

Keeping within Earth's ecological limits

A conservation management curriculum for e-learning about living sustainably

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Abstract

The paper gives the background to international moves towards education change for living sustainably. In particular, it summarises the commitment of the UK Conservation Management System Consortium (CMSC) to develop an on-line e-learning conservation management curriculum. This curriculum is centred on the CMSC's conservation management system for making, recording and reporting on management plans. This management logic can be applied to action plans by communities and organisations for the entire range of issues of sustainable development

The four pillars of the conservation management curriculum deal with managing consumerism to keep a rein on consumption, managing human production to keep a reserve of resources, managing ecosystems to maintain a richness of nature and managing community plans for future neighbourhood resilience. The curriculum addresses the theme of ~~keeping within Earth's~~ ecological limits presented as a mindmap which is integrated with modules for on-line e-learning. An educational model of the delivery plans of the Welsh Assembly Government's climate change strategy has been produced as a practical management model, which links strategic thinking with operational objectives at grass roots level as the policy is developed year by year.

There are three appendices. One introduces the four pillars of the conservation management curriculum through a case study of the rise of consumerism; another reviews international and local moves towards sustainability curricula; the third gives examples of showing how individual bodies of knowledge about conservation management may be assembled and presented as on-line wikis.

1 Background

Virtually every activity we engage in presumes some future continuation in time. Whenever we have aims, ambitions, take precautions, speculate or make commitments, we are concerned with the future. Without some sense of the future we could not even begin to articulate our hopes and dreams, let alone realise them. In contrast to the notion of social learning in general, learning for living sustainably focuses on developing a capacity to manage options. It requires managing actions in organisations, communities and families for the adaptation of human societies to the limits and changing conditions that arise from their own social-ecological systems. It entails becoming increasingly aware of the unintended negative consequences of collective action upon life-support systems and being capable of anticipating and managing those impacts. New educational frameworks are needed that present such futures and provide opportunities to plan critical and creative, 'out of the box' managerial thinking about cultural and ecology.

This thinking was behind *cultural ecology* which emerged as an idea for a new academic subject from student/staff discussions during a zoology field course on the Welsh National Nature Reserve of Skomer Island in 1971. These discussions originated within a group of students who were dissatisfied with the narrow view of world development taken by single honours science subjects. Surprisingly, the idea was enthusiastically taken up by staff in the pure and applied science faculties as the philosophical thread for an honours course in Environmental Studies organised in Cardiff, during the 1970s. This course integrated the inputs from eleven departments, from archaeology, through metallurgy, to sociology and zoology. The cross-faculty commitment to participate came from a shared understanding that education must be completely redesigned, from top to bottom, to produce mindsets and skills so that current systems of industrial and technological development can be re-imagined and re-created in ways that no longer rely on non-renewable resources, use natural resources at non-sustainable rates, or cause harm to people or the natural world, now or in the future. The practical work was exemplified by environmental management schemes which had begun in South Wales to deal with the widespread detrimental impact of a hundred years of unfettered mineral extraction.

Late in the decade this course was evaluated by a group of school teachers under the auspices of the University of Cambridge Local Examination Syndicate (UCCLES), and emerged as the subject '*natural economy*' (the organisation of people for production). Natural economy was launched by UCCLES to fulfil their need for a cross-discipline arena to support world development education.

Natural economy was also disseminated from Wales throughout Europe as part of the EC's Schools Olympus Broadcasting Association (SOBA) for distance learning. Through a partnership between Cardiff University, the UK Government's Overseas Development Administration and the World Wide Fund for Nature, it was published as a central component of a cultural ecology model of Nepal with the help of a sponsorship from British Petroleum.

During the 1980s, an interoperable version of natural economy for computer-assisted learning was produced in the Department of Zoology at Cardiff, with a grant from DG11 of the EC. This work was transferred to the Natural Economy Research Unit (NERU) set up in the National Museum of Wales towards the end of the decade.

In the 1990s NERU obtained a series of grants to integrate natural economy into a broader cultural framework. This initiative came in 1994 from a meeting of academics and teachers sponsored by the Countryside Council for Wales, Dyfed County Council, and the local Texaco oil refinery. The partnership was based in the St Clears Teacher's Resource Centre. From here, a successful award-winning pilot was led by Pembrokeshire schools to create and evaluate a system of neighbourhood environmental appraisals, and network the local findings from school to school. The objective was to promote practical conservation management through environmental appraisal and the long-term management of neighbourhood historical assets, green spaces and community services to promulgate a sense of place, improve quality of life and enhance biodiversity.

