 shows the stakeholder groups in red ink (e.g. TG_LECTURERS_TG), the key concepts that emerged from interviews sitting over a coloured dot (e.g. postgraduate) and the main themes that emerged in circles (e.g. environmental). The strength of associations between stakeholder groups, concepts and themes are shown via the proximity between them.

The specific questions are contained in Appendix A. The key finding is that the stakeholder groups we chose to interview sit at some distance from each other on the map in Figure 2.1. This indicates that they are distinct stakeholder groups within the Australian universities' sustainability education community and that they have diverse understandings or sensemaking of sustainability education. This diversity presents a substantial challenge to building a CoP where key actors interact in a 'mangle' of sustainability practice with the web-based technology, developing the shared stories that become the community resources.

2.2 L&T site redesign as an enabling mechanism

Taking a viewpoint influenced by socio-materialist theories, the L&T site was considered to have active agency within the networks of sustainability educators. These theories posit that both human and non-human actors have agency in the networks that form CoPs (Fox, 2000). Therefore the L&T site as a non-human actor has an effect on the human participants. Web 2.0 technologies allow greater interactivity between users and websites, and between users through websites. With this in mind we took the view that the L&T site itself has the potential to play a critical role in fostering existing connections between sustainability educators and professionals in higher education institutes. Additionally, how the L&T site is designed would influence possibilities for new connections and potentially shift people's expectations about the ways they might be able to interact, share and create knowledge.

In collaboration with the design studio DE, and using an inclusive and iterative approach, the L&T site was radically redesigned so as to have the capacity to act as an interactive platform. The new website received a 'soft launch' in February 2013. The aim of the soft launch was to test key enabling mechanisms of the L&T site design with targeted user groups prior to the commencement of broad outreach. These key mechanisms were: the overall visual design; enabling various user profiles; devolving access and authorisation of content co-creation; and developing an information management system. Details of the methods and findings for the key aspects of the L&T site redesign in regard to these mechanisms are elaborated in this chapter.

In addition to this entire site redesign (see Table 2.1, Site Redesign Timeline below), the L&T site went through several sprints to enable further interactivity. Section 2.4

below outlines the additional sprints that were enabled to enhance user engagement with the L&T site after the soft launch. These were explicitly designed to enable greater connectivity between users and with the L&T site. The aims, methods and findings of these additional site features are detailed in Chapter 3.

2012			
Jan - March	April - June	July-September	October-December
Create course upload form Refine sustainability issues list Refine teaching materials list Needs Analysis Engage Digital Eskimo	DE Workshops Project definition Visual design UX specification	Design stage 1: Staging site set up Content moved over from Drupal to Django Enabled individual log-ins NFEE page design workshops	Trialling new site with institutional catalysts and educators Design Stage 2: Profiles and their relationships and interactions with the institutions, courses and teaching Design stage 3: development of NFEE page
2013			
Jan - March	April - June	July-September	October-December
New site live Admin training in content management Launch at EfS conference Featured Issue Energy Efficiency on home page	Improvements to issues page template	<i>Site Enhancements:</i> Rotating carousel on home page Ability to click to all academics from institution page	<i>Site Enhancements:</i> Removal of metadata from institution cards Refinement of text on Register page Greater flexibility in placing images Addition of discipline/network page template Addition of Twitter feed on homepage
2014			
Jan - March	April - June	July-September	
DE Workshops	Teaching materials survey launched Design and development of Educator page	Google Analytics analysis	

Table 2.1 Site Redesign Timeline

2.2.1 A visual aesthetic

The overall look and feel of the L&T site is a significant factor intended to draw users to the site. A digital design strategist and graphic designer from DE were tasked with the creation of the resulting aesthetic. An expert reference group provided input into the broad design aims through an interactive workshop hosted by DE.

Rather than endorsing usual conventional protocols of sustainability imagery as being 'green' with visual references to nature (see image 1, below), the intent was to create a fresh, clean and vibrant colour scheme and feature visual references to the CoP.



Figure 2.2: Intentional avoidance of conventional green imagery

The basic design feature of the colourful banner or header (see Figure 2.3 below) represents the complexity, diversity and interconnectedness of sustainability concepts. The horizontal bars allude to the polar ice drill cores and scientific cuisenaire rods (see Figure 2.4 below). The banner is a significant design feature of the site, underscoring the hyperlinked categories that sit above: the primary pathways for accessing the information on the site.

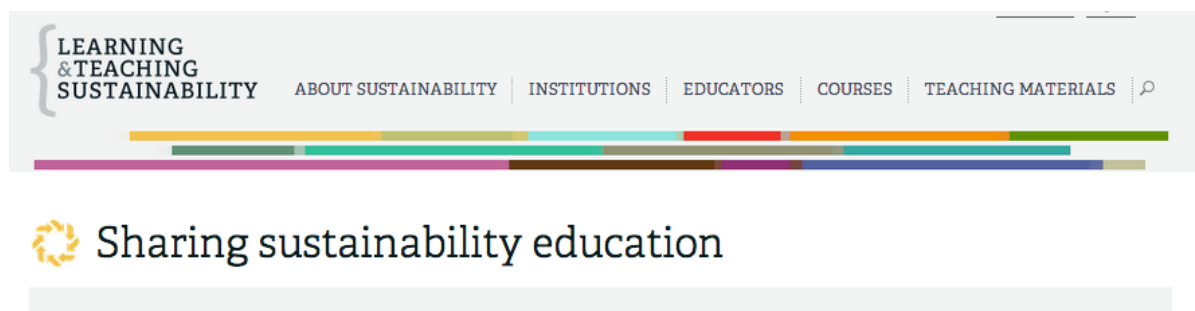


Figure 2.3: Colourful website banner

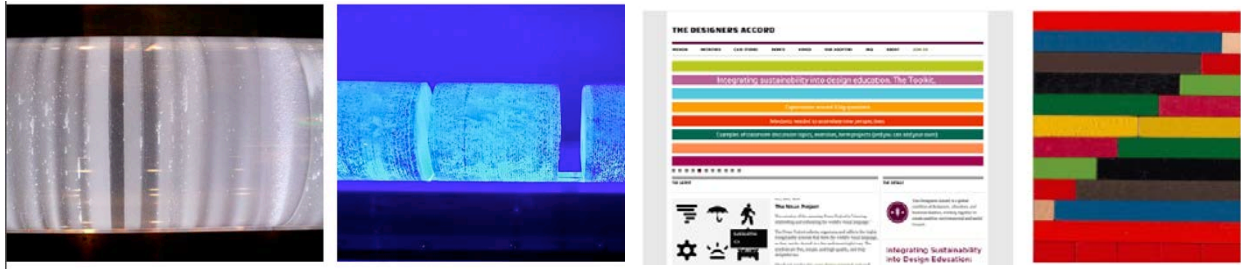


Figure 2.4: Visual design references for the website feature banner

Given the scholarly audience intended as the main user group to be attracted to the site, the overall layout of the pages was designed to reflect the image of a periodical. The page layout and fonts were created to represent aspirational excellence and create an aesthetic feel of authentic scholarship.

2.2.2 Pathways, wire frames and categorisation

Careful and considerable deliberation was required to create a simple information management system (IMS) to organise content such that it may be easily assessed and shared by users through the web interface. Given the complexity of sustainability education as a body of knowledge and the diversity of expertise among CoP members, designing the right framework for accessing data through the site was a complex task. The project team consulted with the expert reference group and a sample of key stakeholders to help determine the best approach.

Once the criteria for the IMS were decided on, the project team collaborated with the DE strategic design team to develop the architecture (called wire frames) and the web forms that would allow users to easily upload and categorise information to contribute to the collective knowledge pool. Sample wire frames and site architecture are provided in Appendix B. Details of the main categories are explicated below.

Meta-categories – about sustainability

Two of the overarching categories for the information architecture are: sustainability issues and disciplines. These meta-categories appear in all of the search functions in the L&T site (see Figure 2.5a–b below) and in the forms used to upload information to the site. For example, when an educator registers, they are asked to select their relevant discipline/s and the issue/s in which they have expertise. When teaching material is uploaded, educators can nominate which discipline is most relevant and what issues are addressed in the material.

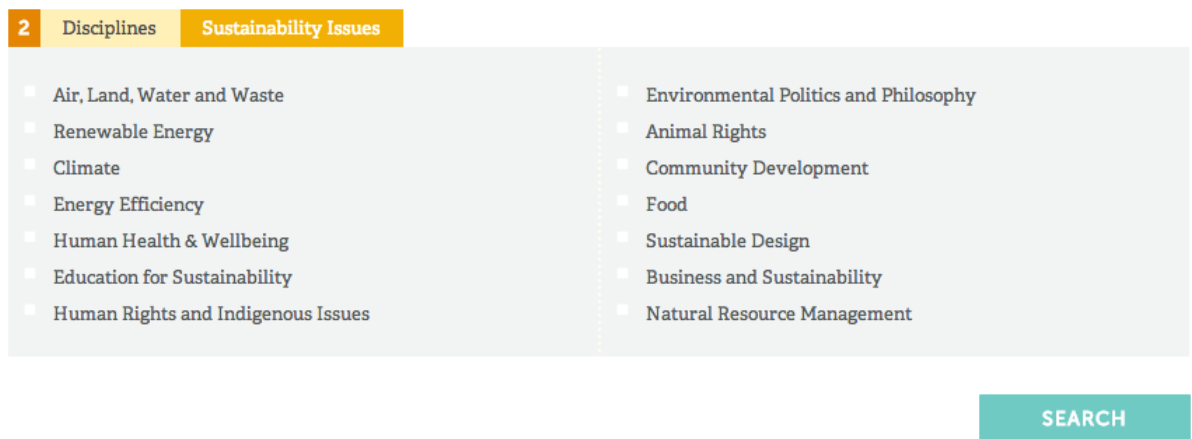


Figure 2.5a: Search categories by topics



Figure 2.5b: Search categories by disciplines

Institutions and locations

Information can be sorted according to the institution. Institutions are any higher education organisation. When educators register on the site they are asked to select their institution. All information contributed by that educator (including teaching materials and courses) is attributed to the nominated institution. Fifty-seven institutions (including one institution called international scholars that includes all content contributed by non-Australian educators) are currently participating in the site and a complete listing is available:

<<http://sustainability.edu.au/material/institutions/search/>>.

Locations is a category used to classify institutions and educators. This category is further defined by the corresponding Australian states and territories or as international.

Academic level, industry and study mode

Teaching materials and courses can be sorted according academic level, as shown in Figure 2.6 (below).

1 Select academic level

<input type="checkbox"/> All	<input type="checkbox"/> Postgraduate	<input type="checkbox"/> Undergraduate	<input type="checkbox"/> Other
<input type="checkbox"/> Short course	<input type="checkbox"/> Vocational Training		

Figure 2.6: Sorting by academic level

Courses have two additional search functions whereby they can be classified according to industry and study mode, as shown in Figure 2.7a–b.

2 Disciplines Sustainability Issues Localities **Industries** Study Mode

<input type="checkbox"/> Agriculture, Forestry and Fishing	<input type="checkbox"/> Communications, ICT, Media and Entertainment
<input type="checkbox"/> Construction and Infrastructure	<input type="checkbox"/> Financial, property and transactional services
<input type="checkbox"/> Health and Community Services, Sports, Government, Education	<input type="checkbox"/> Resources and Utilities, Water, Waste
<input type="checkbox"/> Transport and Logistics	<input type="checkbox"/> Tourism and Hospitality, Wholesale and Retail
<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Mining

Figure 2.7a: Searching courses by industries

2 Disciplines Sustainability Issues Localities Industries **Study Mode**

<input type="checkbox"/> Other	<input type="checkbox"/> Distance
<input type="checkbox"/> On-campus	<input type="checkbox"/> Online

Figure 2.7b: Searching courses by study mode

Teaching material type

All teaching materials uploaded to the L&T site are sorted according to the categories as shown below.

- Case study
- Lecture
- Multimedia
- Syllabus
- Experiential Activity
- Assessment Tool
- Reference Material
- Course Outline
- Instructor's Notes
- Teaching Toolkit

Box 2.1: Categories of teaching material

Each of these categories and the sub-categories within them form the foundations of the architecture of the L&T site's information management system.

2.3 Community members as L&T site users

To determine likely ways users might access information in the site, we conducted primary research via interviews with potential stakeholders (as outlined in section 2.1 above). Additionally, focus groups were conducted with specific CoPs to determine the behaviours and practices they invoke when implementing sustainability education in their professional roles. These workshops allowed us to understand how participants engaged and connected with others in the course of fulfilling these roles. The information gathered was used to generate potential user profiles describing the needs of typical user types and explaining their likely behaviours when engaging with the L&T site. A sample overview of the user scenarios appears in the High Level Specification document in Appendix C.

2.3.1 User scenarios

The purpose of this stage was to determine: Who are the potential site users? How might these users engage with the L&T site?

Six user scenarios were developed as follows: new academic, being an academic entering their career; expert academic, being an academic with extensive experience and expertise; part-time academic; sustainability L&T specialist, being a professional staff member with a sustainability-related portfolio; and student leader, being a student with an interest in sustainability education.

Each user was identified as having different interests in using the L&T site. These interests and likely behaviours informed the design and content of the site's homepage: each of the pathways represented in the banner (Figure 2.3) relate to a different user scenario as summarised in Table 2.1, which considers the academic users together.

Typical user	Header pathways	Desired behaviour
Academic	About sustainability Educators Teaching materials Courses	Gain sustainability knowledge Connect with others Access materials for course design Learn about other sustainability courses
L&T specialist	Institutions	Understand home institution in terms of educators, courses and teaching materials as source of intelligence.
Student	Courses Educators About sustainability	Discover sustainability courses Find supervisors for postgraduate studies Gain sustainability knowledge

Table 2.1: Typical user pathways

Additionally, the positioning of information on the homepage was designed to appeal to these groups in such a way as to enable a community presence. For example figure 2.8 below shows how the page looks when a visitor accesses the homepage www.sustainability.edu.au. The appearance is that of a periodical and the navigation page at the top of the screen takes the visitor to the main sources of knowledge contained in the site. The featured box at the top right-hand side of the screen, is a rotating carousel that dynamically features teaching materials, courses and educators. The mission on the left-hand side of the screen is hyperlinked to take the visitor to related pages (for example clicking on courses takes the visitor to the courses page).

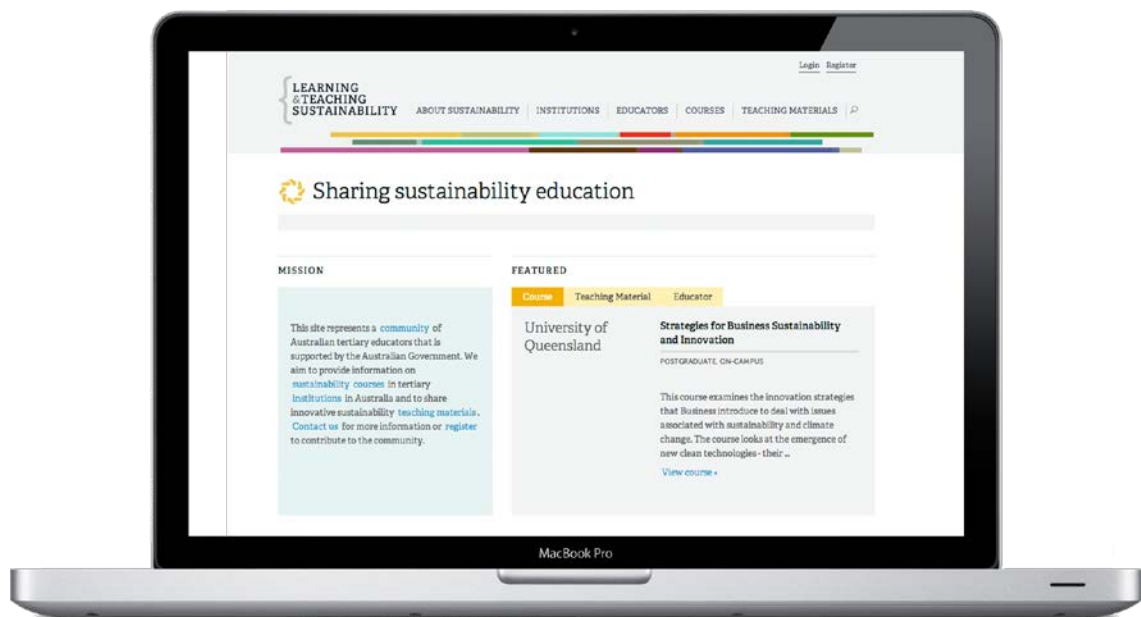


Figure 2.8: The Website landing page

When the visitor scrolls down the page, they see a call to action to join the community, the featured sustainability issue and the dynamic news feeds that provide connection to contemporary news related to sustainability education in higher education (see figure 2.8a).

Why join our community?

Register to be a member of this community of practice and:

- have access to exclusive learning and teaching material
- profile your own work and count the downloads - Paul Brown's materials have been downloaded over 6000 times!
- enter the curriculum award and be part of the vision to build sustainability education.
- access our newsletters
- join our LinkedIn Group and contribute to the discussion

KEY ISSUE



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Figure 2.8a: Screenshot of the lower half of the website landing page

User scenarios were also used to design the how users were able to access the site through log-ins. This is explained in the following section.

2.3.2 Devolving user access

Enabling users to co-create information in the L&T site required devolving access to the back-end (the IMS behind the interface where, among other functions, content is created) to be open to users in addition to the project team as site administrators. We envisaged the site as a house, within which content is created by the site members. Passers-by (public site visitors) can see the house and peer inside the windows to view the content presented, and acquire any information the site members have made available. Initially the site had a single set of keys that remained with the site administrators. All content was centrally controlled. Central control of content creation is an important aspect of maintaining the integrity and validity of site content, helping to establish a strong reputation for the site as a credible source of information. This control had to be yielded, however, to achieve the project's aim of enabling a user-friendly and interactive site engaging a community of users. Insights from the various user profiles supported devolved access as a way of maintaining the credibility of the site content while allowing different types of users to contribute their own inputs. In other words, the keys were cut and shared out.

The design principles for devolving access were to: (1) authorise different user types to have access to the parts of the L&T site most relevant to their interests; (2) maintain control over the process of authorisation to ensure quality and credibility of site content; (3) ensure the authorisation pathways were easily understood; (4) ensure that different user experiences met the needs of target users and that users experienced the site as accessible.

Rather than allowing registered users to modify or add site content anywhere in the house, registered users were given 'keys' to selected spaces only. These spaces became the various different pathways to access and share information in the site. Using the University of Technology, Sydney as an example, the following provides an overview of each type of user and a snapshot of the L&T site pages where user types could create content.