The scheme adopted the acronym SCAN (schools and Communities Agenda 21 Network). SCAN's aim was to help teachers create bilingual systems of appraisal within the National Curriculum to evaluate 'place' (historical, geographical, biological, and notional). The practical objective was to address environmental issues which emerged from the appraisals in the context of their community's Local Authority Agenda 21. You can reach SCAN in the National Museum of Wales at <http://www.museumwales.ac.uk/scan>

This work was boosted by the adoption of Agenda 21 by world leaders at the Rio environmental summit in 1992 when the syllabus was reorientated towards conservation management as a response to the need for environmental justice. The need was set out by Orr in 1994.

“Those now being educated will have to do what we, the present generation, have been unable or unwilling to do: stabilise world population; stabilise and then reduce the emission of greenhouse gases, which threaten to change the climate, perhaps disastrously; protect biological diversity; reverse the destruction of forests everywhere; and conserve soils. They must learn how to use energy and materials with great efficiency. They must learn how to utilise solar energy in all its forms. They must rebuild the economy in order to eliminate waste and pollution. They must learn how to manage renewable resources for the long run. They must begin the great work of repairing as much as possible, the damage done to the earth in the past 200 years of industrialisation. And they must do all this while they reduce worsening social and racial inequities. No generation has ever faced a more daunting agenda”. (Orr, 1994, p.26).

With the passage of time and a whole continent away, at the start of a new century it was being argued similarly that a curriculum for living sustainably should be adopted as early as possible in the tertiary education sector. This emerged in the Spring of 2002 when twenty two staff of the University of Massachusetts, Amherst, testified to the need to develop a sustainability curriculum to serve the needs of the next generation of students graduating from American public universities. They acknowledged that at least one generation will be needed to build learning communities and social structures in order to

support the changes that must occur in our daily lives as we learn to live more sustainably on the planet. The syllabus proposal clarified core community values so that science and technology would be guided to serve the needs of present and future generations. This work will require skills, knowledge and wisdom not currently central to the academic enterprise.

The Amherst group recognised that future graduates will be faced with an unprecedented challenge to redesign nearly every major natural resource based system on the planet. They will inherit systems of industrial and technological growth that are simultaneously destroying or depleting much of nature and endangering human and non-human species, while offering the highest material standard of living and rate of consumption ever known. Education for sustainability will be needed to help redesign food and farming, energy production and consumption, and waste handling and reuse systems. Graduates in the future will also need to understand complex food and agricultural systems at the population, community, and ecosystem levels. Studies of social systems must complement studies of biophysical systems at these higher levels of complexity. Therefore, to achieve the necessary behavioural changes to live sustainably a new set of interdisciplinary academic and experiential education will be required.

Amherst academics therefore proposed that a new tertiary level Sustainability major be developed by the Department of Plant and Soil Sciences in cooperation with other appropriate academic units. What follows is a summary of the CMSC's progress in developing such a holistic educational resource based on its planning system that has been widely adopted as a UK/European standard tool for conservation management . The aim is to produce a self-contained body of knowledge which brings together ~~environment~~ production and ~~equity~~ under the logic of setting targets of conservation management. The syllabus forces routes between strategic objectives via the planning of the allocation of resources to reach measurable outcomes. It answers the question, how do we educate for a concept that is difficult to conceptualise and define, but where long-term management is essential?

There is no doubt that the quest for sustainability demands new approaches to involve people in mapping routes to action by addressing factors which limit futures thinking and stakeholder dialogue rather than in holding to a fixed body of knowledge that was compartmented in the 19th century. Instead, we need socially critical education approaches of reflective thinking towards managed outcomes promoting flexible praxis - a pedagogy that integrates reflection and targeted action. Critical praxis provides opportunities for people; to engage in reflecting upon the basis of their socio-cultural values and assumptions; to identify how they are conditioned and confined by the socio-cultural structures they are operating in and, more significantly, to build their capacity as agents of change. In essence, it is essential to have new curricula to build social capacity for sustainable development through education applied to manage change.

The promotion of a conservation management curriculum has been a consistent objective of the CMS Consortium since the late 1990s when the EU LIFE 'Community Environment Programme' funded a partnership between the UK Conservation Management System Partnership, the University of Ulster, the education department of the National Museum in Cardiff and a group of

European/international industries. The aim was to evaluate the CMS as a tool for biodiversity management of industrial sites (BIAS). This work had an important educational component, which involved developing a knowledge framework for teachers and neighbourhood leaders to carry the CMS logic from professional users into the community.

Since then, with the help of sponsorships from Chevron/Texaco, this educational framework, under the name of cultural ecology, has been as a prototype online resource for teachers and community leaders. The data model is based on the following three interrelated educational pillars for presenting the theme of managing resources to live sustainably.

- KAROC '*keeping a rein on consumerism*' for living with an ethic of production with moderation and neighbourliness;
- KAROP '*keeping a reserve of production*' for living with a renewable economy;
- KARON '*keeping a richness of nature*' for living harmoniously with ecosystems.
- KARIC '*keeping a resilience in community*' for responding to change.

The latest Chevron sponsorship was in celebration of the 50th anniversary of Skomer Island, a national nature reserve situated off the coast of South Wales, becoming a national nature reserve. This has enabled work to begin to turn the cultural ecology teaching materials into a set of interoperable e-learning courses within the EU's ICOPER Best Practice Network. ICOPER is part of the eContentplus programme of the EC. Its mission is to collect and further develop best practices for higher education. It tackles issues like creating learning designs and teaching methods, authoring content for re-use, transferring knowledge in an outcome-oriented way and assessing it, or evaluating learning activities.

In outcome based learning, the results of learning, such as knowledge, skills and competences to be achieved by learners are in the focal point of the learning process. In order to assist the learners in successfully achieving the intended learning outcomes at the end of the learning experience all educational activities and resources need to be related to the intended learning outcomes of a learning module or course. Outcome based assessment means that the assessment process must be aligned with the learning outcomes. This means that assessment should support the learners in their progress (formative assessment) and validate the achievement of the intended learning outcomes at the end of the process (summative assessment). It also means that the assessment process should be adapted depending on the kind of outcomes that it is aimed to appraise. E-learning is ideal for the integration of these elements of teaching.

Current work is concerned with building KARON based on three existing CMSC power point presentations; one outlining a Welsh Atlantic woodland management case history (MA), another introducing the management science of biodiversity (DB/Lincolnshire Wildlife Trust) and a third giving a brief history of the CMS Partnership/Consortium (DM). Power point files are the central components of two e-learning tool kits, Articulate and Moodle, adopted for the project. Their slide sequences present the basic information packages, which are integrated with quizzes, wikis, glossaries, choice-branching, forums and chats.

The future of humankind can be understood in two ways. It is either a technocratic effort to maintain year on year economic growth against the drift towards ecological disaster; or it is a cultural effort to abandon economic growth as a social target and gradually retire from the development race. The first model involves the management of the bio-physical limits to growth to steer development along the edge of an abyss, continuously surveying, testing, and manoeuvring around our bio-physical limits. In the second model, the challenge is to adopt management systems which allow society's course to stay at a comfortable distance from the edge of the abyss, living graciously within a stable or shrinking volume of production.

The alternatives are analogous to driving a vehicle at high speed towards a canyon either you equip it with radar, monitors and highly trained personnel, correct its course and drive it as hard as possible along the rim; or you slow down, turn away from the edge, and drive leisurely here and there without too much attention to precise controls. According to Wolfgang Sachs, too many global ecologists - implicitly or explicitly favour the first choice+.(Wolfgang Sachs: 1995)

Each society is called upon to search for indigenous models of prosperity to stay a comfortable distance from the abyss. As an educational core to this search, the CMSC is promoting the educational mindmap of cultural ecology (<http://www.culturalecology.info>) and an e-learning programme about keeping a richness of nature (<http://cwicnet.info/karon/player.html>), which define and make managerial links between consumerism, production and nature

2 Consumerism

Consumerism is the belief that wellbeing and happiness depends on the level of personal consumption, particularly on the purchase of material goods. The idea is not simply that wellbeing depends upon a standard of living above some threshold, but that consumption and material possessions are at the centre of happiness. A consumerist society is one in which people devote a great deal of time, energy, resources and thought to 'consuming' goods and services. The general view of life in a consumerist society is that consumption is good, and more consumption is even better.

There are great global inequalities in consumption, but the planet is simply incapable of supporting Western-style consumption everywhere for ever. This truth is expressed as cultural currents in the West that embrace "voluntary simplicity" and advocate a slower pace of life with less concern with material consumption. Many people are dissatisfied with the morality of the market place. They know from folklore and experience that consuming more will not make them happier, and they are conscious of the lack of purpose in modern life. They continue with their current lifestyles because they feel that they have no choice: material consumption is an integral part of meeting social needs in their society.

These anti-materialistic counter-tendencies to consumerism are likely to remain weak and fragmented in the absence of any serious public policies designed to rein in consumerism. The ethics of modern consumer societies seem to be at odds with the aim of achieving sustainable consumption. This social importance of consumption makes behaviour change to reduce consumption unlikely. It requires a cultural change in values across society to decide collectively how the good life should look, and to modify behaviour accordingly.