Institutional catalysts

To keep sustainability courses and teaching materials relevant and up-to-date, the user profile of the institutional catalyst was created. The institutional catalyst is usually a professional staff member appointed within a university who may have a particular work role to report on sustainability education, or an academic or L&T professional with a high level of interest in building the profile of sustainability education. One authorised credential log-in was created for each institution and this was sent to the catalyst. Upon logging-in to the L&T site, the catalyst obtains special access to the institutional homepage where they can edit the content, authorise educators from their institution who register on the site, and add and modify sustainability-related courses offered by their institution. Invitations were sent to potential catalysts via email and simple instruction sheets were distributed after their access had been approved by the project team (see Appendix D).



Figure 2.9: UTS catalyst Seb Crawford, Sustainability coordinator

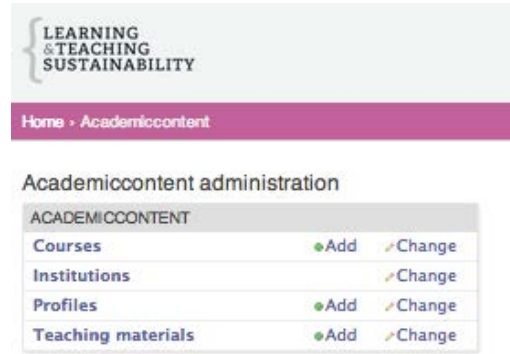


Figure 2.10: Simple back-end menu for catalyst

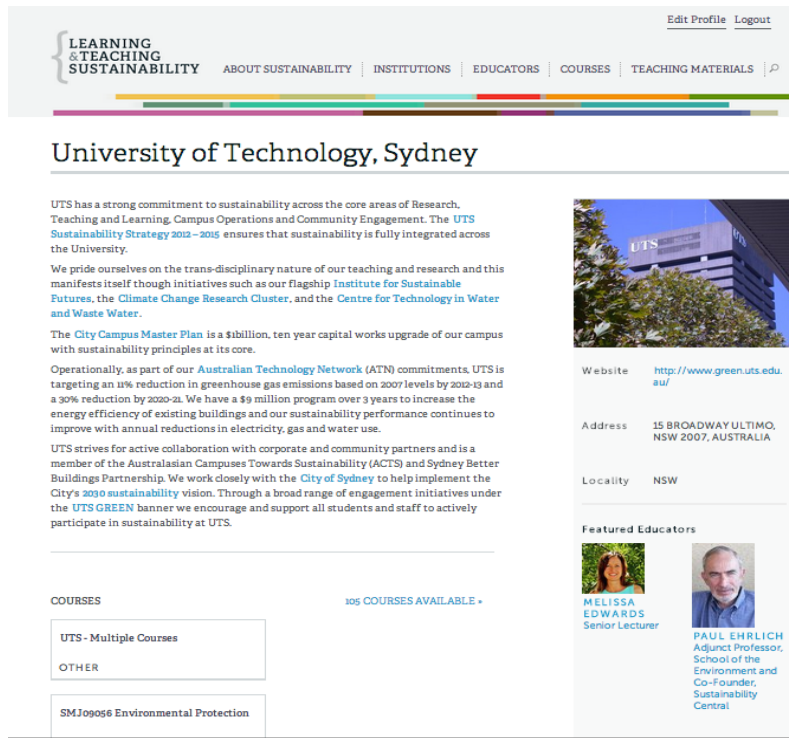


Figure 2.11: Institutional homepage displaying content contributed by catalyst

Educators

Individual educators have a motivation to keep information regarding their courses up-to-date, and need to access and share teaching materials. Individual user profiles are created when an educator registers by selecting the register button on the homepage. Profiles are authorised by the site administrators or the institutional catalyst. Only registrants with a valid institutional email address (i.e. including 'edu') are authorised. All educators can be found through a direct pathway from the 'Educators' link in the website header. Figure 2.12 (below) depicts the all educators landing page.

Educators

Search for colleagues who have registered on the Learning and Teaching Sustainability Website, and access their contributed teaching materials. Colleagues can be searched by locality, institution, discipline and sustainability issue.

If you are not already registered and you are working at an Australian university or TAFE, we welcome you to [register here](#) and join our community of practice of sustainability scholars.

Join the community
If you would like to be listed here along side your teaching materials please [register today](#).

FEATURED EDUCATORS

[SEE ALL](#)



ROGER SIMNETT
Professor of Accounting, Scientia Professor., University of New South Wales



CAROL ADAMS
Professor, Monash University



DAVID SCHLOSBERG
Professor of Environmental Politics, Co-Director of the Sydney Environment Institute, University of Sydney



JOHN THWAITES
Professorial Fellow and Chair of ClimateWorks Australia and the Monash Sustainability Institute, Monash University

FIND EDUCATORS

1 Select Localities		Institution	
<ul style="list-style-type: none"> All Tasmania 	<ul style="list-style-type: none"> Australian Capital Territory Victoria 	<ul style="list-style-type: none"> New South Wales Queensland Western Australia 	<ul style="list-style-type: none"> Northern Territory South Australia International
2 Disciplines		Sustainability Issues	
<ul style="list-style-type: none"> Architecture Building and Construction Creative and Performing Arts Engineering and ICT Science Non-disciplinary 	<ul style="list-style-type: none"> Arts, Social Sciences and Humanities Business, Management and Economics Education Law Interdisciplinary Health, Medicine and Veterinary Science 		

SEARCH

Figure 2.12: All educators landing page

Once educators are registered they receive a welcome email and user guidelines from the L&T site administrators (See Appendix E for sample documents) and they can create the content on their profile pages (see for example Figure 2.13 for a sample public profile page). This includes a general biography, information about sustainability-related courses and teaching materials (figure 2.15 shows a the simple form registered users complete to create their profile page. Figure 2.14 shows a visual reference to the simple form educators see when they access their individual profile page via logging-in to the site. When uploading teaching materials, the educators have the option to make the materials available to the open public (i.e. any site visitors) or they can make them available to other registered users only. When educators add teaching materials and courses to their profiles, these are automatically added to their affiliated institutional homepage and to the general information pool.

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Suzanne Benn

BIO

Professor Suzanne Benn is Professor of Sustainable Enterprise in School of Management, UTS Business School. In this position she provides leadership within the Business School and across UTS, working with other disciplinary areas and external stakeholders to promote sustainability. She was previously Professor of Education for Sustainability, Director of ARIES and Head of the Graduate School of the Environment at Macquarie University, Sydney. Suzanne has a background in the sciences and the social sciences. She has had wide experience working across the range of educational sectors and as a research and industrial scientist. Her current research interests range across corporate sustainability and corporate social responsibility, business education for sustainability and organisational change and development for sustainability. Her interdisciplinary academic publications include three books and more than 90 refereed journal articles, book chapters and refereed conference papers. She has led consultancy and research projects on the topic of corporate social responsibility, organisational change and sustainability for a number of Australian organisations. She has also conducted major Australian Research Council grant funded projects on topics such as the communication of corporate social responsibility through social networks, collaboration and governance for sustainability. Professor Benn has modified and taught curriculum on sustainable business at the University of Shanghai, and led the introduction of these programs into the undergraduate and postgraduate curriculum at UTS and at Macquarie. She has a strong interest in interdisciplinary curriculum development and holistic approaches to learning for sustainability. Professor Benn also has a number of PhD students in the area of corporate social responsibility, sustainability and education, learning and change for sustainability.

TEACHING MATERIAL

- [CR3+ Conference Presentation: Restorative Business and the Circular Economy](#)
- [Culture, Practices and Strategies of the Sustaining Organisation: Link to EFS](#)
- [ESAA Discussion Paper Electric Cars](#)
- [Fuji Xerox Australia Eco manufacturing Centre: A case study in strategic sustainability](#)
- [Introduction to Managing for Sustainability](#)
- [Phases of Organisational Sustainability](#)
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Disciplines BUSINESS, MANAGEMENT AND ECONOMICS

Areas Of Interest BUSINESS AND SUSTAINABILITY, NATURAL RESOURCE MANAGEMENT, ENERGY EFFICIENCY

Figure 2.13 Example educators public profile page

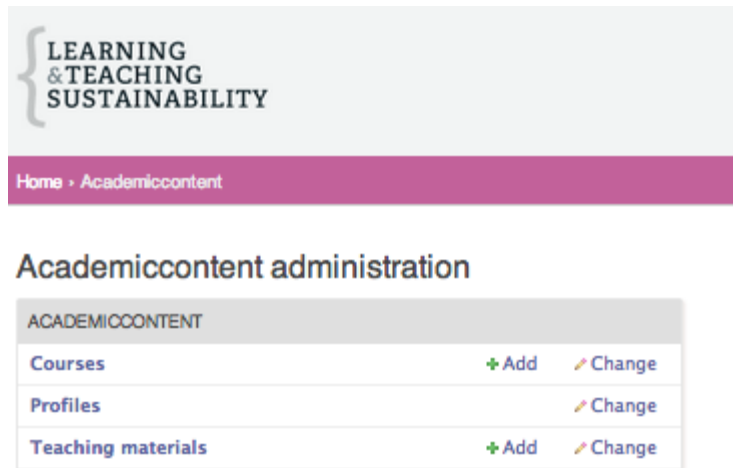
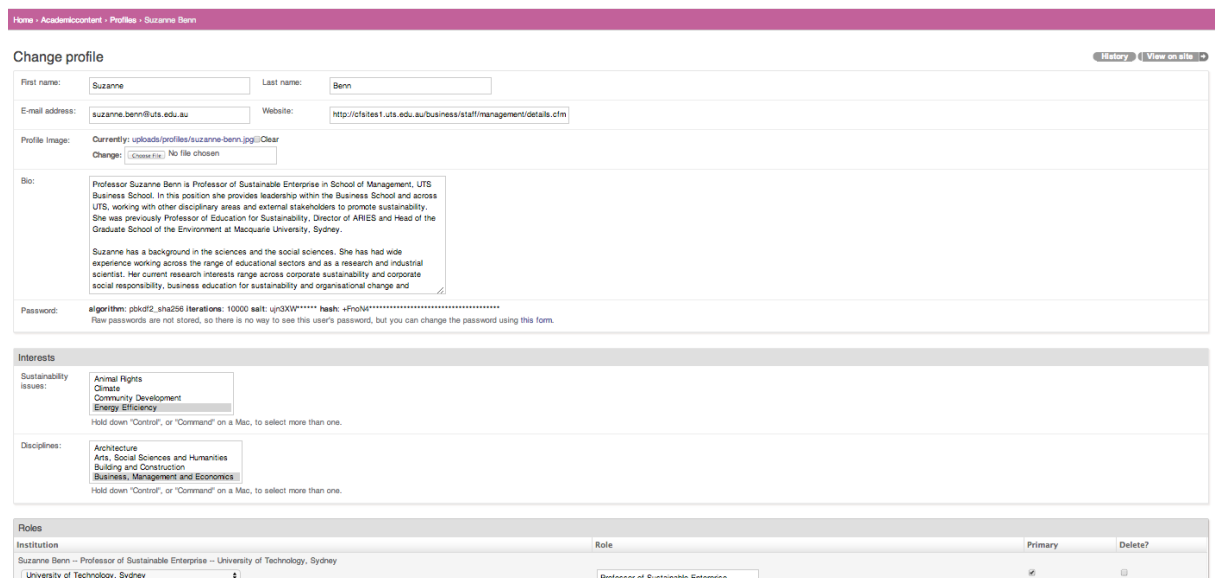


Figure 2.14: Simple user menu for registered users



2.1.5 User friendly profile content form

2.3.3 A unique virtual presence

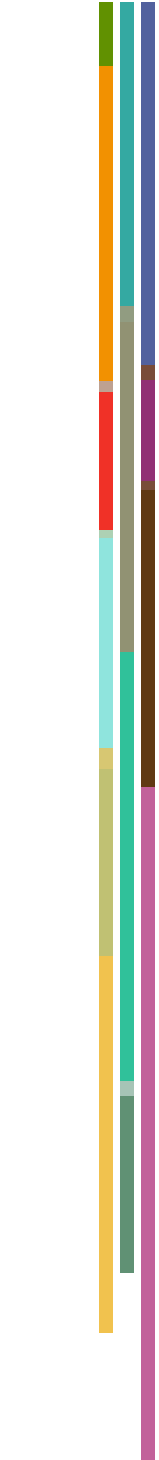
A final design consideration for the L&T site was to address the needs of users in such a way that their virtual presence would be differentiated from other existing sustainability-related websites. Other Australian websites operating in the broad area of sustainability education were considered in relation to their key functions in addressing the needs of specified user communities. Findings in relation to such websites are summarised in Table 2.2 along with the key features of each site.

Website	Description	Key feature/s
Education Centre for Teachers www.environment.gov.au/about-us/education-centre/teachers	Department of Environment website aimed at primary and secondary school teachers	Provides resources and reference guides to shape sustainability education in primary and secondary schools. Content created and controlled by the Federal Government department
Environmental and Sustainability Education www.curriculumsupport.education.nsw.gov.au/env_ed	NSW Department of Education and Communities website aimed at primary and secondary school teachers	Provides resources and reference guides in relation to the sustainability curriculum predominantly focused on primary and secondary education. Content controlled and created by the NSW Government department.
Education for Sustainability Hub www.swinburne.edu.au/ncs/efshub	Former Department of Education, Employment and Workplace Relations (DEEWR) in partnership with the National Centre for Sustainability (NCS), Swinburne University of Technology. Website developed for VET educators for the <i>TAE10 Sustainable Practice Skill Set</i> .	Provides a comprehensive set of teaching materials, reference materials and other resources specifically designed for the VET TAE10. These resources may be used in other courses and provide a comprehensive introduction to sustainability education. Content controlled by the site administrators.
www.efslarninghub.net.au	Repository of information and resources managed by the NSW Government Office of Environment and Heritage.	Provides a comprehensive overview of information related to environmental sustainability. Provides coverage of public resources. Content controlled by the site administrators.

Table 2.2: Summary of other sustainability education websites

Ultimately, our search concluded that while existing sites served specific community needs, none of these existing platforms catered to tertiary higher education. Secondly, these sites do not have devolved control; all content on these sites is controlled by the site administrators.

The unique positioning of the L&T site was therefore twofold: it focused specifically on tertiary higher education, and enabled users themselves to create and share content. This is significant in relation to teaching materials because tertiary educators mostly create their own materials and this practice traditionally occurs in isolation or with a small number of select colleagues. Thus the provision of the L&T platform – allowing



tertiary educators to openly share and access sustainability education materials in this way – to our knowledge sets a global precedent. This enabling capacity serves a dual purpose in that the educators and institutions become the key focal points of the L&T site.

Furthermore, such devolved access is particularly apt for the tertiary sector for the following reasons:

- There is no standardised tertiary education sustainability curriculum in higher education. Therefore enabling institutions and users to define and create their own sustainability education content is a vital aspect of facilitating sharing in the tertiary sector, particularly as there is wide variation in the type of sustainability courses offered across different institutions, within institutions, within disciplinary groupings and between courses.
- Sustainability education in higher education is developed in the context of specific disciplines and each of these may have very different accreditation and assurance of learning criteria. Sharing knowledge regarding sustainability education across disciplines is useful to better understand to what extent shared understanding of sustainability education may translate across disciplines.
- Sustainability educators may develop teaching materials in relation to their unique research outputs. Providing sustainability educators with the opportunity to share their research findings in a way that can be shared across institutions can enhance the impact of research findings.

In addition to the profiling institutions and educators, the site has the capacity to profile courses and teaching materials. These pages are accessed through the Courses and Teaching Materials pathways in the main header on the homepage. Sustainability educators and professional staff contribute the materials to these pages through their individual profile pages, and the inbuilt IMS and wire frames collate these in a common pool that is available to public visitors.

2.4 A user-friendly platform

After the initial launch in February 2013, the second major stage of the L&T site development was planned to incorporate feedback from universities and individual site users. Specifically, users needed the site to be more dynamic and to be able to easily identify other registered users. Many of the site features which we term user-friendly enhancements were vital enablers for the various connecting strategies outlined in Chapter 3. Table 2.3 provides an overview of the enhancements as they were implemented during different sprints.

Enhancement	Connecting strategy
Rotating carousel	Show featured site content upon landing on the site homepage to build site identity
Twitter feed	Allow news to be rapidly added to the site. Allow users to add tweets to feed. Acquire social media traffic to visit the site.
International scholar page	Develop international connections. Share and acquire sustainability education knowledge from non-Australian scholars.
Educators' search page	Allow educators to identify one another and allow site visitors to see all educators and search for them by location, institution, discipline and issue.

Table 2.3: User-friendly enhancements

These enabling features of the redesigned L&T site point to the development of a unique platform. To our knowledge no other such platform exists. This presents an exceptional opportunity to further collaboration with tertiary education institutions in Australia and other countries. During the first year of operating the redesigned site, international interest was evidenced by the high rate of traffic from overseas visitors.

Key findings

- Gaps exist in terms of connectivity between educators from different disciplines in the same institution where the educators are not connected or known to one another.
- Educators cited barriers in being able to freely and actively create and share teaching materials.
- In relation to the whole-of-campus approach to sustainability, we found vastly different interpretations of sustainability between different roles in universities.
- Different roles in universities had very different routine practices they engaged in for their sustainability education work.
- Sustainability education can be categorised according to issues, disciplines and practices.
- Practices vary between roles. The main roles that could enable site content co-creation are educators (practices related to teaching materials, courses and events) and professional staff catalysts (practices related to institutional sustainability, course design and accreditation).



Chapter 3: Connecting

Creating and enabling the L&T site for a particular CoP is a vital element of facilitating connection between people. It also establishes a virtual presence that may encourage others to recognise the significance of sustainability education. However, the proposition that if website managers enable users to co-create content then those users will proactively use their agency in this way, is broadly misconceived (van Dijck, 2009). This misconception is encapsulated in the mantra ‘if you build it they will come’. Online communities generally experience broad differentiation between users who actively and frequently contribute, those who sometimes contribute and those who benefit from the contributions of others while not contributing themselves. Furthermore, users (in this case sustainability educators) are broadly constrained by their own protocols for engaging in online communities, and within their professional roles are constrained by the protocols of their institutions.

The redesigned L&T site provided the enabling capacity for educators to connect across disciplines and within and across higher education institutions. In principle this should allow educators to connect in a self-organising manner with others in their discipline or from other disciplines. The L&T site, pro-sharing behaviour can occur voluntarily, from peer to peer. In theory, such connections do not require deliberate management incentives to create inter-organisational connections or to intentionally create CoPs. To assume that all sustainability educators will proactively engage in pro-sharing behaviours is further complicated in the case of sustainability education. As outlined in the preceding chapter, very weak linkages exist between sustainability educators across diverse disciplines and even within institutions we discovered a distinct lack of connectivity.