Practically all traditions, apart from that of the modern West, recommend that material consumption should be moderated. However, the consumer society is partly a reaction against these traditions, so although there are many models for a vision of the good life and a related ethic of sustainable consumption in cultural traditions around the world, sustainable consumption is unlikely to be achieved through the imposition of earlier ethical systems.

A more promising path might be to encourage dialogue on ways in which individuals and communities can meet new social values without gross levels of material consumption, and to foster the grass-roots development of more sustainable ideals of the good life; i.e. new values come before new behaviours.

3 Production

Three kinds of reserves of natural resources can be identified:

- continuous resources such as sunlight and wind, the use of which does not lead to a reduction in their size;
- renewable resources, such as wood and crops that can be harvested - but not faster than their rate of replenishment;
- and non-renewable resources such as fossil fuels and minerals. The last are created by very slow geological processes, so slow in human terms that their use diminishes the available stocks.

Resources such as clean water, fertile soils and biodiversity, given the time required for their recovery, can also be considered to be non-renewable.

The Club of Rome first drew attention to the depletion of resources at the beginning of the 1970s. At that time the emphasis was on the depletion of fossil and mineral resources. It was assumed that various important natural resources such as oil and various metal ores would be exhausted within a few decades. In fact, this turned out not to be true. Discoveries of new deposits, technological advances and falling energy prices made possible the recovery of lower grade ores, and the estimated remaining lifetimes of some resources have been considerably extended.

However, if in 2050 the predicted enlarged population of the world consumes natural resources at the levels now enjoyed by the 'rich countries', it would consume 2 to 7 times the present amount of natural resources. This would multiply current environmental problems by 2 to 7 times as well.

The challenge facing the Western world is to cut fossil fuel consumption by a factor of 4 to 10 to reduce the greenhouse effect, land-take and consumption of other resources by a factor of 2 to 4. This challenge goes much further than improving material and energy efficiency in the production of materials and products. More fundamental changes are needed, such as:

- Bringing the use of materials in line with functional use
- Limiting wastage of materials and energy in production and consumption chains
- Making better use of resources in the economy (recycling and cascading)
- Developing new products and services
- Using alternative raw materials and resources.

Putting 'products' at the heart of maintaining reserves, places the responsibility for implementing policies with producers, at least as far as changes to products or services are involved. Also, government will have to influence consumer behaviour through market mechanisms, confronting consumers with the costs of environmental impacts via the prices they pay for products

4 Nature

Our management of nature is intimately bound up with what we think about our place in the cosmos and the way we value ourselves as sentient beings. This varies between societies and individuals, which change over time, and influence the way we value nature's richness. What is absolutely clear is that this richness is now confined to postage stamp areas where the balance of nature can no longer follow primeval ecological laws. Conservation management locked onto measurable objectives of biodiversity is essential to keep what richness remains of nature's former vastness.

Intrinsic value

“ The intrinsic value of biodiversity is central to the idea that humans are part of nature.

“ "We know now what was unknown to all the preceding caravan of generations: that men are only fellow-voyagers with other creatures in the odyssey of evolution... Above all we should, in the century since Darwin, have come to know that man, while now captain of the adventuring ship, is hardly the sole object of its quest, and

that prior assumptions to this effect arose from the simple necessity of whistling in the dark." - Aldo Leopold, A Sand County Almanac.

“ The argument for conservation of biodiversity often emphasizes the need to facilitate continued evolution. As humans we are and were part of nature, and benefited from the evolutionary process. The tenet that humans are part of nature questions whether humans should endanger their own milieu and the process from which they stem.

“ A corollary to the above argument is reflected in the Noah principle , named for the biblical Noah who saved one pair of every creature on earth in the Ark, which argues that the usefulness of a species is not considered when discussing its conservation, but rather its very presence in the long history of evolution is sufficient to warrant its preservation.

“ "The non-humanistic value of communities and species is the simplest of all to state: they should be conserved because they exist and because this existence is itself but the present expression of a continuing historical process of immense antiquity and majesty. Long standing existence in Nature is deemed to carry with it the unimpeachable right to continued existence" D.Ehrenfeld, Conserving Life on Earth 1972

“ Environmental ethicists also stress that humans should protect biodiversity because they are the cause of most of the decline of biodiversity through loss of habitat, over-exploitation and other perturbations.

“ "99 percent of all species that ever lived are now extinct. But we have an obligation, now, in our generation and in foreseeable generations, to try to protect every species and try to maintain every species. This is because virtually every species that is going extinct now is going extinct due to human activity not because of natural processes"

Benefit value

“ While intrinsic arguments for protection of biodiversity are compelling, it is ultimately arguments of human benefit that are most appealing because as humans, we are inextricably and wholly dependent on this diversity of living things for survival.