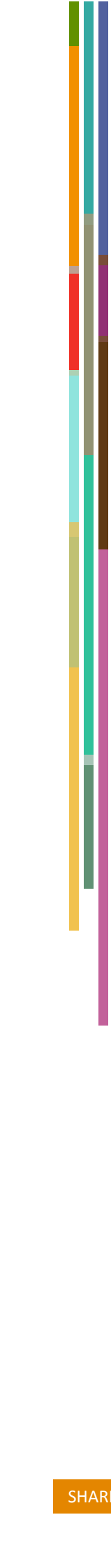
Given the nature of sustainability education as a complex and multifaceted body of knowledge, deliberate connecting strategies were trialed to:

1. acquire members through registrations
2. encourage sharing behaviours such that registered members would contribute site content and share their teaching materials
3. facilitate discussions about sustainability education through face-to-face workshops and online social media campaigns.

Overall the aim was to purposively engage in community outreach such that site members would represent high-profile and emerging sustainability educators.

The connecting strategies outlined in this chapter address the following project aims to:

- consult broadly with existing sustainability networks in participating universities to develop a strategy for linking with the site in an ongoing manner
- establish a well-recognised Australian award for educators and students to



enable ongoing profiling of best practices in relation to sustainability education

- connect to international sites that profile regularly updated course materials, sustainability curricula and case studies.

In satisfying these aims it became essential to conceptualise the connecting strategies as targeting connectivity between CoPs or NoPs sharing patterns of practices rather than a singular CoP. So, rather than establishing a CoP, these connecting strategies were more effective when directed towards an existing CoP in relation to other networks. The conceptual framing for this approach was discussed in Chapter 1.

If enabling relates to agency, connecting relates to intentionally activating the agency of others to adopt proactive sharing behaviours. As outlined in Chapter 2, the sustainability education CoP is inherently complex. To facilitate connecting in a sustainability education network, we identified shared practices which were common to user groups and modelled the L&T site accordingly. Crucially, a website that facilitates user-generated content requires not only connection between members, but the encouragement of contribution.

3.1.2 Connecting through practices

A focus on practice informed the design of the user pathways based on a shared set of practices. In particular, the strategy to connect active contributors to the L&T site focused on three types of users: educators, catalysts and CoP leaders. The key practices we sought to activate with each user type were: sharing teaching materials; sharing sustainability courses; sharing information about best practices for sustainability education; and sharing disciplinary or issue-specific knowledge.

In order to enable connectivity under these conditions, the L&T site interface was designed to focus on ‘constellations of practices’ (Wenger et al., 2002) and ‘collectivities of practice’ (Lindkvist, 2005). Rather than the focus of community building being to establish a shared sense of purpose or collective action towards a specifically defined and shared outcome, the focus is on encouraging pro-sharing behaviours based on commonly shared practices. For example, all sustainability educators are engaged in course design as a practice. Therefore, the shared practice is course design. Connecting and contributing course design materials through the L&T site is one way members can share knowledge with one another and build a common knowledge pool. Building a common knowledge pool over time will increase the recognition of best practices in relation to course design, as individual users understand and recognise how others engage in similar practices. Rather than seeking to establish shared common practices or commonly shared sustainability education knowledge, the main aim of the L&T site redesign was to promote understanding of the general practices of various communities in sustainability education and develop an interface to support these practices.

3.2 Bridging and buffering connections

As discussed, our conceptualisation of the CoP as an NoP necessitates the use of connecting strategies that facilitate brokering and buffering connections between organisations. Strategies for connecting communities of practice through a NoP enabled through the L&T site were each designed as contained experiments. The seven strategies outlined below were iteratively designed and applied based on feedback from each experiment. They centred on, more or less chronologically:

1. institutions (university homepages)
2. issues
3. individuals
4. identifying networks by discipline/interest, i.e. Colin, engineers
5. social media contributors (twitter and LinkedIn)
6. supported engagement of high profile academics
7. global outreach.

In terms of aim, proposition, method, data and discussion, each strategy dovetails with the broad objectives of this project, namely to:

- consult broadly with existing sustainability networks in participating universities to develop strategies for linking with the site in an ongoing manner
- establish a well-recognised Australian award for educators and students to enable ongoing profiling of best sustainability practices
- connect to international sites that profile regularly updated course materials, sustainability curricula and case studies.

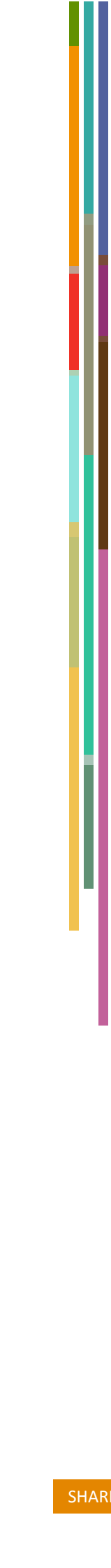
3.2.1 Institutions (university homepages)

Statement of aim

The aim of creating university homepages on the site was to empower ownership of and participation in the site by universities as a starting point to turning the site into a community of practice, where educators share and co-create teaching materials. The characteristics of a community of practice are a common domain of knowledge, a notion of community and a practice around which the community develops, shares and maintains its core of knowledge.

Background

The previous UTS website team had identified the unsustainability of having a centralised uploading function on the site, meaning that only site administrators could upload materials to the site, and the team was under-resourced to manage this function. This practical barrier to populating the site with current teaching materials and courses, coupled with the team's agenda to create a community of practice, led to an early decision to decentralise this function. The natural place to begin community building was with the website contact person allocated by each university.



Site functionality was redesigned to enable individual universities to update courses rather than the central project team, the latter scenario having proven time-consuming and unsustainable. In response, a user-friendly upload form and the ability to allocate new log-ins were developed. All university contacts were asked to reactivate their accounts. After this first outreach, only 19 new contacts had been given log-ins and were actively updating their university's course materials. To encourage this participation, various subjects and courses were profiled on the front page of the site on a rotating basis.

This strategy met with some success, but it quickly became obvious that more buy-in from universities was needed to support population of the site and the development of a solid community of practice. The following propositions were thus formed:

1. If universities as organisations provide appropriate structural incentives to facilitate (cross-disciplinary) sharing through face-to-face interactions and active change agents within the organisation, there would more likely be an endogenous willingness to encourage pro-sharing behaviours.
2. If an open-sharing platform for sustainability educators to share their L&T materials is enabled, the principles of sustainability education will be sufficient to activate collective reciprocal sharing behaviours.

Method

Organisations focused on attaining certain EFS outcomes by 2015 were positioned as the main feature on the redesigned website. Institutions were given a profile on the site, indicating the number of sustainability courses, teaching materials and educators from each institution, as well as capacity to co-create their sustainability education presence on the site. Each institution was asked to provide an administrator (catalyst) to develop and maintain the institution's presence on the site and act as change agent or catalyst in generating educator participation in sharing practices on the site.

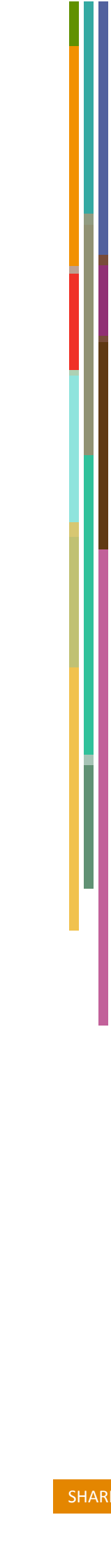
Data

The findings of the focus group and email analysis in this stage showed that:

1. sustainability catalysts had a lack of power to instigate structural incentives in their network
2. educators did not understand how disciplinary knowledge from their close colleagues would be operationalised in their disciplinary context
3. the transparency of organisational sustainability education in the inter-organisational network (numbers of sustainability courses, teaching materials and educators from each institution) provided a disincentive to share further
4. sustainability educators in the same institution were unfamiliar to one another.

This final point is illustrated by one catalyst:

I would like to play a role in establishing a sustainability education CoP, but then step away when it is bubbling away. I would probably have to be the facilitator in my uni for these conversations. The academics from different disciplines don't know each other – so I would need to say to them, 'You are



actually talking about some common stuff here, so get that conversation started'. I think it would benefit university uptake of sustainability in general if I could point to a humming L&T working group. (university catalyst)

We assumed that in a loosely connected heterogeneous community, the principles of sustainability education would be sufficient to activate collective reciprocal sharing behaviours. However, early registrations on the website during the soft launch stage were slow and educators who registered did not exhibit pro-sharing behaviour through the contribution of teaching materials to the site.

Interviews with sustainability educators indicated six main themes in relation to sharing behaviours. Firstly, pro-sharing attitudes were basically positive, as indicated in the following quote:

As a way of encouraging a community of lecturers to share content it [a sustainability website] would certainly be useful. (sustainability educator)

Yet the other five viewpoints related by educators revealed perceived barriers to open sharing:

1. organisations restrict knowledge flows to protect intellectual property
2. sharing is viewed as anti-competitive in an increasingly competitive sector
3. knowledge is not shared in a usable way (e.g. curriculum templates online either lack sufficient detail or miss the target area)
4. sharing is easier within a homogenous knowledge discipline (e.g. what makes a CoP work is people wanting to participate and share, most likely within a particular discipline)
5. sharing should be reciprocated in a community of academics that are known to one another.

These themes highlighted the tension between an espoused willingness to share and actual sharing practices that were restricted by the structural characteristics of networks and institutional norms and rules restricting sharing behaviour, as indicated in this quote from one of the interviewees:

I suppose the copyright restrictions; the problem is that the university decides what I can do with my materials. It is such a competitive market now ... which is really unfortunate because it would be great to have this sort of idea of knowledge commons where you can share quite easily. I think the bottom line is that my supervisors would not be happy with me giving out much content.

Secondly, educators developed their understanding of sustainability education in a disciplinary context, which engendered resistance to a holistic approach to sustainability, facilitative of cross-disciplinary knowledge flows.

Furthermore, the strategy to engage users with the community was through access granted by a senior executive or their delegate, but we found that these actors did not endogenously facilitate holistic engagement with sustainability education and hence were not active brokers in the development of the online CoP.



Discussion

Barriers to the development of sharing knowledge flows related to the institutional norms embedded in the dominant logic of the tertiary education sector. These were structural rules that actively incentivised educators to develop norms of interaction that incentivised knowledge protection for competitive advantage, rather than for the development of a common knowledge pool. As the opportunity to facilitate the sharing of sustainability data across disciplines and between organisations was unprecedented in the form of a website, actors had not developed structured exchange norms that evoked collective action for sustainability education, even if their endogenous predisposition was pro-sharing.

Our sustainability website experiment bears out Ostrom's (1990) recommendations for the essential design principles that enable endogenous collective action towards cooperative behaviour. The main challenges we face in sustainability education, as represented through the site, are to establish clear boundaries and conditions that define who is part of the community, and to identify a mutual purpose or sense of what is to be shared.

The tertiary education sector as a setting raises another contextual consideration regarding the public or private ownership of knowledge. Can sustainability education engender a common knowledge pool given these constraints and tensions? We argue that before sustainability education can be fully embedded and embodied in the sector, fundamental shifts towards openness – including developing and bedding down norms that foster a culture of sharing, and creating structural incentives to do so – must occur at individual and organisational levels.

3.2.2 Issues

Statement of aim

The aim of this strategy was to develop a more specific boundary around the community and enable experts in this sustainability specialty to co-create common knowledge via the mechanisms of the L&T site.

Propositions

Given that sustainability issues are cross-disciplinary, we propose that this focus would facilitate knowledge transfer and co-created knowledge in a wide-reaching way.

Method

The design strategy was to feature a contemporary and topical sustainability issue, in this case energy efficiency (EE), as the main attraction to the site: <http://sustainability.edu.au/about-sustainability/energy-efficiency/>. In addition we facilitated face-to-face workshops with specialist EE educators, actively worked with publically funded research institutes and university research centres, and collaborated with a leading national panel of public professionals to co-create knowledge on the EE issues webpage within the site. The EE experts also provided feedback on the conceptual framing of issues, and shared research outputs and teaching materials.



Data

Interviews and focus groups suggested several barriers to sharing. Public practitioners and publically funded research institutes saw the value in promoting their work through the site and sharing outputs of their work, but indicated that they did not understand how their work would be incorporated in education institutions. Despite being publically funded, research institutes questioned whether their work could be openly shared. Educators reported that face-to-face interaction was important in developing a sense of community directed towards institutional change for sustainability education.

Website statistics revealed that an issues-based focus attracted educators to be engaged in the CoP within the narrow confines of the specific issue. Knowledge flows in relation to sustainability issues were discipline-specific. In this sense, the issues-based focus did not allow holistic sustainability education.

Discussion

Issues have the potential to generate co-created knowledge on the site, particularly from educators who have not yet engaged with the site, and publically funded researchers.

3.2.3 Individuals – awards and incentives

Connecting educators to the site through acquiring membership is the first step, however the ultimate aim is to encourage educators to create content in the form of sharing teaching materials and courses data, and to return to the site regularly. Various strategies to attain this aim included establishing a well-recognised award, developing a newsletter to profile contributors (see Appendix F a for sample newsletter), and allowing educators to see the number of times their materials have been downloaded as a means of determining impact.

A. Curriculum award

Statement of aim

Establish a well-recognised Australian award for educators to enable ongoing profiling of best practices.

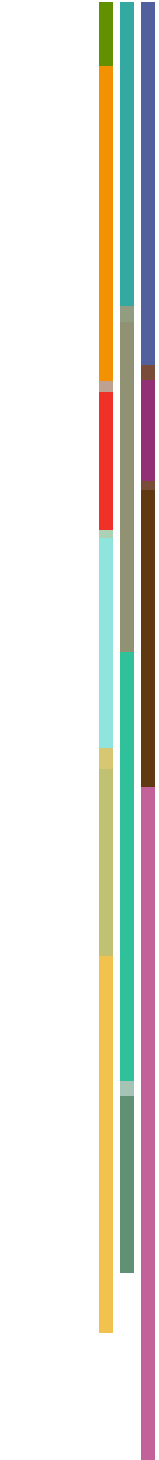
Proposition

An award would provide incentives for educators to share their teaching materials.

Method

During our preliminary research stage, we identified the Green Gown Awards Australasia as an established award with a category for L&T. Given our overall aim to build a community of practice, it was decided that working with this award, supported as it is by the well-regarded organisation Australian Campuses Towards Sustainability (ACTS), rather than in competition with it was supportive of our purpose.

In 2013 the Green Gown Award for L&T was first sponsored by the L&T site. This category recognises achievements in education for sustainability in undergraduate,



postgraduate and vocational courses in tertiary education institutions. Examples of possible application topics include:

- effective integration of sustainability principles and/or practices within and across disciplines and courses, especially those not traditionally engaged with sustainability
- the development of new courses focused on sustainability issues
- use of practical sustainability-related projects or other practical activities within courses including work-based learning initiatives.

Applicants are encouraged to upload supporting teaching materials to the website and guidance on the suggested principles for EfS can be found on the website. The awards are presented at the ACTS annual conference.

Data

In 2013 the award attracted more applicants (ten in total) than the awards in the other Green Gown award categories. This was probably assisted by promotion of the award on the website and via the website team as part of communications with educators, as well as assistance by the website team to award entrants.

Following the presentation of the award, the website team followed up with requests to the award winners to register on the site and upload their winning materials. This was achieved to some degree.

Discussion

The website team has decided to support this award again in 2014, with the proviso that the website be acknowledged in any promotion and news release stories related to the award winner. It is expected that applicants will be more likely to upload their supporting materials to the website now that the website's support of the award is in its second year and awareness of the opportunity is higher. For the project team, it is worth exploring options for an award that could attract a higher number of applicants. This could be achieved by opening entry to universities and academics abroad, instigating a less time-consuming application process and making some contribution to the L&T site obligatory.

B. Newsletter

Written by the website team, the e-newsletter correlates with an increase in traffic to the site and teaching material downloads, and enables the leveraging of other outreach strategies, e.g. development of a LinkedIn group, development of educators' profile pages, profiling of recently contributed teaching materials and their contributors, and links to sub-communities.

Newsletters were sent on 12 December 2013, 1 April 2014 and 30 May 2014. A copy of a sample newsletter can be found in Appendix F. Figure 3.1 gives an overview of results from the first newsletter on the day it was sent. This first newsletter was sent to 151 members of the site and on the day it was distributed, around half of the recipients had opened the newsletter and over one-third had clicked a link in the newsletter that sent them to the L&T site. Figure 3.2 shows the top 10 clicks on links in this newsletter. The most popular links related to the EfS Forum, the website

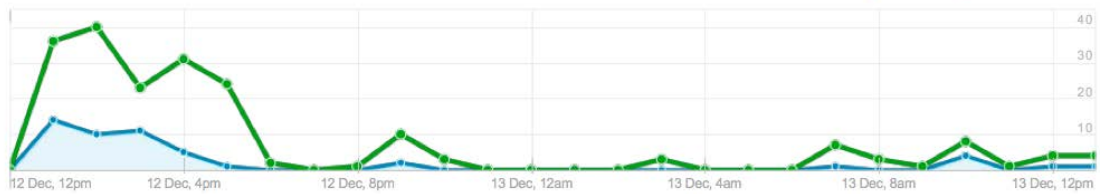
homepage and various teaching materials featured in the newsletter.

Newsletter 1

Sent Dec 12, 2013 at 1:42PM

Sent to 151 unique subscribers in Newsletter 1

● Opens and ● Link Clicks for first day



Campaign Overview



75 Unique opens
430 total opens to date

2 Bounced
1.32% couldn't be delivered

74 Unopened
Open rates are only estimates

50.34% of all recipients opened so far

38.67% clicked a link (29 people)

0.67% unsubscribed (1 person)

0 people marked it as spam (0%)

4 shares across Facebook, Twitter & email

Figure 3.1: Campaign overview for Newsletter 1

Link (URL)	Unique	Total
sustainability.edu.au/news/register-your-interest-forum-efs/	9	10
sustainability.edu.au	7	9
www.sustainability.edu.au	6	7
Link to web-based version of this email	5	6
sustainability.edu.au/material/profile/101/	4	4
sustainability.edu.au/teaching-materials/	4	4
sustainability.edu.au/about-sustainability/sustainable-business/	2	2
sustainability.edu.au/material/profile/225/	2	2
sustainability.edu.au/material/profile/256/	2	2
sustainability.edu.au/material/profile/271/	2	2

Figure 3.2: Top 10 clicks in Newsletter 1

Newsletters 2 and 3 experienced similar results to Newsletter 1 in terms of how many recipients opened the newsletter on the day it was delivered. Newsletter 2 generated most clicks to the teaching materials search button on the website and Newsletter 3 generated most clicks to a specific teaching material.

C. Teaching material downloads

The number of teaching material downloads was proposed as an incentive to educators to upload their teaching materials. When a registered member uploads teaching materials to the site, they are able to track the number of downloads by other users. An example of this is shown in Figure 3.3.