“ Biodiversity, encompassing genetic diversity, species, populations, communities, ecosystems, landscapes and regions, provides countless benefits to humans at all these scales. Some of these benefits include:

“ Economic benefits, both direct and indirect Some of these benefits come in the form of goods that can be directly valued and costed because they provide something that can be extracted and sold. These goods include

everything from all the domesticated agricultural crops that form the basis of the world's food supply, to medicines that protect and cure us, to the fibres that make up the clothes we wear and clean-up ecosystems that deal with our wastes.

“ Aesthetic benefits; rich ecosystems are aesthetically pleasing and provide leisure opportunities to get away from urban living;

“ Scientific and ethical knowledge;

“ Insurance against the future; a threat to biodiversity can be compared to book burning (the obliteration of former and future knowledge).

5 Community

The emergence of environmental governance for sustainable development as a field of inquiry has stimulated a plethora of research into new formations for governing the environment.

Although perhaps not described in these detailed conceptual terms, place-shaping has been a focus of attention amongst policy-makers for many years. But the nature of the approach to area-based policy has changed dramatically from one period to the next. In the Victorian era it was the leadership of big cities (such as Glasgow, Liverpool, Manchester and Birmingham) that undertook the development of these as centres of economic power and civic pride, introducing state-of-the-art amenities such as clean drinking water, sewers, electricity and public transport.

During the twentieth century central government took over much of the leadership role in driving area-based policy through a web of centrally managed agencies, one of which was local government. More recently, however, the need to achieve joined up working has shifted the emphasis towards locally focussed partnerships. Healey, for example, has argued that many initiatives now involve *horizontal* linkages with an interactive quality, involving a variety of different stakeholders, and necessitating more collaborative ways of developing and implementing policy. In particular, Healey argues that

“hierarchical forms of articulating public policies and firm boundaries between public and private action are being displaced by more fluid and horizontal relationships” (Healey 1998, p.4).

The sustainability movement has become ever more important as an integrated role in the development of sustainable communities. The motivations behind the emerging practice of sustainable communities include the desire to improve the quality of community life, to protect the environment, and to give residents the chance to participate in shaping their own community. Sustainable communities strive to be cleaner, healthier, and less

expensive; to have greater accessibility and cohesion; and to be more self-reliant in energy, food, and economic security.

P. Jacobs argues that there are three elements of sustainable development:

- 1.Environmental considerations must be entrenched in economic policy-making.
- 2.Sustainable development incorporates an inescapable commitment to social equity.
- 3.The term "development" does not simply mean "growth."

Sustainable communities are defined by the six types of community capital that they possess. Natural capital is resource like tree canopy and preserved land; physical capital refers to any built infrastructure; economical capital relates to industry and finance; human capital relates to the available workforce; social capital is the collective sense of place and ownership; and cultural capital includes the community's unique make-up of its residents. These community capitals are the foundations to a successful sustainable community because they build off each others strengths and weaknesses to help the community as a whole.

Examples of the Planning Contribution to achieving community planning outcomes.

| Outcomes | Planning Contribution |
|--|---|
| Health & Wellbeing | <ul style="list-style-type: none"> ● parks, recreation and sports provision, transport, walking and cycling, air quality, access to goods and services, strong economies and access to employment |
| Combating Climate Change | <ul style="list-style-type: none"> ● transport, walking and cycling, energy supply, recycling, housing design and renewal, bio-diversity, access to goods and services, minerals and waste, flood risk |
| Safer Communities | <ul style="list-style-type: none"> ● licensing decisions, design, landscaping, recreational and sports provision, transport |
| Vibrant and Sustainable Neighbourhoods | <ul style="list-style-type: none"> ● housing, strong economies and access to employment, social and community infrastructure, transport, walking and cycling, service co-location, safe and green environments, school provision and design |
| Social Inclusion | <ul style="list-style-type: none"> ● equal access to goods and services, transport, strong economies and access to employment, housing quality and housing provision, affordable energy, involving communities in plan making |
| Economic Development | <ul style="list-style-type: none"> ● availability of employment sites and access, transport, social and environmental infrastructure, housing – location, accessibility, levels and type of tenure, access to goods and services, energy provision |

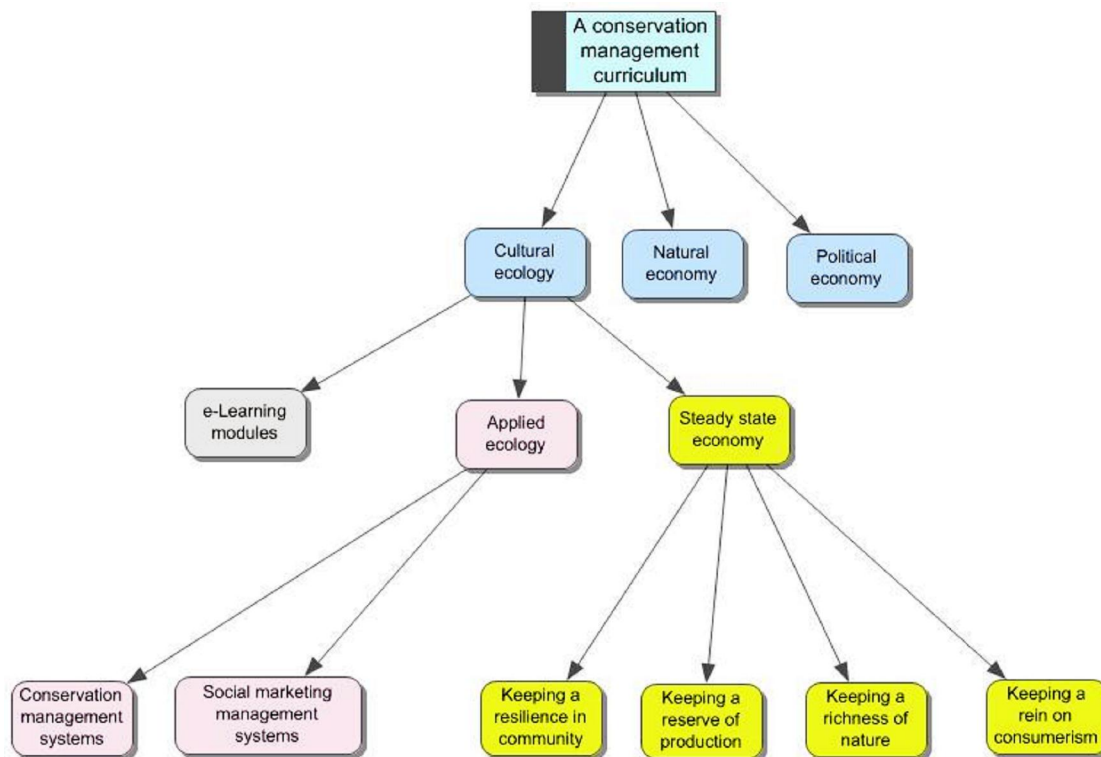
<http://www.sed.manchester.ac.uk/research/cups/news/Adams%20&%20Tian.pdf>

6 Keeping within Earth's limits

The datamodel of the conservation management curriculum may be viewed at <http://webbrain.com/brainpage/brain/75FC361A-ADD9-8F2C-9B35-4EC7698A7D82/>

The following diagram is an outline of the first three levels of the datamodel as a mindmap

The e-Learning models which are under development for ~~4~~ Keeping a Richness of Natureq may be accessed at www.biodiversity.ecoworld.co.uk/naturequest



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<http://www.cct.umb.edu/efsgaUMAsustaincurriculum.doc>

http://www.umass.edu/uww/programs_courses/programs/sustainability.html

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Appendix 1 Case history of consumerism

Pig fat, wood ash, and nobility of culture

1 Consumerism

Choosing places where humanity turned the page of history from self-sufficiency to global dependence on mass-produced goods and services is not difficult. Any European town around 1800 will provide evidence of local entrepreneurial activity that combined creativity with marketing to lift an individual above his neighbours. The eastern colonial towns of North America also provide good case studies to illustrate this particular new chapter of social evolution. It was here in the early 1800s that the sharp edge first became visible between pioneering capitalist culture pressing westwards from New England and the subsistence ecology of the native American woodlanders.

The 1837 edition of the *Guide for Emigrants to the West* written by John Mason Peck, a Baptist missionary, described the exploitation of the American continent as follows:

“Three classes, like the waves of an ocean, have rolled one after the other. First comes the pioneer, who depends chiefly upon the natural growth of vegetation... and the proceeds of hunting. His implements of agriculture are rude, chiefly of his own make, and his efforts directed mainly to a crop of corn and a truck patch... a rude garden. The next class... purchase the lands add field to field, clear out the sods, throw rough bridges over the streams, put up hewn log houses... occasionally plant orchards, build mills, school houses, court houses etc., and exhibit the pictures and forms of plain, frugal, civilised lives. Another wave rolls on. The men of capital and enterprise come... The small village arises to a spacious town or city...All the refinements, luxuries elegances and fashions are in vogue...”