Teaching material documents			
Title	Document	Url	Downloads
Case study: Westpac Banking Corporation	Currently: uploads/teaching-material/TUP-CorpSustain-Bern-1e2p..._Case12.pdf	http://www.tup.net.au/publications-new/Cases_in_Corporate_Sustai	368
Teaching Resources for the Westpac case study	Currently: uploads/teaching-material/TUP_Bern..._Case_12..._Teaching_Resources..._Westpac_Banking_Corporation.pdf	http://www.tup.net.au/publications-new/Cases_in_Corporate_Sustai	330

Figure 3.3: Example of downloads made visible to the author

Some teaching materials have been downloaded thousands of times. For example, a teaching material uploaded by Paul Brown from UTS has been downloaded almost 6500 times:

<http://sustainability.edu.au/admin/academiccontent/teachingmaterial/23/>. This fact has been highlighted on the site's home page and in Newsletter 1.

The newsletters are also pointing readers to specific teaching materials and this strategy is impacting downloads. Figure 3.4 shows downloads of teaching materials by new and returning users from 3 December 2013 to 3 June 2014. Looking at the graph, peaks can be seen in mid December 2013, early April 2014 and late May 2014, correlating with dates following newsletter distribution.

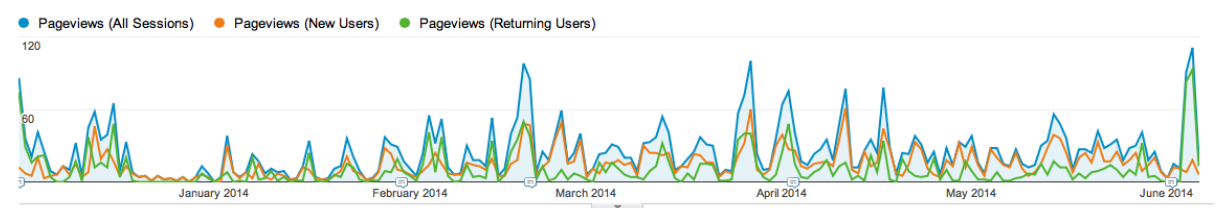


Figure 3.4: Downloads by new and returning users

3.2.4 Networks by discipline/interest

Statement of aim

The strategy to enable sub-communities of networks by discipline/interest on the site was part of the project objective to consult broadly with existing sustainability networks in participating universities to develop a strategy for linking with the site in an ongoing manner.

Propositions

It was assumed that by recognising and working with sub-communities the site would become a meta-community of practice in sustainability education, and that members of sub-communities would register on and contribute to the site, thereby strengthening its sustainability.

Method

Interest from the sustainability engineers network, SEEN, prompted the creation of a replicable template on the site along the lines of the energy efficiency page (discussed earlier in section 3.2.2) but with a Twitter feed inserted in the right-hand column of the page. The sub-community Twitter feed would function as the main place where online discussion and sharing of ideas, events, articles and comments on topics of interest to the sub-community takes place.

The project team was approached by an EfS community established by Latrobe and Charles Sturt universities to host a forum titled 'Education for Sustainability in the Tertiary Sector: What have we learnt, Where to next, What resources are available?' held on 20 February 2014. The forum, initiated by Dr Colin Hocking, featured Emeritus Professor Geoff Scott as the keynote speaker to discuss Turnaround leadership. The remainder of the forum was dedicated to sharing progress and discussing future plans regarding how to embed sustainability into tertiary curricula as well as plans to develop a forum, stream or roundtable for the 2014 AAEE and ACTS conferences. The website hosts resources and outcomes of the workshop at <http://sustainability.edu.au/about/what-community-practice/efs-community/>.

Data

Looking at online traffic to the EfS community page, we can analyse the effectiveness of this strategy in terms of new registrations, page views and numbers of users on the site.

In terms of new registrations on the site, during the week of the EfS Forum (17–21 February 2014) there were 21 new registrations compared with 3 registrations during the same week in 2013. Traffic to the EfS community page from 1 January to 19 August 2014 is shown in Figure 3.5. The EfS page ranked eighth in terms of total page views during this period, and first in terms of time spent on the page (the average time spent on a page for all pages was 1.23 minutes).

Page	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit
8. /about/what-community-practice/efs-community/						
All Sessions	531 (1.75%)	377 (1.67%)	00:04:16	306 (3.35%)	66.99%	54.99%
New Users	204 (1.18%)	154 (1.10%)	00:06:05	146 (2.24%)	69.18%	66.18%
Returning Users	327 (2.50%)	223 (2.59%)	00:03:32	160 (6.16%)	65.00%	48.01%

Figure 3.5: Traffic to EfS community page, 1 January to 19 August 2014

Figure 3.6 shows traffic from new and returning users to the site. All traffic and particularly the number of returning users peaked at around the time of the EfS Forum on 20 February 2014.

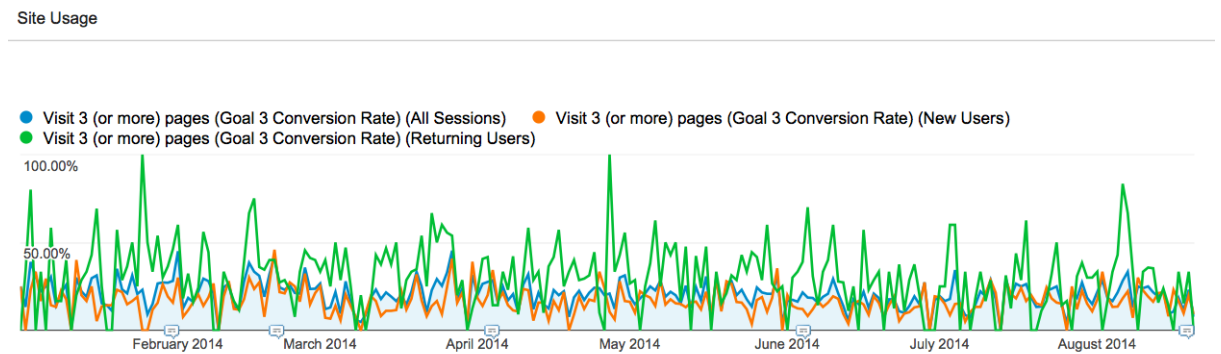


Figure 3.6: New versus returning site users, 1 January to 19 August 2014

Figures 3.7 and 3.8 show that views of teaching materials and total page views also peaked at around the time of the EfS Forum.

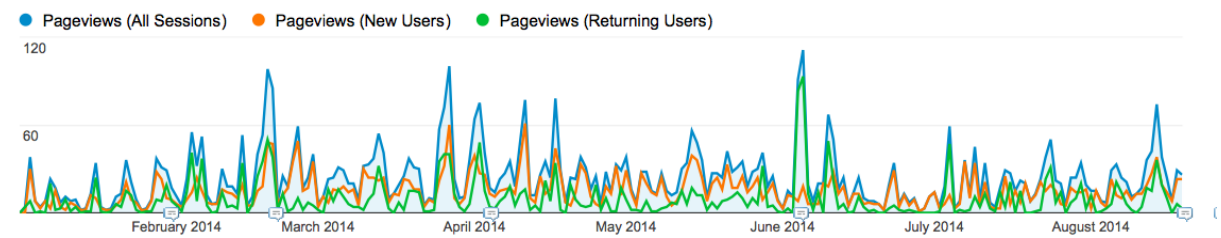


Figure 3.7: Views of teaching materials, 1 January to 19 August 2014

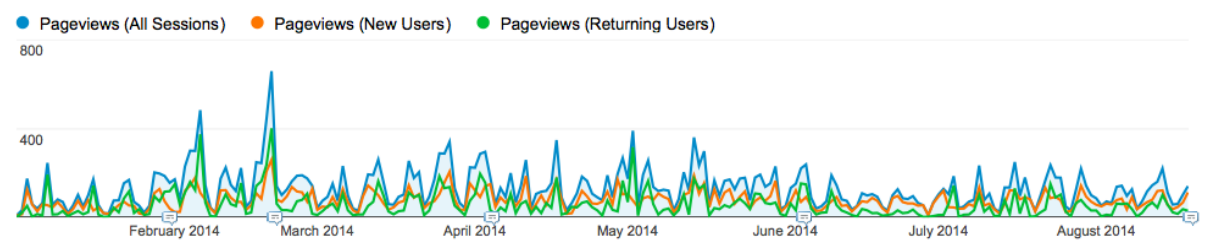


Figure 3.8: Total page views, 1 January to 19 August 2014

Discussion

It appears that hosting the EfS Forum and an EfS community page has been very effective in drawing new users and returning users to the site. Also, the EfS page has engaged users for longer than other pages. Hence our proposition that members of sub-communities would register on the site proved correct. However, our proposition that sub-community members would contribute to the website, and thereby strengthen the sustainability of the site, is uncertain. There has not yet been an increase in teaching materials contributed to the site by EfS sub-community members. This could be in part because the agenda of the EfS sub-community is to discuss how sustainability may be more effectively embedded in tertiary curricula, as opposed to the website's main agenda: to share teaching materials.

3.2.5 Social media engagement

A. Twitter



Figure 3.9: Site Twitter feed

Statement of aim

The tactic to embed a Twitter feed, as shown in Figure 3.9, on the L&T site homepage was part of a broader strategy to make the landing page more dynamic. There were three interrelated aims of the Twitter account:

1. re-tweet tweets by sustainability educators and add these educators to a list of contributors
2. acquire followers to build the virtual presence of the L&T site
3. tweet short messages when site contributions had been made.



Propositions

In terms of the overall aim, if the site had a dynamic news stream that was connected to broader networks it would give a more dynamic feel to the landing page. In response to the three Twitter aims listed above respectively:

1. If contributing members were able to have their messages rapidly appear on the homepage, they would feel more connected to the site, and if their messages were displayed on the webpage and re-tweeted, they would reach a broader audience.
2. If the site could attract credible and legitimate followers with high visibility then it would enhance the virtual presence of the site and may encourage Twitter followers to register on the website as contributing members.
3. Tweets when site contributions are made would attract site visitors and help followers and contributors be alerted to content updates.

Method

A Twitter account was established in January 2013 with the handle @sustaineduau. The feed was added to the L&T site homepage in July 2013. A project team member checked and contributed to the account every one to two days. Contributing site members and university research centres were followed by the account. Australian sustainability educators and contributing members were added to a list in the account. Tweets that were related to sustainability education or research by the people on the list were re-tweeted. As site contributions were made, a tweet was composed and sent along with a link to the site. Pre-semester targeted tweets were sent to encourage educators to register on the site and add teaching materials.

Data

The Twitter account currently has 505 followers (as at 27 August 2014). The rate of new followers is growing steadily, with circa one to two new followers each day. Twitter followers include high-profile professionals and educators as well as universities and non-government sustainability institutes. The @sustaineduau list has 79 members who are identified as sustainability educators in Australian universities or research institutes.

The Twitter profile has been added to 13 other lists concerned with sustainability in education and research: this signals that others recognise the legitimacy of our presence.

Tweets that attract users to the site are those that contain a direct link to the site. For example, there was a peak in visitors when the following campaign was launched in a succession of tweets to draw users to the site (see Figure 3.10 below). The aim was to include specific twitter handles of sustainability educators in the @sustaineduau list and include a direct link to the L&T site in the tweet.

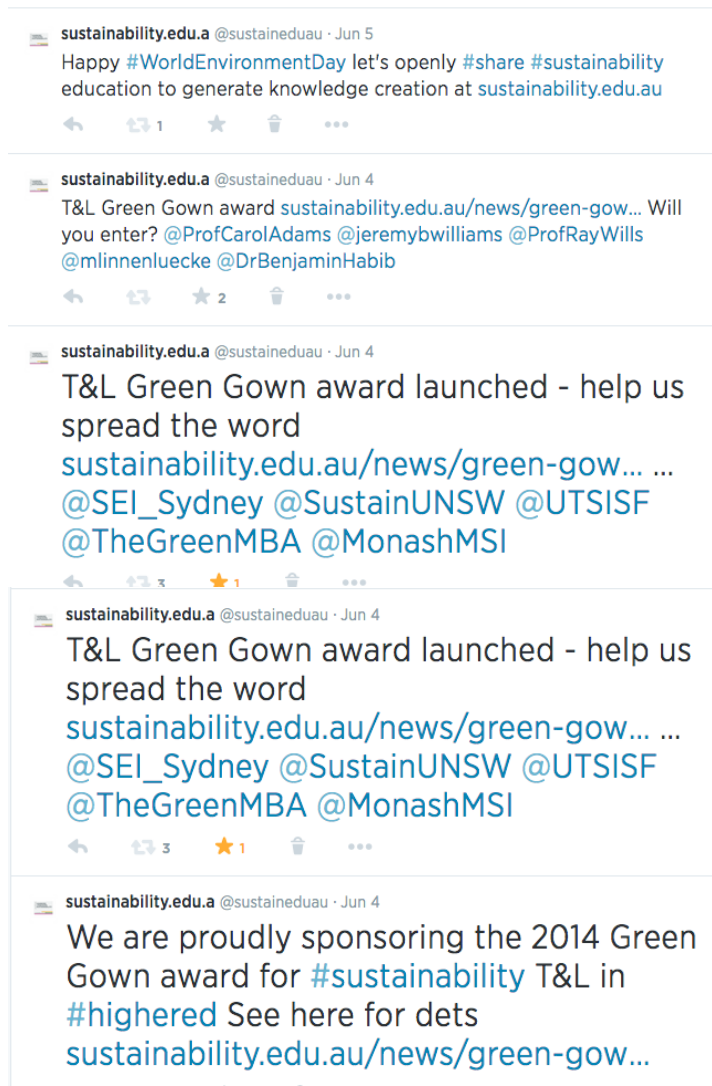


Figure 3.10: Sample tweets from direct to website campaign

Of the visitors that the Twitter account draws to the L&T site, 52% of these are new visitors, indicating that the Twitter stream succeeds in drawing new visitors to the site.

The Twitter account has maintained a steady stream of tweets since its launch. It continues to receive mentions and re-tweets. Figure 3.11 demonstrates that 1300 tweets have been made from the account since its launch. Of these, 237 have been re-tweeted and 454 have received mentions by other users.



Figure 3.11: Tweets and mentions

Discussion

The Twitter site has received traction in the twitter community and receives regular mentions and re-tweets, demonstrating that others view the Twitter presence as a legitimate source of information.

The Twitter feed has been successful in adding a dynamic feel to the homepage. We have not tested to see specifically how users track from the Twitter stream to the site itself – this is recommended for a subsequent stage of research and can be conducted using advanced google analytics.

When the Twitter strategy was directed towards including direct ‘calls to action’, with directed links to visit the L&T site, it had more success in drawing new visitors to the site. However, this strategy is far more time-consuming than re-tweeting tweets already provided by @Sustaineduau members. Therefore, if the Twitter account is to be used as a dedicated social media strategy to draw users to the site, it would require this to be a dedicated practice of the community outreach officer rather than as a periodic experiment.

B. LinkedIn

Statement of aim

The aim was to develop an online discussion group in LinkedIn to allow discussion related to teaching materials and to send more regular alerts to L&T site members about new content additions. A related aim is to attract new contributing members from the broader LinkedIn community to register on the L&T site.

Proposition

A strategy to acquire members to a LinkedIn group and create discussion that

connects back to the L&T site will attract new registrants and contributions to the site.

Method

We took the following steps in launching the LinkedIn campaign in June 2014:

- prepared LinkedIn profile with text and logo
- set up L&T site with anchor point
- alerted Jeremy Williams, APCSE, Griffith University that we would use his uploaded module as the first discussion and link it back to the L&T site; discussion could act as a proxy for comments on teaching materials on the L&T site
- invited all existing members by email
- promotion via team members' LinkedIn contacts and Twitter followers, communicating clearly about who can join, observing protocol on industry experts versus those affiliated with a higher education institution
- moderated the site
- sent newsletter to registrants
- sent LinkedIn invitation alert.

Concurrently we undertook a controlled experiment to track and measure visitors from the LinkedIn group to the L&T site to discover how we could leverage social networks to draw users in the form of contributing members and visitors to the site.

We did this by adding a tag to two teaching materials links on the L&T site to see how people access the site after they have visited a teaching material. We also set up a LinkedIn discussion on the topic with a tagged link to the teaching materials. We could then track people as they access the site and see where else they may go on the site after they have accessed the initial teaching materials page.

The two links were both to business models:

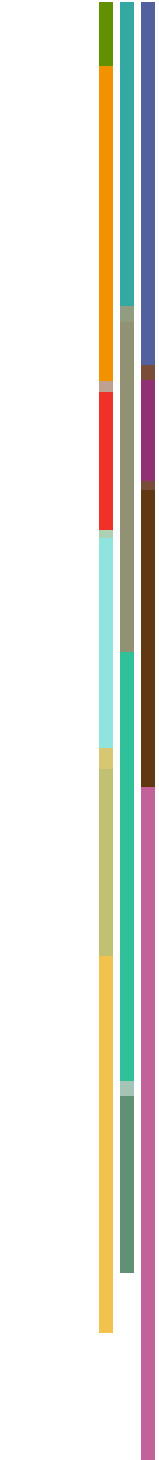
1. Part 1 was a classic model with discussion around its ongoing use in analysing various business cases. It is also open access (meaning people do not have to be registered to access it): <http://sustainability.edu.au/material/teaching-materials/phases-organisational-sustainability/>.
2. Part 2 was Dr Wendy Stubbs's work on the B-Corp model. It is closed access (we are tracking if this prompts people to register): <http://sustainability.edu.au/material/teaching-materials/exploration-emerging-sustainable-business-model-b-corp-model/>.

Data

Two months after going live, the LinkedIn group had 97 members and 19 discussions. A number of these discussions invite users to visit the L&T site to access featured teaching materials. In Part 1 of the controlled experiment we saw a spike in visitors to the site directly from the LinkedIn discussion.

Discussion

LinkedIn provides a good basis for enabling discussions between members. The group in LinkedIn can be relatively self-sustaining. Continuing with a strategy of drawing



users into the L&T site by intentionally creating discussions on L&T materials that draw users to the site is a worthwhile strategy going forward. This would be a dedicated role of a community manager, where at least one discussion per week would be created.

3.2.6 Supported engagement of high-profile academics **Statement of aim** (October 2013 to July 2014)

The focus of the design strategy was to feature leading academics on the site, and regularly communicate the outputs of pro-sharing behaviour in the broader network through a social media strategy.

Proposition

The assumption was that peer leaders identified as leading experts in a specific disciplinary context would be more likely to endogenously share and understand the holistic sustainability education principle of the L&T site.

Method

We drew up a list of high-profile scholars in sustainability to amplify the profile of the site to act as a drawcard for others to register. Our criteria were:

- currently affiliated with a university
- well known inside and outside academia circles
- usually holding a position on a research, policy or advocacy related national body, e.g. Climate Change Authority, Climate Council or Academic Research Centre.

Email, phone and face-to-face approaches to prominent sustainability scholars were personalised in terms of addressing:

- their field of interest and a suggested contribution
- where possible their use of personal or professional networks
- any IP address concerns
- building motivation to share material, collaborate, partake in a community of practice, monitor downloads and give feedback on shared material
- assisting their contribution through follow-up phone calls and offering assistance registering on and contributing to the website
- featuring profiles of registered members on the homepage profile carousel and in newsletters.

Figure 3.12 illustrates the relative success of various recruitment approaches.

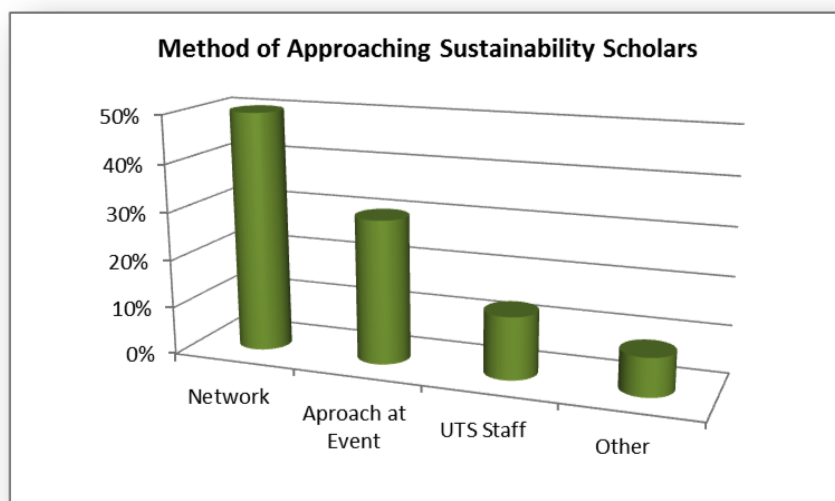


Figure 3.12: Recruitment approaches

Data

This list details headline figures achieved during the implementation of this strategy entailing endorsement by high-profile academics (October 2013 – July 2014):

- number of L&T site registrations grew from 175 to 325 (by 46%)
- number of teaching materials hosted on the site grew from 50 to 125 (by 64%)
- uploaded teaching reference material (accessible from Sustainability Issues pages) increased by 28%
- number of prominent sustainability scholars (including international) who registered on and contributed materials to the site increased by 30%
- other potential contributors, where initial contact has been made/registration in progress, increased by 20%
- only one prominent scholar declined to contribute to the site, citing concern about exposing their IP address.

Perception of project as worthwhile

Uniformly, sustainability scholars were supportive of the project, as these sample quotes attest:

- 'I would be delighted to be registered as a sustainability educator and to take part in this important initiative. Happy to share my conference presentation and research.'
- 'This looks fantastic, thank you. I have added a link to your site on my posts.'
- 'Very happy to contribute to this – it sounds like an excellent initiative. Count me in.'
- 'The sustainability website looks like a good idea, fine with me if you upload that video.'

Perceived obstacles to making a contribution

These centred on concerns about lack of time and nervousness about contributing

materials which may not be ready to share:

- 'I believe that we can contribute something, but as the teaching period is rapidly approaching, I may need some time to decide on what's most appropriate to post.'
- 'In principle I'm very happy to be involved in this but I will need a little bit of time to think about the best contribution I could make.'
- 'I'd rather upload some fresh materials which I will be working on in the coming weeks for the upcoming semester.'
- 'Again very sorry for the delay on this – just flat out on a million things!'

Researchers as contributors

Prominent sustainability scholars are often associated with University Research Centres (e.g. Monash Sustainability Institute, University of Queensland's Global Change Institute). On approaching these academics it was important to draw a link between their research (reports, presentations, papers) and the need for educators to have access to current research in order to produce quality teaching materials, and hence the relevance of their contributions.

Champion contributors

A small number of participants have become 'champion' contributors, reliably keen to contribute materials and ideas for the site, for example, Professor Jeremy Williams, Director of the Asia-Pacific Centre for Sustainable Enterprise at Griffith University. Jeremy provided advice on the integration of social media in driving interactivity on the website as well as uploading an interactive teaching module, 'Managing Sustainable Enterprise' (an elective in the Griffith MBA program).

Leveraging conferences and speaking events

Face-to-face requests to join the website and contribute materials at conferences and speaking events quickly became one of the most effective ways to engage sustainability scholars.

Discussion

The success of this strategy is twofold: (1) the accuracy of the assumption that peer leaders would be more likely to share resources and understand the holistic sustainability education principle of the site; and (2) the valuable resource of a project officer was dedicated to this strategy one day per week for six months.

The rise in high-profile registered members on the site and their teaching materials has generated 'newsworthy' content for the newsletter and encouraged the building of a dedicated Educators feature page, displayed prominently on the website toolbar to enable users to search for colleagues registered on the site, and access their contributed teaching materials. Colleagues can be searched by locality, institution, discipline and sustainability issue. This recent addition to the website was promoted in turn in the newsletter.

3.2.7 Global outreach

Statement of aim

The aim of our global outreach strategy is linked to the project objective to connect to international websites that profile regularly updated course materials, sustainability curricula and case studies. The L&T site aims to be a repository of best practice in teaching materials and sometimes these are found overseas.

Proposition

By including international curricula on the site we are increasing the validity of the teaching materials available on the site.

Method

The first step in connecting to international websites was to update the links page: <http://sustainability.edu.au/about-sustainability/sustainability-education-links/>.

The second step was to begin adding publicly available international teaching materials to the L&T site. One of the first international materials added was this innovative OIKOS case study:

<http://sustainability.edu.au/admin/academiccontent/teachingmaterial/43/>.

The problem with adding international teaching materials was in how to acknowledge their authors when only Australian institutions were active on the site. We began by attributing international materials to UTS Admin by default. However, as we progressed with the site's development, we realised the need to connect individuals rather than just featuring institutions and teaching material; a global outreach strategy connecting people emerged.

We established our global outreach to high-profile academics using the method outlined in section 3.2.6 (supported engagement of high-profile academics), with the addition of a new International Sustainability Scholars page:

<http://sustainability.edu.au/material/institutions/international-sustainability-scholars/>.

Data

Since its inception in July 2014, eight international scholars have agreed to be featured on the International Sustainability Scholars page and five have contributed teaching materials. The L&T site appears to have international appeal. From 15 July 2014, when a user downloads teaching materials they have been prompted to answer a short survey asking how they are using the teaching materials. Thus far there have been 219 respondents to the survey from site users in 18 countries other than Australia. Google Analytics (see Figure 3.13) also shows a considerable amount of international traffic to the site.

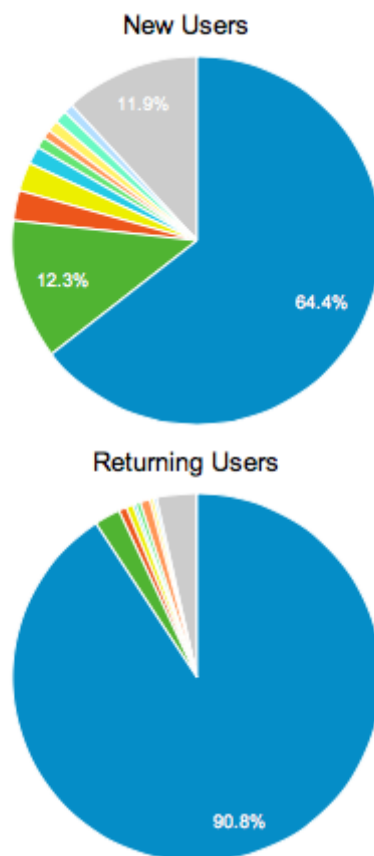


Figure 3.13: Traffic from different countries for new and returning users, 1 April 2013 to 26 August 2014

In Figure 3.13, the largest (blue) sector in both pie charts represents traffic from Australia. The green sector represents traffic from the US. Other sectors represent traffic from other countries. Looking at the lower international traffic levels in the returning users pie chart, it appears that once new users have found the L&T site and deem that it is designed for Australian audiences, they are unlikely to return to the site.

Discussion

As with the preceding strategy to engage high-profile individuals, it is a resource-intensive process to encourage engagement by international scholars with the site, and unless the site deliberately aims to have international appeal, this strategy is of lower priority than the other strategies. The ultimate goal of global outreach might be to open site membership to international institutions and academics so that global outreach is integrated into the self-sustaining objective of the site.

3.3 Where to now?

The connecting strategies outlined in this chapter were based on the concept of connectivity between communities of practice rather than within a single CoP. The strategies addressed the following project aims to:

- consult broadly with existing sustainability networks within participating universities to develop strategies for linking with the site in an ongoing manner
- establish a well-recognised Australian award for educators and students to enable ongoing profiling of best practices
- connect to international sites that profile regularly updated course materials, sustainability curricula and case studies.

The findings from these experimental strategies highlight the importance of bridging and buffering connections. Connecting users with the L&T site and with one another is the overall enabling objective of the redesign outlined in Chapter 2. Yet we learned that there is a difference between a visitor to the site or acquiring a new user through registration, and having them contribute actively to the co-creation of content. That difference is often about strategic support and direction from the project team. The importance of a community manager role emerged through the course of our experiments, although ‘manager’ is a misnomer; ‘it’s not about management but about engagement and interaction’ (Ahonen, 2014).

Ideally a CoP would become self-sustaining and we set out with the intention of leaving this project in the hands of a developed community. However, as will be discussed in Chapter 4, ‘communities are not short-term projects ... they require a proper investment of time and resources to succeed, while the payoff is usually calculated over a longer period’ (Ahonen, 2014). Thus we see an opportunity to build on the foundation of success that has been achieved so far.

Key findings

- Managing the engagement of high-profile individuals was successful in acquiring new teaching materials. However, this is an intensive process for the online community manager.
- Face-to-face workshops greatly boost traffic to the site and lead to spikes in new registrations. However, this did not necessarily translate to the acquisition of new teaching materials.
- Newsletters create a spike in returning site visitors. However, this does not necessarily translate to the acquisition of new teaching materials.
- Catalysts need to be in a position to offer structural incentives in order to motivate sustainability educators to register and share on the site.
- The greatest blockers to sharing teaching materials, as stated by educators, are competing interests and lack of time.



Chapter 4: Sustaining

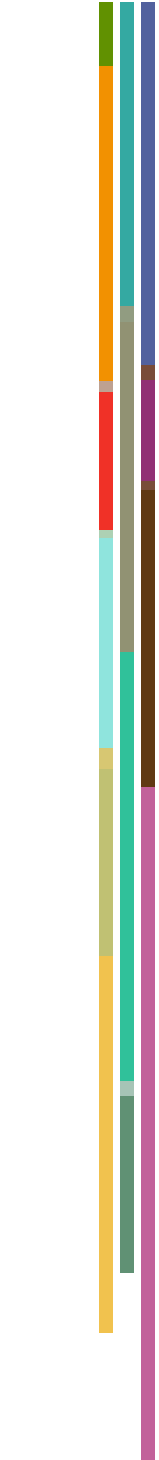
This chapter addresses the ambitious challenge presented as the final aim of the L&T tender, that is, how can the L&T site become self-sustaining? The guiding principle for addressing this aim was to enable the site to allow knowledge and information sharing rather than simply act as a repository for information. The implemented strategies were designed with this in mind. In the course enabling and connecting networks of practice in sustainability education through the site, the project team encountered opportunities and challenges. These are summarily reviewed in this chapter. We then draw conclusions regarding the potential for the site to continue in a self-sustaining way while retaining legitimacy and credibility.

4.1 Sustaining opportunities

A self-sustaining website incorporating Web 2.0 technology enables user agency, such that educators and professional staff can co-create content in the form of sustainability education knowledge and information. As sustainability educators are thought leaders and experts in their disciplinary domains, this enabling capacity provides the opportunity for the L&T site to be the leading source of sustainability education knowledge in higher education. Achieving this ambition requires that contributing members adopt regular pro-sharing behaviours in order to maintain the legitimacy, relevancy and credibility of content on the site.

Many of Australia's leading high-profile academics associated with the L&T of sustainability are already registered as contributing members. However, a strategy designed to support the enrolment of further numbers of these leaders across the sustainability field would enhance the utility and credibility of the site. High-profile academics require particular support to enable them as contributing members as they have already achieved academic status and are therefore less likely to be motivated to become active site contributors to attain further status. Furthermore, they are often the most time-poor for such activities as contributing to voluntary networks of practice due to the high demands of their usual academic practices. Engaging a critical mass of high-profile academics is a strategic opportunity for the site as it aids in maintaining its overall status, reputation and legitimacy.

Opportunities to further engage highly active contributing members will drive the generation of up-to-date content. Specifically two types of user profiles have demonstrated the greatest agency in this regard: (1) academics with a passion for embedding sustainability in the curriculum; and (2) catalysts (professional staff) with performance indicators related to L&T sustainability. Besides appealing to the altruistic motivations of such contributors, or offering award incentives (such as the Green Gown award), an opportunity exists to create formal incentives for topical contributions to be endorsed by universities and the higher education sector. For example, incentives could be offered reflecting the impact of sharing knowledge flows



for the advancement of sustainability education. For educators this could be in the form of individual biannual reports that, for instance, indicate:

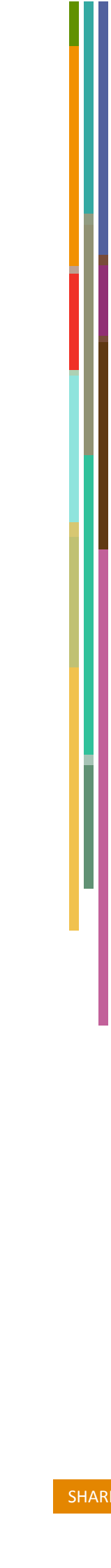
- the number of downloads of their contributed teaching material (indicating the frequency of usage of their knowledge contribution)
- the number of profile page visits and repeat visits (acting as a proxy indicator for the contributor's status)
- the number of follow-through page visits from their profile pages to the institutional homepage (indicating benefit to the institution obtained from the contributor's status)
- the results of the teaching materials survey regarding how users intend to use the knowledge they have acquired from particular teaching materials (indicating the broader impact of the contributed teaching material).

For catalysts where there is a specific incentive to acquire new contributing members, and to maintain the credibility and legitimacy of institutional information and course listings, incentives could be in the form of a biannual report detailing, for instance, the:

- number of new academics registered for their institution
- number of registered academics who have contributed knowledge or information to the L&T site
- number of page visits to institutional courses
- frequency with which updates have been made to course listings (for each institution this should occur on a biannual basis to ensure course listing information is up-to-date).

Such incentives, if endorsed by universities, would enable contributing members to perceive that their efforts are valued by their organisation. We suggest this is one way to enhance commitment and influence the adoption of pro-sharing behaviours. Bartol and Srivastava (2002) note that knowledge sharing behaviours that occur in social exchanges, such as those voluntary actions required to maintain the vitality of the L&T site, are more difficult to reward as they are less obvious. However, the end result of their effect on enhancing employee performance could be greater than in professional exchanges.

Studies by leading scholars have shown that communities and networks of practice are highly effective as means for sharing and developing knowledge which does not require a high level of coordination or management (Brown and Duguid, 2000, 2001). Pro-sharing behaviours that award status and reputation to individuals exemplify how this can work. The L&T site has the potential to enable a status mechanism based on the number of downloads of contributed materials as well as the feedback received via the teaching materials download survey. Prominent contributors can be featured on the homepage to further enhance their standing. Opportunity also exists for members' status to be become more widely recognised at the institutional level. Alternatively, contributing members could receive personalised reports showing key indicators of the influence of the material they have shared. The regular newsletter is one way the project team has awarded status to high-profile and regularly contributing members.



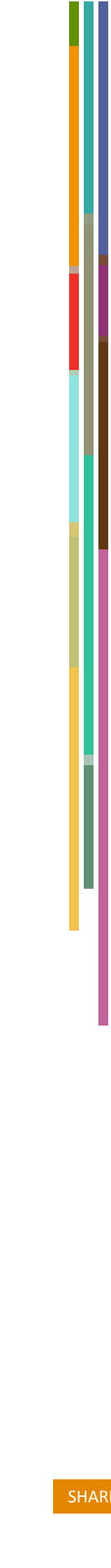
Given the site has provided a platform through which geographically dispersed members can identify and connect with one another based on sustainability interests, courses and types of teaching materials, there is great potential for knowledge sharing and development to continue. Through supporting and encouraging the contributions of the members most actively displaying pro-sharing behaviours, capacity for connectivity can be further leveraged. For example, online and face-to-face events focusing on contemporary sustainability issues could occur. These could be facilitated through the site. Educators with interest in an issue could be provoked to contribute by sharing their knowledge in relation to it. In this way, pages become available collective knowledge pools.

A trial strategy to expand the community to include international academics indicated strong interest from individual academics as well as existing networks (such as United Nations-sponsored organisations, Principles for Responsible Management Education and Global Responsible Leadership Initiative). This was evidenced by the traction of the social media strategy and the proportion of regular international visitors to the site. We have received feedback that no other such site exists internationally and therefore we assume that the L&T site sets a global precedent. An opportunity exists to develop formal alliances with international networks of practice. A further opportunity to expand globally would entail allowing overseas universities to have their own institutional presence on the site by enabling them to have a credential catalyst and an institutional homepage.

4.2 Sustaining challenges

A key insight from the research is that despite an espoused willingness and intention to share, this behaviour was only enacted by a small number of contributing members. If sharing behaviour was enacted, it was not always through regular engagement, but as a one-off contribution or registration only. Activation of agency in terms of pro-sharing behaviour relied on the voluntary and often spontaneous 'prosocial behaviour' of individuals. Connelley and Kelloway (2003) define prosocial behaviours as: '... positive social acts carried out to produce and maintain the well-being and integrity of others. Prosocial behaviours include the acts such as helping, sharing, donating, cooperating and volunteering.' Although knowledge sharing is typically not viewed as prosocial behaviour (it is usually considered directed behaviour), in the case of the site pro-sharing behaviour is categorised as prosocial due to the project team's lack of legitimate authority to direct knowledge sharing.

Key motivators for sharing behaviours have been defined as altruism, reputation and commitment (Wasko and Faraj, 2005). Very few previous studies have examined pro-sharing behaviours as knowledge sharing in the context of academic professions (see Ramayah et al., 2014 for a recent summary of these works). A study of an online network of practice for accounting academics found that altruism was the key motivator for knowledge sharing (Taylor and Murthy, 2009).



Predictably, key barriers often cited as limitations to prosocial behaviours were also found in relation to the L&T site. Challenges to the adoption of pro-sharing behaviours were time limitations and an absence of legitimate incentives, norms or routines where pro-sharing behaviours were an accepted component of usual academic practice. This finding is widely supported by the findings of other studies that prosocial behaviours are not practised widely among academics outside their specific discipline-based groups or local work context.