Peck had watched this process for two decades in Indiana, Illinois, Missouri and Michigan. Here in miniature is the history of the rise of consumerism. By the time of the third wave, previous daily acts of monetary exchange of the colonists to satisfy domestic 'needs', were becoming rituals of ego satisfaction through the purchase of goods from an endless mass-produced supply of novelties made to satisfy 'wants'. Actually, this has always been a feature of socialising humans since the first over-engineered axe was produced by a Stone Age quarryman and set a collecting trend for these highly polished, never-to-be-used objects. What was new in 19th century Europe and America was the scale and variety of goods created by mass-production. Wants instead of needs began to govern everyone's way of life leading to a mode of social interaction in which stuff with market value now mediates all human relationships. We describe this organised political, economic and social movement as consumerism. By the 1930s, driven by the theories of public relations and advertising, the movement's common strategy was that the masses have to be 'benevolently' manipulated into participating in mass consumption.

The year 1836 was a significant year in the time-line of consumerism. It was then that Alexander Morris a Cincinnati chandler, persuaded his two sons-in-law William Proctor and James Gamble, to form a partnership to manufacture and sell candles and soap. Both men were recent emigrants. William had left England in 1832 after his woollens shop in London was destroyed by fire and burglary; James came from Ireland as a boy in 1819 when famine struck his native land. Both men

settled in Cincinnati, then nicknamed "Porkopolis" for its booming pig-butcher trade. The Cincinnati community had been founded on November 18, 1788, by a group of pioneers who landed their boats on the shoreline of the wild Ohio River. They immediately began to clear an opening within the mixed deciduous forest, which stretched from the Potomac to the Mississippi down the Ohio River valley. Here they established Columbia, the first pioneer settlement of what was to become the city of Cincinnati. After its consolidation and the Indian raids had ended the small river town began to blossom into what would later be dubbed the "Queen City". It rapidly became a hub for westward expansion. In 1802, Cincinnati was chartered as a village, and in 1819, it was incorporated as a city. Steam navigation spread up the Ohio River, which is the biggest tributary of the Mississippi, in 1811, and played an important part in the future growth in the region. The introduction of the river paddle-wheeler on the Ohio River after the War of 1812 quickly turned Cincinnati into a centre of river commerce and trade.

Alexander Norris, pointed out to his sons-in-law that Gamble's trade, soap making, and Procter's trade, candle making, both required the use of lye, which was made from animal fat and wood ashes. Pig fat and trees to burn were two of Cincinnati's natural resources and were taken up by the two men to create a scheme for producing and distributing low cost, high quality soap products. They were extremely successful, and in less than twenty years, their annual sales exceeded \$1,000,000. By 1904, the Procter and Gamble company was spending nearly half a million dollars a year on advertising - a staggering amount for that time. Even today, their pioneering insights into mass-marketing and distribution are studied in college courses on social marketing.

Advertising of mass produced goods and services is now itself a massive institution. For example, in 1998 Procter & Gamble, spent more than \$3 billion to advertise outside the United States, solidifying its global reach. Culturally, advertising is a major system of communication by symbols in its own right, exposing every person with a television screen, a magazine or a newspaper, to thousands of promotional messages each week. These messages may bombard us with social stereotypes or fragment us into niche-designed target markets, as groups of people who are prone to spending more money. Research has shown the great influence of advertising and consumerism on such institutions as broadcasting, schools, and children's entertainment. It takes advantage of any piece of information that suggests that people's behaviour can be changed to buy more than they really need. For example promises are made of emotional and social rewards that products cannot really deliver. One type of social reward often promised by advertising is class or status mobility-the promise that, by using a product, a person will appear to be of a higher social class than he or she really is. Recent research into two weeks of programming on the home shopping TV channels, revealed that "the promise of status mobility through consumption" permeates the sales discourse of these channels-in particular those that are designed to appeal to a working-class audience, which encourage them 'to live to buy'.

Advertising can create new social habits. The analysis of the impact of advertising any new product shows this to be true. Take Febreze, a product developed by Procter and Gamble to remove odours from smelly fabrics. Its advertising initially focused on smelly household situations, like sofas, pet-beds, and shoes of sweaty teenagers. The launch in 1998 flopped, and the company was ready to abandon the product. Then its researchers found that consumers liked Febreze when they used it, but that many customers simply forgot that it was in the house. The adverts therefore needed to give them the right cues to use the product regularly. The company identified one: the act of cleaning a room. So, it created commercials showing women spraying Febreze on a perfectly made bed and on freshly laundered clothing instead of in smelly areas. The ads worked well-and the more people sprayed Febreze, the more automatic the behaviour became. Now consumers buy \$650 million of the non-essential deodorant each year.