A shift to a new institutional logic (Thornton et al., 2012) of pro-sharing enabled by open knowledge flows and co-created knowledge pools is challenged by extant norms in the higher education sector. Individual academics remain bound by organisational norms and rules that disincentivise sharing organisational intellectual property. The dominant logic is to accumulate knowledge rather than facilitate the exchange and collective development of sustainability education through knowledge flows or an open-source knowledge commons.

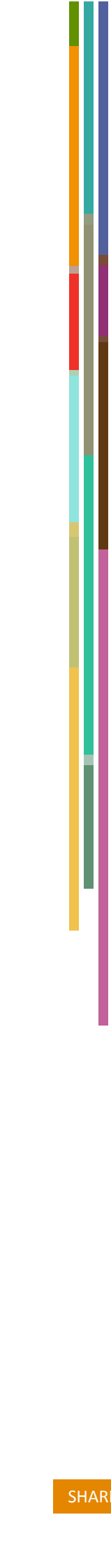
Despite the espousal of a willingness to share, it seems that the benefit of knowledge flows across disciplines for the purposes of developing L&T content is not well understood or widely practised. Academics develop their sustainability teaching materials within their specific disciplinary domains or for particular application tailored to their specific degree programs. Some educators felt challenged as to the incentive and motivation for sharing knowledge across disciplines.

The opportunity to facilitate sharing across disciplines and between organisations was unprecedented in the form of a single website. Actors had not developed structured exchange norms that evoked collective action for sustainability education, even if their endogenous predisposition was pro-sharing.

4.3 Insights for ongoing sustainability

While community members can effectively update content on the site to maintain relevancy, keeping the site dynamic requires ongoing maintenance, hosting and development, and an online community manager.

Domain hosting is a minimum requirement for any website to maintain a virtual presence. Recalling the analogy of the L&T site as a house, the site hosting is equivalent to paying rent. Ongoing regular maintenance is required to ensure that the site's functionality maintains integrity, that data is not corrupted through bugs and viruses, and that any software updates are installed as required. Ongoing renovations or enhancements can occur to improve the site over time. The site has additional security requirements to ensure that information remains credible, and, where data is open only to the community, security checks must be run. This is the equivalent of ensuring that the house and its contents are secure from unwelcome interference and intruders. Finally, as new technologies emerge, the site will have further opportunity for development. For example, Web 3.0 technologies may be integrated into the current design to further enhance the search functionality for individual users. Advanced data analytics can be installed to track the precise flows as users navigate



the site; this intelligence could be used to design more intuitive user pathways to make the site even more user-friendly for the most frequent visitors.

An online community manager is the second most important requisite for the ongoing sustainability of the site. The online community manager acts as the gatekeeper to authorise legitimate members and welcome them to the site; the event organiser to orchestrate social media campaigns and liaise with other event organisers in participating CoPs or networks to promote and disseminate their events; the friendly neighbour to intentionally engage in outreach strategies to acquire new members and update existing members on new materials added to the site, other network events and social media campaigns. Ideally, an accompanying face-to-face community development strategy would be maintained to complement the virtual platform. This strategy could be developed and implemented through: (1) a series of ongoing workshops to further advance knowledge in relation to sustainability education; (2) workshops to profile the latest courses, research and teaching materials in relation to a specific sustainability issue; and/or (3) to complement the virtual connectivity users attain through the site, deepen the strength and extend the diversity of connections between sustainability educators and professional staff.

Finally, further development of legitimate incentives for pro-sharing behaviour through the analytics built in to the site, distributed by the online community manager and endorsed by institutions or regulatory bodies would further incentivise altruistic and voluntary contributions to site content.

Key findings

- An online community of practice cannot be entirely self-sustaining.
- At a minimum the L&T site requires ongoing hosting, maintenance and development to maintain data security, integrity and credibility.
- An online community manager is essential to maintain the site as a vital nexus of interconnected CoPs and sustainability networks.
- A CoP strategy to stimulate periodical face-to-face workshops and seminars on themes or best practices in sustainability education can enrich and diversify virtual connections.



Chapter 5: Conclusions

Establishing the sharing of sustainability education through the L&T site by enabling and connecting a network of practice involved firstly a complete redesign of the site. The outcome is a site that allows users to co-create content through sharing knowledge flows related to sustainability education. The site has succeeded in attracting 233 registered educators, listing 1380 courses and hosting 130 teaching materials. On average the site receives over 1200 visitors per month – having built up from 200 when the site was taken over in 2011. Attaining this level of interactivity has occurred in the space of 18 months, since the site was re-launched in February 2013. Given the substantial barriers to open sharing in higher education and the absence of routine and incentivised pro-sharing behaviors, these achievements are significant. Importantly, enabling resources such as the site can attain the well-recognised benefits of a CoP across a geographically disperse practice community.

This report outlines a range of enabling and connecting strategies tested throughout this 18-month period, and reaches conclusions regarding the minimum requirements to sustain a sound network of practice. We draw broad recommendations that could apply generally to any L&T site that supports an ongoing network of practice.

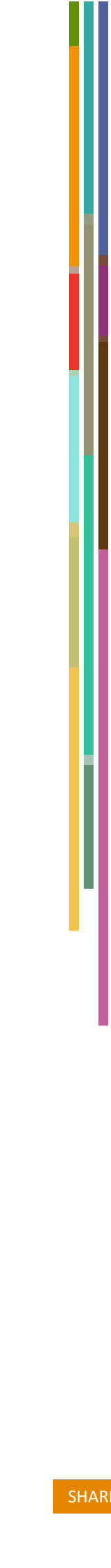
5.1 Sharing sustainability education

The open sharing model offers the potential for sustainability educators to engage with the principles of open knowledge flows that allow maximum utility of existing resources and translation of discipline-specific sustainability knowledge into other disciplines. The outcome is shared understanding that may progress systemic thinking about sustainability. This requires sharing the endeavours of our disciplinary ‘knowledge silos’ to allow open knowledge flows.

5.2 General recommendations

While the insights in this report relate specifically to tertiary sustainability education, similar conclusions have been reached by other researchers, particularly in relation to activating the agency of users to become contributing members of a CoP (van Dijck, 2009).

The internet is replete with archived websites that have lost their vitality. Like an abandoned house, these sites are still valuable. The L&T site will remain viable as long as users continue to create and modify content. More than a repository, the site actively produces knowledge.



We have summarised our intentions in this project in the following nine recommendations.

1. Devolving access to reputable users enables content co-creation and maintains vitality and currency of the L&T site.

Creating a website that enables members to keep content vital and up-to-date is a minimum but not sufficient criterion for enabling a self-sustaining online community. When the community is geographically disperse and structural incentives are not supportive of the pro-sharing behaviours required to facilitate knowledge sharing and content creation, then a community manager is required to broker, buffer and bridge communications. Facilitating and supporting educators to engage in pro-sharing behaviours expedites the acquisition of members and site content. Our findings are that keeping registered members connected through social media channels, such as LinkedIn and Twitter, successfully spreads up-to-date news on L&T events, research and practices, fostering a sense of connectivity between members.

2. An online community manager supports development of sharing behaviours to expedite membership and content acquisition.

3. An online community manager facilitates the spread of L&T news and the latest research between members through social media and newsletters.

Where knowledge flows supporting shared practices are the basis of enabling members to contribute content, then the enabling systems, rewards and incentives must activate the sharing of high-quality knowledge. In the open sharing economy, where these flows occur in mediated peer-to-peer exchanges or through a common pool, qualitative measures of reputation and status are more significant than monetary value. Our peer-leader strategy made the educator, rather than the sustainability issue, the impetus to motivate actors to engage in sharing behaviour. It became apparent that the reputation attributed to knowledge in sustainability education is a strong endogenous motivator to activate academics to adopt sharing behaviour. We suggest that how tertiary organisations translate the value of knowledge flows into non-monetary terms should become an avenue of future research.

4. An online community manager enhances the status and reputation of the site and publicly awards reputation and status credits to contributing members and high-profile academics.

The site administrators have an important role to play in maintaining the legitimacy and reputation of the L&T site by auditing and monitoring the co-created content. This is not a content creation role, but a content management role. This requires outreach to catalysts and educators at least once a year to remind them to update courses and teaching materials. It also requires facilitating workshops with disciplinary-based or issues-based leaders to update content regarding specific issues.

5. A curriculum content manager regularly oversees site content, facilitates the development and sharing of teaching materials and incentivises educators, catalysts and disciplinary/issue experts to update content.

The project team were not in a position to offer structural rewards to encourage pro-sharing behaviour. However, there are various monitoring mechanisms built into the site that could be used as structural incentives by universities or regulatory bodies to further incentivise pro-sharing behaviours. Examples include:

- The site tracks the number of teaching materials downloaded and surveys users regarding how they intend to use downloaded materials: universities could reward educators based on the impact of their work (based on number of downloads and type of reach to intended usage).
- The institutional profile cards can be enabled to show the total number of courses, educators and teaching materials each institution has contributed to the site: universities could use this feature to show the level of their pro-sharing behaviours and the quantity of resources they have available in the area of sustainability education (see Figure 5.1 below).

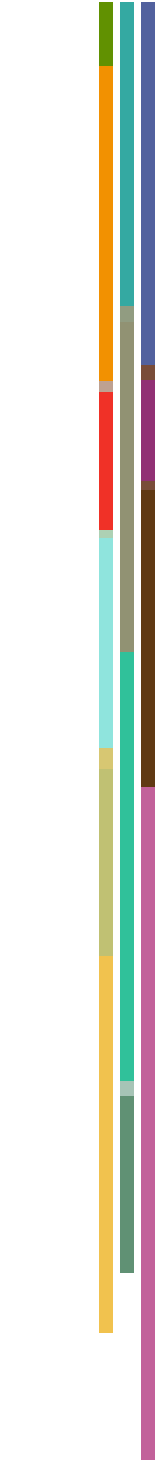


Figure 5.1: Sample profile card

6. The L&T site connects to structural incentives and rewards systems to encourage pro-sharing behaviour.

7. The L&T site is used to audit sustainability education by regulatory and voluntary compliance bodies that require sustainability integration for course accreditation.

The benefits of a self-sustaining network of practice are to spread knowledge flows efficiently through an online community, to enhance peer recognition of best practices, and for academics to be connected and up-to-date with the latest developments in their field. To avoid over-structuring the network, which would encounter resistance from many academics, pro-sharing behaviours must be encouraged through voluntary and altruistic motivations. This requires a fundamental cultural shift in the way open knowledge flows are valued.



8. To make online L&T sites self-sustaining, fundamental shifts towards openness, development of norms that foster a culture of sharing, need to be encouraged at the individual and organisational levels

The L&T site is hosted under an Australian education 'edu.au' domain. Unlike other domains, it is not owned by a university and acts as a shared resource. Yet the site itself requires hosting and maintenance. Additionally, the site is differentiated as it allows authorised users to create content and share it through a collective commons licence. Ensuring legitimacy and integrity of the site requires ongoing quality control. Developing an administrative body that operates as a foundation or non-profit association could be one way to continue governance of this shared resource. Furthermore, this body could have the potential to raise funds to maintain the ongoing hosting, maintenance and community development costs associated with the site.

9. To maintain integrity to the .edu.au site name an administrative body should be established containing members of the reference group, and nominated or elected representatives of contributing universities.

5.3 Enriching L&T practice

A L&T website such as the one created through this project provides an opportunity to enable co-created knowledge flows across a geographically disperse NoP. Given the public presence of the site and the high number of new and returning visitors from Australia and abroad, the site raises the prominence of L&T in Australia and on the international stage. The benefits attained from prosocial sharing behaviours in sustainability education inform L&T practices more broadly.

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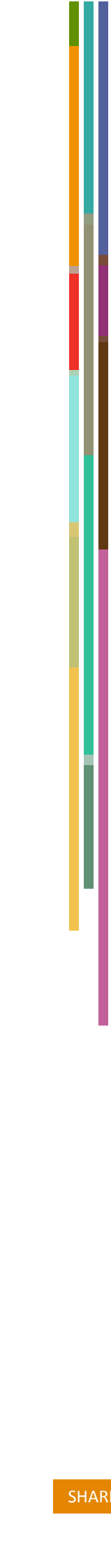
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Appendix A

1. What are your views on the significance of sustainability education in the design and delivery of your specialty curriculum?
2. Do you think sustainability education is a sound basis for interdisciplinary curriculum development?
3. What concepts or tools could you apply in your classroom that would allow it to be more interdisciplinary?
4. In the sustainability literature there is debate over the distinction between Education for Sustainability and Education about Sustainability. Do you see a distinction? Is this significant for the design of the website?
5. Is Sustainability currently a theme in your course curriculum?
 - a. Would you rate this as a strong or weak theme?
6. If yes to 1, can you identify which subjects exemplify sustainability themes?
7. How do you or your staff access leading sustainability education curriculum and materials in your disciplinary specialty?
8. Are you or your staff actively engaged in any L&T networks?
 - a. If yes, which one/s?
9. Are you or your staff actively engaged in any education for sustainability networks?
 - a. If yes, which one/s?

Appendix B – Sample Site Architecture and Wireframes

The site information architecture is developed to generate meet the following high level general design recommendations.

3. General design recommendations

- Clearly state the purpose of the website and the community of practice
- Create strong calls to action
- Maintain regular, high quality, curated content
- Expose relationships within the community between educators, Universities/VET and teaching materials
- Streamline content management for site owners and users
- Facilitate communication between community members
- Allow educators and institutes to build their profile overtime
- Showcase quality content and content creators
- Highlight ways in which users can engage with other members of the community

Below is an example of a preliminary information architecture for the website. This was modified during subsequent iterations to include additional header pathways.

Sprint 1 - Site Information Architecture (IA)

The following site map represents the pages that will be developed in the course of Sprint 1.

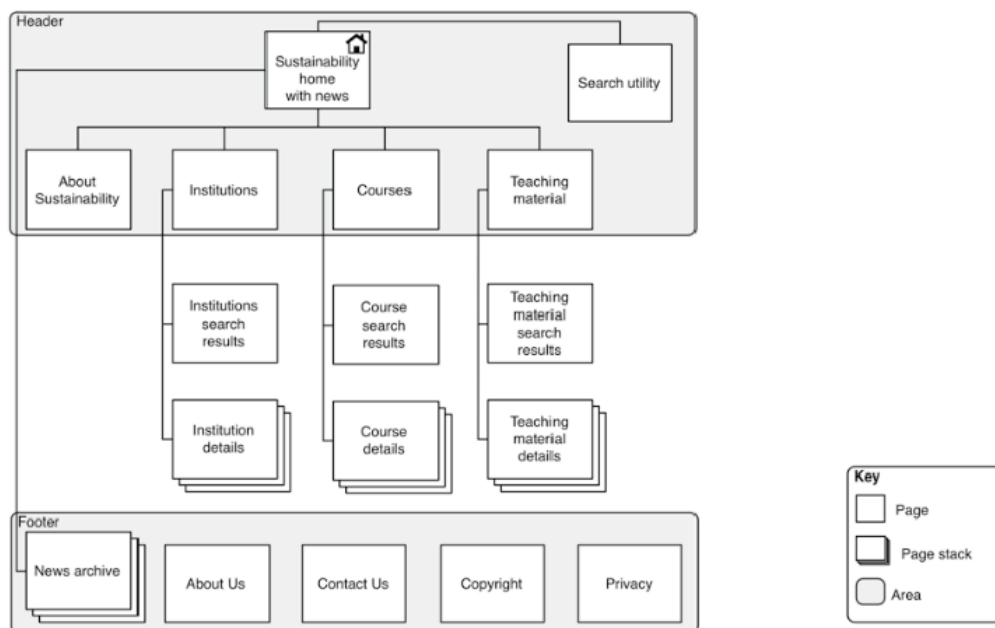


Figure 1 : Sprint 1 - sustainability.edu.au Information Architecture

Below is the initial wireframe that depicts how the typical member is directed to the internal architecture of the site once they log-in from the home page. This is depicted in blue.

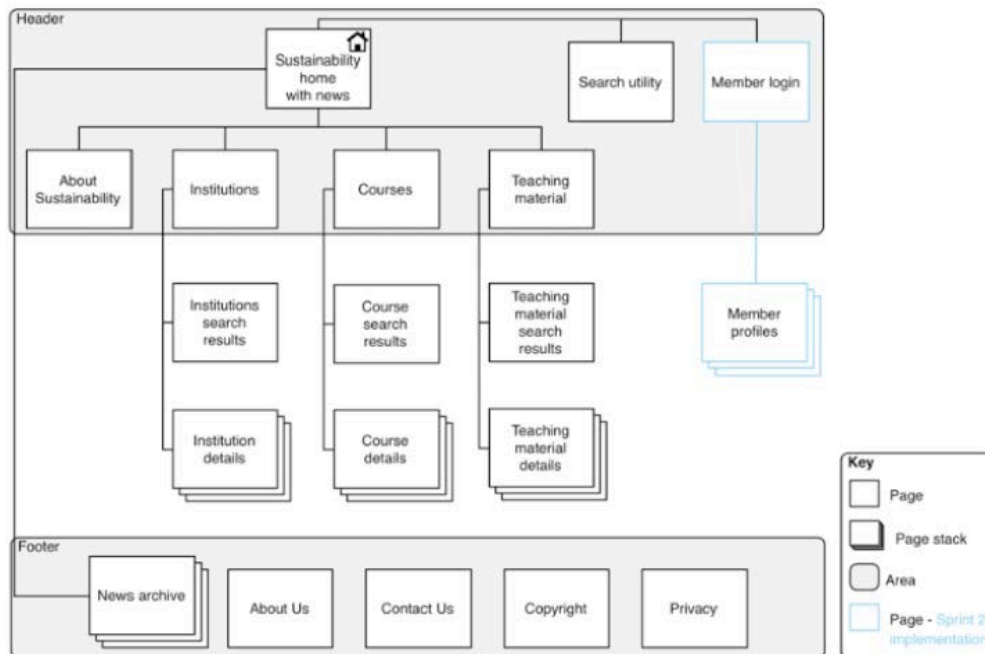


Figure 2 : Sprint 2 - sustainability.edu.au Information Architecture

For each of the pages, a page flow speculation is produced that maps the typical pathway a user might take to access information through the site. The example provided below is the typical pathway for the search to access a resource in the form of a teaching material.

Purpose

The teaching material details page is for other like-minded academics such as Dr Mark, Dr Suzie and Dr Romy to find sustainability teaching material, share their own teaching material and make them available for the 'Curriculum Award'.

The submission pages which members can use to submit their teaching materials will require a 'front end' presentation and will be resolved in sprint two.

Page flow

The following paths are available to access teaching material on the site. Pages marked 'a', 'b' & 'c' are included as wireframes below.

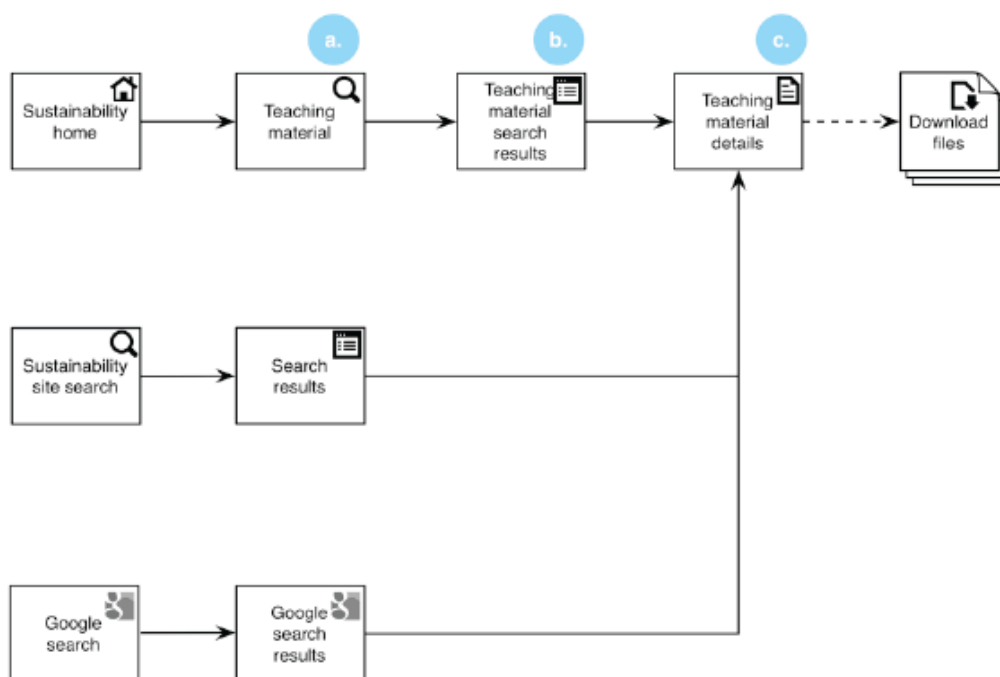




Figure 7 : Teaching material page flow

Wireframes are then developed for each page that provide a sample of the way in which information will be displayed on each page.

a. Teaching material search page wireframe




[About Sustainability](#) | [Institutions](#) | [Courses](#) | [Teaching Material](#)

▼ 

Teaching material

Short copy explaining the purpose of the teaching materials section of the site. This could also contain how the sustainability component has been incorporated into various teaching materials shard. Si veteres ita miratur laudatque poetas, ut nihil anteferat, nihil illis comparet, errat.



Submit your curriculum today to win. [Find out how](#)

Featured teaching materials

Teaching material title	Teaching material title	Teaching material title
Type Institution	Type Institution	Type Institution

Find teaching material

1. Select academic level

All
 Undergraduate
 Masters
 PhD

2. Select

Disciplines	Sustainability issues	Types
<input type="checkbox"/> Agriculture, Environmental & Related Sciences		<input type="checkbox"/> Engineering
<input type="checkbox"/> Architecture and Building		<input type="checkbox"/> Health, Medicine and Veterinary Studies
<input type="checkbox"/> Arts, Humanities and Social		<input type="checkbox"/> Information Technology
<input type="checkbox"/> Business, Management and Economics		<input type="checkbox"/> Law
<input type="checkbox"/> Creative and Performing Arts		<input type="checkbox"/> Mathematics
<input type="checkbox"/> Education		<input type="checkbox"/> Sciences

[News Archive](#) | [About Us](#) | [Contact Us](#) | [Copyright](#) | [Privacy](#)

Each of these pages is linked back to the user experiences that were generated through primary research with targeted user groups (see appendix C). Below is a sample of the type of needs that are satisfied through the teaching materials pages.

I want to find teaching materials by discipline, academic level and University/ VET	<p>Teaching material search results page</p> <p>1. I can search for teaching material by discipline and academic level</p> <p>Institutions pages</p> <p>2. I can look up a specific institution and see related teaching material</p>	To simplify the teaching material search function, we have included only three filter options and removed the option to filter by university.
I want to find teaching resources by discipline and issue	<p>Teaching material search page</p> <p>1. I can search for teaching material by looking up discipline or sustainability issue</p>	

I want to find credible and engaging teaching materials for students	<p>Global</p> <p>1. I can see link to 'teaching material search page' on each page of the site</p> <p>Teaching material search page</p> <p>2. I can access the 'teaching material search page'</p> <p>3. I can see introductory copy on the 'teaching material search page'</p> <p>4. I can see x featured teaching materials on the 'teaching material search page'</p> <p>5. I can select an academic level</p> <p>6. I can then select either a discipline, or sustainability issue or type</p> <p>7. I can submit the form and receive appropriate search results</p> <p>Teaching material search results page</p> <p>8. I can see the number of results and the terms I have searched for in the introductory copy</p> <p>9. I can see the terms I have searched for in a closed panels</p> <p>10. I see the further refinement options that are available to me in a panel that is open by default</p> <p>11. I can see a list of search results in alphabetical order (?)</p> <p>12. Each search result displays the 'title', 'type', 'university' and 'academic level'.</p> <p>13. I can click the 'show more' button to see more results appear at the bottom.</p> <p>Teaching material details page</p> <p>14. I see a brief overview about the 'teaching material'</p> <p>15. I can see copy regarding the intended usage of the teaching material</p> <p>16. I see a link to the teaching material's creator's profile page.</p> <p>17. I can download the associated files (the teaching material)</p> <p>18. I can see the 'sustainability issues' that this has been tagged with</p> <p>19. I can see other material that is related by virtue of sharing issues and academic level</p> <p>20. I can see other contributors to the teaching material</p> <p>21. I can see a panel with further details - type, discipline and academic level</p>	1. Featured teaching material is manually curated by the site administrators. It is intended that examples of best practice are elevated to the search page. The number of featured teaching material objects will be resolved in implementation
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Appendix C – Sample User Experience Specification

The following two graphics are samples of the user experience scenarios (UX scenarios) that were developed for different user profiles (termed personas). The UX scenarios then link to a specific story that outlines how a typical user might behave when they are accessing information through the site or needing to share their knowledge through the site. Preliminary concepts describe the website design features that could enable these behaviours. Different priorities were attributed to each one to inform the different stages of the L&T site development. The first (Figure C.1) sets out general user behaviours that were common to all of the profiles developed. The second (Figure C.2) is an example of a specific user profile.

All personas

Scenario	User story	Priority	Preliminary concepts
Sharing sustainability.edu.au	I want to share a human readable URL	Must	
Seeking to engage in a community of practice	I want to know who is already part of the community	Must	Universities/VET and Educator profiles.
Visiting sustainability.edu.au for the first time	I want to know “what this site can do for me”, “what can I contribute to it” and “How I use it”	Must	
Visiting sustainability.edu.au for the first time	I want to know who the site is owned and run by	Must	It is important to note previous site owners and supporters, as it adds legitimacy to the site.
Visiting sustainability.edu.au for the first time	I want to understand the purpose of the site	Must	A new primary navigation About section.
Sharing sustainability.edu.au	I want to share a page or resource on sustainability.edu.au with a friend/colleague via email	Should	Email a link to a friend.
Visiting sustainability.edu.au for the first time	I want a succinct summary of recent activity on the site, without visiting the site	Should	Email newsletter template.

Figure C.1: Sample UX Scenario for generic user profile

Professor Mark

Sustainability Expert - engaged, but time poor and already accessing information from a range of online and offline sources. He is interested in being profiled on the site as a PhD supervisor.

Scenario	User story	Priority	Preliminary concepts
Assessing the 'usefulness' of sustainability.edu.au	I want a succinct summary of recent activity on my profile, without visiting the website	TBC	Automated email that updates site contributors with quantitative and qualitative feedback on their site profile and resources.
Assessing the 'usefulness' of sustainability.edu.au	I want to confirm the site has an 'accurate' position on sustainability	Must	About section with key definitions, principles and concepts. High quality content on the homepage.
Assessing the 'usefulness' of sustainability.edu.au	I want to read about the sites position on copyright and content ownership	Must	Statement regarding copyright and ownership. Further exploration into creative commons required.
Assessing the 'usefulness' of sustainability.edu.au	I want to view the profiles of other sustainability experts	Must	Profiles accessible via Universities/VET pages, courses and resources.
Creating a profile	I want to create and view my profile on sustainability.edu.au	Must	
Assessing the 'usefulness' of sustainability.edu.au	I want to find content produced by my university	Should	University/VET listing and profile pages

Figure C.2: Sample UX Scenario for a specific user profile

Appendix D - Catalyst Invitation and User Guide

Email Invitation to Catalysts

Dear

I'm a member of the UTS/ISF team that has taken on development of the OLT-funded Learning & Teaching Sustainability website. The new sustainability.edu.au site is now live and we would like to invite UQ to participate in the site.

We have redesigned the site so that it is a portal for a community of practice in EfS. Each tertiary education institution has two levels of membership to the site. The first level is a "sustainability catalyst" and the second level is the "sustainability educators". (University Name) already has X educators registered on the site, but no catalyst (institutional administrator) to manage the (University Name) presence on the site, housed here: [http://sustainability.edu.au/material/institutions/\(University Name\)](http://sustainability.edu.au/material/institutions/(University Name))

I am writing to ask you to suggest a sustainability catalyst for (University Name). At UTS the sustainability catalyst is a role shared by Seb Crawford and Danielle McCartney in the sustainability office. Their job is to create and manage the uni's sustainability profile on the site and check whether the sustainability courses listed on the site are current and then to encourage academics teaching sustainability to register on the site. I describe the role in more detail below.

Please let me know your thoughts
Kind regards, Tamsin

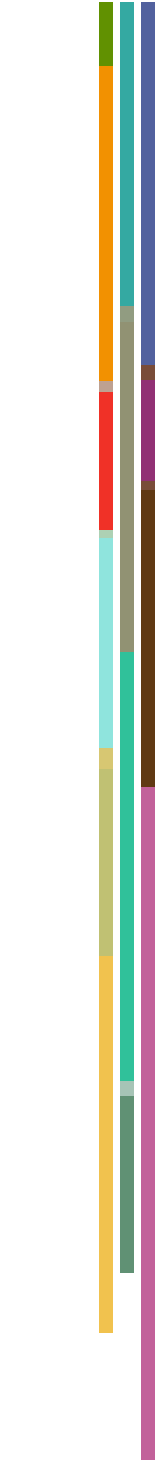
What is a sustainability catalyst?

As a catalyst you will be part of a select group who will grow and shape the sustainability curriculum community in Australia. You are someone who is passionate about sustainability and knows others in your institution who share our vision. You will be the hub of this network. To activate the network there are a few small things we ask you to do to build the foundations to enable others in your institution to join. There will be a small amount of time involved in this initial set-up, but after that your role will be act as a centre point for the growth of sustainability curriculum in Australian tertiary education institutions.

Why a community of practice for sustainability education?

We know many educators who are passionate about sustainability and increasingly incorporating sustainability into the courses they currently teach as well as developing new courses dedicated to sustainability. However they are often working alone and recreating the wheel, thinking up class exercises and ways to engage our students with sustainability. Community is a big part of sustainability, wouldn't our work be better and easier if we work together?

The website sustainability.edu.au was established by UWS 2 years ago under ALTC



funding as a place to collect and list the many sustainability courses taught in Australian universities. Input from Australian unis was high but inevitably the course list became out of date. The logical next step is to develop the site into a place where universities - and increasingly TAFEs - participate in the site, keeping courses up to date, and co-creating the community by sharing teaching materials.

What's involved with being in this community of practice as the catalyst?

Once you have agreed to be your institutional catalyst you will receive a special log-in and password to the site that will allow you access to your institutional control homepage. From here you will be able to upload your university profile and encourage academics from your institution to create their own profiles. Each institution has a profile that looks like a name card on the site.

The institutional homepage will be a way for your university to profile their sustainability courses and best practice sustainability curriculum. Searchable on the web – it will be a place where potential students may be attracted to your campus and where academics can share best practice. Click here to see a sample institutional profile:

<http://sustainability.edu.au/material/institutions/university-of-technology-sydney/>

As the catalyst you have the capacity to edit the institutional profile, to approve and delete courses and academic profiles from your institutional profile, and to feature your best practice courses and curriculum on your institutional homepage.

We will help you learn the basics and are here to provide you with advice and support as the network grows. You can also change over the catalyst role with another member of your institution at any time.

The first step is to join us and agree to be a catalyst in this exciting community.

User Guide for Catalysts

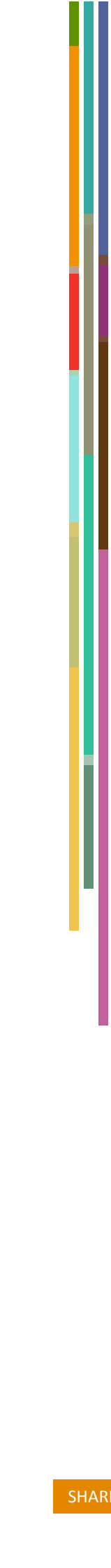
WHAT YOU CAN DO AS A SUSTAINABILITY CATALYST...

LOG –IN to www.sustainability.edu.au using the log-in we send you. From the menu, click "Profiles". Click on your admin profile name, e.g. "Holmesglen Institute of TAFE Admin". In the "Email address" box, delete the current email and insert your own email address where you would like notifications to be sent to. Scroll down and click "SAVE".

START out by creating a welcoming homepage for your institution.

Your log-in gives you control over the way your institution is represented on the site.

INSTITUTIONAL HOMEPAGE



Firstly, you might like to create a welcoming place for your institution on the site. Once this is created you will be able to link in practitioners from your institution and add and update current sustainability courses. When you log-in go to your institutional homepage and fill out the details. You will find the page here:

<http://sustainability.edu.au/admin/academiccontent/institution/>

You'll need about 150 words describing the institution's strategy and initiatives in terms of operations, L&T and research. Make it sound appealing to potential students and members of the public who might be perusing the site. A picture tells a thousand words - post a photo of the institution that reflects its green image. This image becomes the main face of your institution on the site. You can use the UTS profile as a guide here:

<http://sustainability.edu.au/material/institutions/university-of-technology-sydney/>

THEN be a catalyst for sustainability-engaged academics in your institution

Your second role is to be a catalyst for academics to register on the site, upload their sustainability courses and teaching materials. The numbers of courses, educators and teaching materials on the site from your institution show up on your institution's "name card".

COURSES

Click here <http://sustainability.edu.au/admin/academiccontent/course/>

You will see the list of courses from your institution that are already on the site. These are a starting point. They may be out of date or need more targeted information.

There are new fields to add. The main question that potential students will have is "how will this course add to my qualifications in sustainability?"...You can use the UTS course listings as a guide. For example see:

<http://sustainability.edu.au/material/courses/21832-managing-sustainability/>

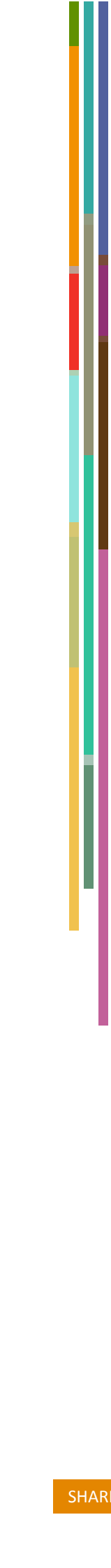
You will be able to select courses to profile on your institutional home page.

EDUCATORS

We are also contacting educators directly, and many are already involved with the site, but your role is to approve their registration on the site, co-ordinate their efforts to update courses already on the site and upload new courses. Start with the courses already on the site, as a prompt to educators at your institution. Ask them to recommend other sustainability educators who teach sustainability courses. In order to upload their courses, educators will need to register on the site. When they do, you will receive an email notification.

To approve or make an educator "Active":

1. Log in to www.sustainability.edu.au.
2. From the menu, click "Profiles".
3. Click on the name of an educator to review their profile.
4. Once you are happy to approve them, return to the Profiles menu and click the "Active" box next to their name.
5. Scroll down and click "SAVE".
6. Email the educator the PDF instructions for sustainability educators, which you



would have received upon being nominated as catalyst.
You will be able to profile academics on your institutional homepage.

TEACHING MATERIALS

Educators themselves will be responsible for uploading their teaching materials which they can only do when they are registered on the site. They can choose to have these materials viewable only by other educators, or they can choose to share them publicly. Other members of the site can download materials, comment on them and recommend them for the curriculum award. Comments cannot be seen by unregistered visitors to the site. In this way educators share and add to each others' teaching materials, under a Creative Commons agreement (see here: <http://sustainability.edu.au/terms/>). You will be able to profile featured teaching materials on your institutional home page.

SOON AFTER, tell us what you think.

We will be contacting you soon to receive your feedback and suggestions for creating continued momentum in the community of practice on the site. But in the meantime you can contact us with your suggestions.

+ Do you have a contribution to make to the issues pages? They are accessible through this page: <http://sustainability.edu.au/about-sustainability/>

You will see they are all quite bare aside from the energy efficiency page that was supported by the National Framework for Energy Efficiency (NFEE). We hope to co-create these pages with you over the oncoming months.

+ Would you like to recommend academics or courses to be profiled on the main webpage?

+ Have you news related to conferences, events, topical issues that you would like to share with the community?

HELP DESK

Use the UTS profile and course listings as a guide. If you have any questions or encounter any difficulties, email Tamsin Angus-Leppan on Tamsin.angus-leppan@uts.edu.au

In the spirit of community! Many thanks from,
Suzanne Benn, Melissa Edwards and Tamsin Angus-Leppan

-End of Form-

Appendix E - Educators Information Sheet

WHAT YOU CAN DO AS A SUSTAINABILITY EDUCATOR on www.sustainability.edu.au

Welcome to the sustainability community of practice. By joining this site, you form part of an emerging community of educators who are passionate about embedding sustainability into tertiary curriculum and dedicated to learning approaches that develop sustainability capabilities.

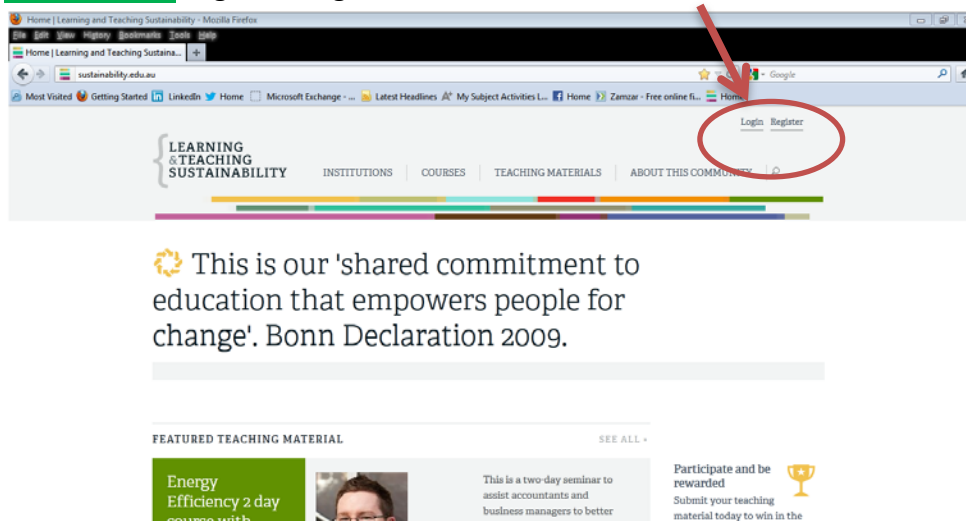
Because you are joining us, this community will grow. Our shared vision for this community is to:

- + Make visible the courses we offer in sustainability across every discipline. We can apply institutional pressure to practice education for sustainability in every tertiary course.
- + Share news on advances in education for sustainability on contemporary issues.
- + Share and profile best practice teaching materials. So our colleagues can easily learn how to embed sustainability into their curriculum. By sharing your materials on the site you could be eligible to enter the Green Gown award for Learning & Teaching.
- + Recognise and connect experts in the diverse fields related to sustainability.
- + Provide pathways for students into sustainability careers.

We only achieve these aims through your active participation. The site acts both as a repository and information source. Over the next year the site will develop through a series of interactive seminars where you decide the content. We welcome your contribution and hope to facilitate your voice.

**Log-in or register
here**

TO START Log-in or register



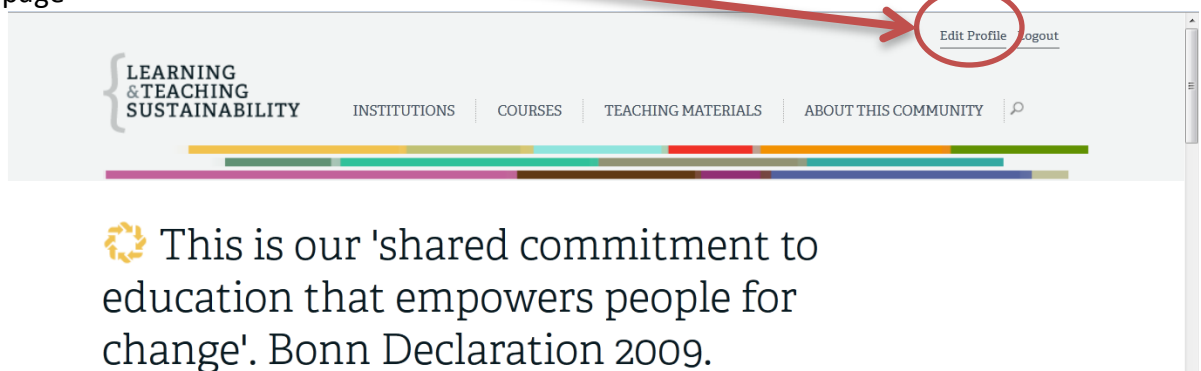
The screenshot shows the homepage of the Learning & Teaching Sustainability website. The navigation menu includes 'INSTITUTIONS', 'COURSES', 'TEACHING MATERIALS', and 'ABOUT THIS COMMUNITY'. The 'Login Register' link is circled in red, with a red arrow pointing to it from the 'Log-in or register here' text box. Below the navigation, there is a quote: 'This is our 'shared commitment to education that empowers people for change'. Bonn Declaration 2009.' Underneath, there is a section for 'FEATURED TEACHING MATERIAL' with a 'SEE ALL' link. The featured material includes a green box for 'Energy Efficiency 2 day course with', a photo of a man, and a text box describing a two-day seminar for accountants and business managers. To the right, there is a call to action: 'Participate and be rewarded. Submit your teaching material today to win in the...'

Your log-in gives you control over how you are represented on the site. It allows you to upload materials and courses. You can also download materials and make comment on the materials you access.

If you are registering for the first time you will need to wait for approval from your institutional catalyst before you can get started on the site. The catalyst is the person at your institution who is helping to grow the sustainability community at the institution you have registered with. Contact us at ausustainabilityedu@gmail.com if you want to find out more about your institutional catalyst.

THEN Get active in the community through the site.

When you log-in click on '**edit profile**' in the top right of the screen to go to your home page



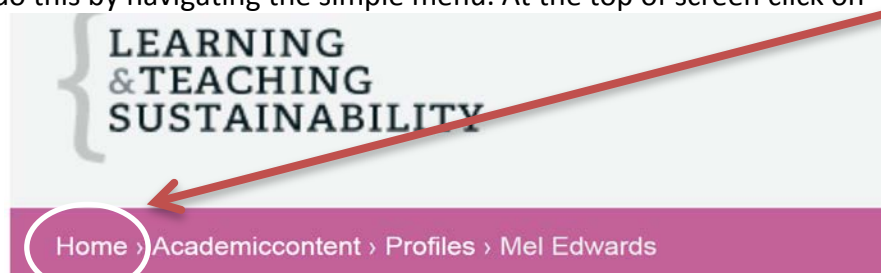
YOUR PROFILE

Check that the details on your profile are correct. Make your profile description specific to your experience as a sustainability educator. If you make any changes be sure to click 'save' at the bottom of the screen.

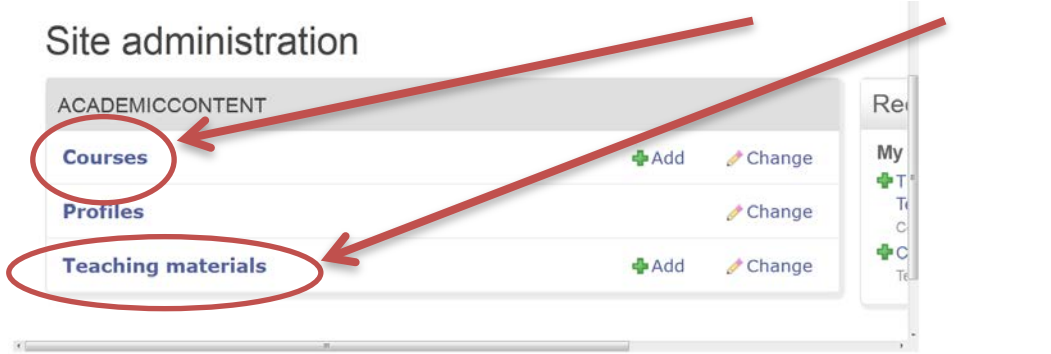


YOUR COURSES AND TEACHING MATERIAL

Now you are ready to submit sustainability teaching materials and courses to the site. You can do this by navigating the simple menu. At the top of screen click on '**Home**'



From this home screen (below) you can add/change 'courses' and 'teaching materials'.



COURSES

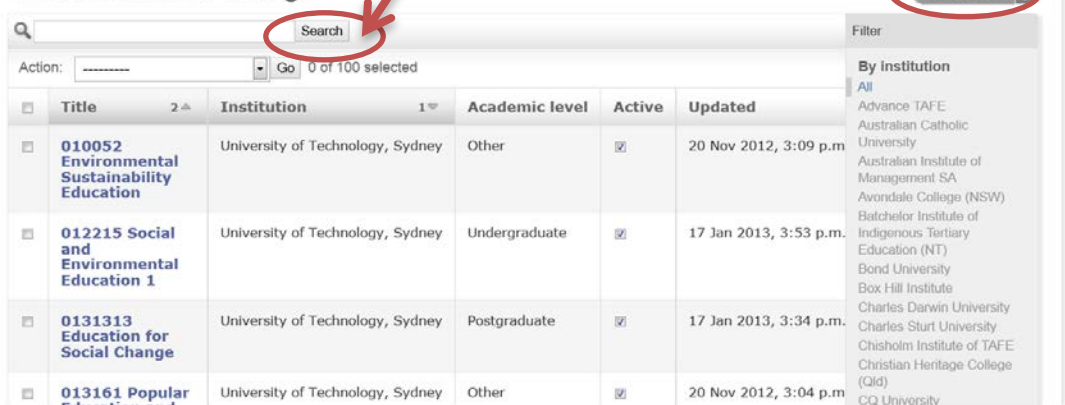
You can only see/add courses to your institutional profile page (for eg. UNSW users can only add UNSW courses). Courses will also be checked by your sustainability catalysts before they are approved as 'active' on the site. We recommend you first check to see that the courses you teach are on your institutional list and up-to-date. Do this by clicking on 'change' on your home page.

Site administration



On the course listing page you can search for your subject/course by name. And then 'add course' if you cannot see it.

Select course to change



If you select 'add course' please note the following information regarding specific entry fields:

'URL location': Do not change the text in this box. It fills automatically.

'Description': Remember a student may locate your course through the text in this box. Explain if the listing is for a course or a subject. Is it a compulsory subject in a degree structure or can students take it as an elective? Is it a stand-alone degree?

How can students enrol in the subject/course? Make the sustainability angle/content explicit. If the course is a generic subject what are the specific learning objectives that relate to sustainability? What about outcomes? What is the career path out of this subject/course/degree?

Once approved, each course listing is searchable through the web engine on the sustainability.edu.au site, but also has it's own unique URL that you can use as a direct link to the subject/course you teach. For example:

<http://sustainability.edu.au/material/courses/sustainable-energy-use/>

'Course Link': a direct URL link to your institutional page for this course. The more specific you are, the better. Remember this may need updating if your institutional pages change.

MAKE SURE YOU CLICK 'SAVE' ONCE YOU HAVE FINISHED.

TEACHING MATERIALS

Adding teaching materials is the main way you can add value to this community.

Through the sharing of materials from leading educators across Australia we can create a vibrant, influential and authoritative place to go for sustainability inspiration. The more accessible and 'ready-to-use' the materials we share, the more likely we will see the growth of sustainability in the curriculum. We can make visible the simple ways in which sustainability can be embedded within any discipline. As we have a developing partnership with Australian Campuses Towards Sustainability (ACTS), you may also be eligible to enter your teaching materials for a Green Gown Award in Teaching and Learning.

To add teaching materials from your home page click 'add' next to 'teaching materials'.

Site administration



When you are on the 'add teaching materials page' some important tips in relation to the specific fields are:

'URL location': Do not change the text in this box. It fills automatically.

'Description': Include here any useful information regarding the learning outcomes of the materials, how they are used in your course/subject, and useful information other educators may use to implement/adapt the materials.

'Course': Make sure you link it to the course you teach so that the materials will also be accessible when people view your course listing. This is also an important field if you want the materials to be added to the profile page of your institution. By connecting with a course your material is automatically added to your institutional homepage. If the materials are not linked to a course, you may leave this section blank.

'Teaching material documents': The 'Title' you insert (see below) becomes the link for users to download or access the teaching material. If the teaching material is a

document, click 'Choose file' to upload it. If the teaching material is a link to a website, copy the URL link into the 'URL' box. You may upload multiple teaching materials if several materials are applicable under the same title.

Teaching material documents		
Title	Document	Url
<input type="text"/>	<input type="button" value="Choose File"/> No file chosen	<input type="text"/>
<input type="text"/>	<input type="button" value="Choose File"/> No file chosen	<input type="text"/>
<input type="text"/>	<input type="button" value="Choose File"/> No file chosen	<input type="text"/>

[+ Add another Teaching Material Document](#)

'Enter into Curriculum Awards': make sure you click this box if you want your resource to be considered for the Green Gown awards selection.

'Invite my contributors to join': here you can send an email to invite contributors who are not already registered on the site to join. When they have signed up you can add them to the teaching material.

HELP DESK

Use the UTS profile and course listings as a guide. If you have any questions or encounter any difficulties, email ausustainabilityedu@gmail.com

In the spirit of community! Many thanks from,
Suzanne Benn, Melissa Edwards, Tamsin Angus-Leppan

- End of Form -

Appendix F - Sample Newsletter

Web Version | Update preferences | Unsubscribe Tweet Forward

LEARNING & TEACHING SUSTAINABILITY | ABOUT SUSTAINABILITY | INSTITUTIONS | COURSES | TEACHING MATERIALS

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- Welcome to the first Learning & Teaching Sustainability Newsletter
- New teaching materials
- Use the materials and start a conversation
- Not sure what to contribute?
- Calling all specialists
- Join a Conversation about Sustainability in Tertiary Education

IN OTHER NEWS

Congratulations to the winners of the Green Gown Award for Learning & Teaching, sponsored by www.sustainability.edu.au



Winner: **Nick Barter** ,

Welcome to the first Learning & Teaching Sustainability Newsletter

The aim of the **Learning & Teaching Sustainability website** is to build capacity around teaching and learning sustainability and to provide information on sustainability related courses in Australian tertiary institutions.

In this newsletter we draw your attention to new teaching support materials available on the **website**. We also hope to encourage you to share some teaching and learning materials with other members of this online community. You will be able to count the downloads of your materials- in less than six months, the teaching materials contributed by **Paul Brown** have been downloaded over 3000 times!

New teaching materials



Many thanks to **Paul Ehrlich** (pictured at left with fellow environmentalist **Dick Smith**), **David Karoly**, **Ian McGregor**, **John Thwaites**, **Helen Ross**, **David Schlosberg**, **Lesley Hughes**, **Thomas Clarke**, **Geoff Scott**, **Suzanne Benn**, **Jeremy Moon**, **Michael Smith**, **Carol Adams** and **Chris Riedy** for adding new teaching materials during November.

Use the materials and start a conversation

Director, "Griffith MBA"

Highly Commended: University of Tasmania "UTAS' Academic Operations Sustainability Integration Program"
Highly Commended: University of Technology, Sydney "Accountants: The New Climate Change Warriors"

Happy Holidays!

From the Learning & Teaching Sustainability website team at UTS Business School: Prof Suzanne Benn, Dr Melissa Edwards, Dr Tamsin Angus-Leppan and Rosemary Sainty



The Dr Chau Chak Wing Building, UTS Business School, due to open 2014

COMMENTS

Your comment:

COMMENT

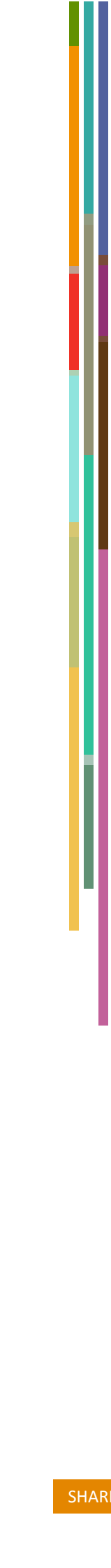
[Melissa Edwards](#) commented on 25 Mar 2013, 5:42p.m.

The development of a learning framework in this presentation is an interesting and thought provoking theoretical development.

This [Office of Learning and Teaching](#) funded website is designed to enable interaction between members through sharing teaching materials and providing feedback. When you [log in](#) and download teaching materials on the site, why not take the opportunity to leave a comment? Start a conversation about teaching sustainability, tell your peers how you have used the material and let the author know how useful it was.

Not sure what to contribute?

Anything you put on the site that might help your peers develop or implement sustainability across the tertiary curriculum is valued. A [case study](#), a [video](#), an [assessment tool](#), [lecture slides](#), a [teaching toolkit](#), an [experiential activity](#) - log in to the site and [share them](#). They don't have to be award winning curriculum to be useful for your fellow educators. Your contributions to this site are protected under the [Creative Commons](#) licensing system for the protection of [intellectual property](#). You can choose to share your materials publicly or only with your peers who are members of the site.



If you have a twitter account you can send your news alerts by including our handle on your tweet.

Join a Conversation about Sustainability in Tertiary Education

On Thursday 20th February 2014 **La Trobe**, **CSU** and **UTS** are collaborating to host a forum titled '**Education for Sustainability in the Tertiary Sector: What have we learnt, Where to next, What resources are available?**'. The forum, initiated by **Colin Hocking** will feature **Geoff Scott** as the keynote speaker to discuss **Turnaround Leadership for Sustainability in Higher Education**. The remainder of the forum will be dedicated to sharing progress and discussing future plans regarding how to embed sustainability into tertiary curriculum. This will lead into plans for a forum, stream or roundtable for the 2014 **AAEE** and **ACTS** conferences. The Learning & Teaching Sustainability website will host resources and outcomes of the workshop. **CLICK HERE** for more information and to register your interest in attending.

You're receiving this newsletter because you registered on the Learning & Teaching Sustainability website

[Edit your subscription](#) | [Unsubscribe](#)

- End of form -

To find a copy of another newsletter please follow this link:
<http://createsend.com/t/d-71AD11718ABD8CEE>

Appendix G - Article in The Australian

iSENTIA
INFLUENCE • INFORM • INSIGHT

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(www.copyright.com.au)



The Australian, Australia
19 Feb 2014, by Andrew Trounson

Higher Education, page 31 - 512.32 cm²
National - circulation 116,854 (MTWTF)

ID 237804924

PAGE 1 of 1

Online push puts materials in mix for all

ANDREW TROUNSON

CROSS-DISCIPLINARY learning will drive the sharing across institutions of teaching materials and courseware, says Suzanne Benn.

Professor Benn is involved in an online project that is fostering collaboration across all Australian universities and some TAFEs in the teaching of sustainability. It's an area that cuts across many disciplines, including science, the environment, business, architecture, law and health. And, according to Professor Benn, the approach is likely to work well in other cross-disciplinary areas.

"This is going to be the way of the future, I think," said Professor Benn, who is professor of sustainable enterprise at the University of Technology, Sydney.

Driving the project is an underlying philosophy of the "sharing economy" that has been promoted by the advance of information technology. Professor Benn said the project team had stepped beyond massive open online courses, where individual universities put courses online, to create a "community" that develops common materials for all to use under a creative common agreement. "This is about raising the bar," she said.

UTS is co-ordinating the website at www.sustainability.edu.au, which includes course outlines, assessment tools, tutorial exercises and PowerPoint presentations. It also has an open space for academics to discuss approaches and work together to create ma-

terial and design courses.

One UTS business academic, Paul Brown, has had his material downloaded more than 3000 times.

"Universities have come to realise that it is in such an interdisciplinary area that they need to co-operate and share," said Professor Benn.

She said it was easier to break down discipline-based silos by operating across universities than within a single institution. The site will also give students insight into differing approaches to the teaching of sustainability in different institutions.

The project, which began with a modest grant from the Office of Learning and Teaching, has just been boosted by a further

\$320,000. About 60 universities and TAFEs are involved, with 200 individual teachers. There are plans to bring in international educators.

Professor Benn said collaborating on teaching materials and approaches did not mean there would be a sameness across the sector. Instead, the project was a community of academics to constantly invigorate and improve teaching.

"Universities will continue to differentiate themselves in terms of area of speciality and reputation. Universities are still going to be identifiable as different according to their expertise and research capacities in different areas," she said.



FABRIZIO AMELTON

The cross-disciplinary project is aimed at fostering collaboration across all Australian universities and some TAFE institutes in the teaching of sustainability