2 Production

In the same year that Procter and Gamble began to set up their business in Ohio the official opposition to their promises of physical comfort to promote material consumption emerged in Boston with foundation of the Transcendental Club. The Transcendentalists insisted that the ultimate realities of the universe are ideas, not things, and their supporters clung fast to the view that the truly good life is spiritual and intellectual. Transcendentalism asserts that, whether or not a person is religious, he or she has a spiritual body, with senses to perceive what is true, right and beautiful. We have a natural love for these non-material experiences as much as the fleshly body has for its material inputs.

These transcendentalist home-spun East Coast writers and philosophers were responding to a slowly industrializing New England with dense, intensively managed farms, frequent clear-felled wood lots and a paucity of wildlife that had all but vanished in their lifetime. This highlights the emergence of two of the four modern pillars of living sustainably, namely keeping a rein on consumerism and keeping a richness of nature. In Ohio at the turn of the 18th century the third pillar, keeping a reserve of production was evident in the lives of the native Americans.

Before the settlement of Cinccinati, native Americans had already lived in the area for over 100 centuries. In the 1780s the Shawnees continued to hunt and gather food from the land and streams of Ohio from their villages located in the Little and Great Miami River Valleys to the north. "Ohiyo" is an Indian word for the Ohio River, which means "it is beautiful." The Shawnees were not the original inhabitants of the Ohio valley. Previous tribes had been decimated by smallpox and other European diseases before the Europeans had even met them, and Algonquian and Iroquoian peoples from neighbouring regions moved in as European colonization forced them from their original homes to the East.

The Shawnees were the latest local native culture and had developed a sustainable woodland tribal economy deriving their livelihoods through a combination of hunting, fishing, gathering, farming, and trading. The men hunted a variety of game animals from the forest's richness, including deer, elk, bear, raccoons, turkeys, and to a lesser extent, beavers, squirrels, and other small game animals. By far, the white-tailed deer comprised the single most important source of animal protein. The tribal groups moved through the forest practicing slash and burn agriculture. Originally, they had used stone hatchets to clear underbrush and to girdle trees growing within their prospective fields. Later, the acquisition of iron tools from European traders made the work considerably easier. Considering that one acre of old growth forest contained an average of twenty-six trees with trunk diameters over eighteen inches, it is of little surprise that iron axes quickly became a popular trade item. After the cut wood had dried, the Shawnees piled it around the girdled trunks of the larger trees, which were often 100 ft high and set it all ablaze. Women gradually grubbed out the smaller stumps leaving the larger stumps and trunks in place. In all, it often required several years to prepare a new field for planting.

Crops were raised in small hills rather than rows. Using hoes fashioned from the shoulder blades of deer, women farmers scraped the topsoil into mounds that measured about thirty inches in diameter with an additional thirty-inch space between the mounds. Land that had been totally cleared of all trees and stumps had space sufficient for approximately twenty-five hundred hills per acre. Into each hill they planted a combination of corn, beans, and squash. By planting corn a few weeks prior to beans and squash, the corn stalk served as a living beanpole. Throughout the early summer, women periodically hoed the field to keep weeds down, although after the squash and

pumpkin plants became mature, their broad flat leaves inhibited weed growth and reduced water loss by shading the ground.

Barring drought, blight, insects, and mammalian pests, the villagers could expect to harvest their first ears of maize about eighty-four days after planting. To celebrate the occasion, they held their annual Green Corn ceremony in mid-August. Two weeks later, the longer season varieties of corn ripened. For winter storage, the women peeled the husks back from the corncobs without breaking them off and braided them together into long strands they suspended from the interior roof of a wigwam. If desired, the dried kernels could later be shelled and stored in baskets or clay pots. In addition, the women preserved squash and pumpkins for up to five months by drying thinly sliced pieces.

From these sparse details of tribal life it is possible to build up a story of how the Shawnees were held in a thrall of self-sufficiency bound by the time it took for the fertility of wood ash from burning the forests to become expended. It was then time to move on and leave their clearances to regrow, so keeping a reserve for future production. This complex of living sustainably ended as the European pioneer farmers got a grip on the land.

Nature

In relation to the American dream of freedom, transcendentalism may be viewed as a movement that encourages people to be rebellious and strive to break away from any and all social norms; it opposes mainstream conformity and embraces individualism. The Massachusetts proto-ecowarrior Henry David Thoreau followed the transcendentalist philosophy in an experiment that he wrote about in his book 'Walden'. Thoreau's attempt to break away from Massachusettsq dominating materialism was to live in a small cabin in the woods near a pond where he could get close to nature. He lived there in solitude and 'Walden', the record he made of his experience, tells us,

"If a man does not keep pace with his companions, perhaps it is because he hears a different drummer. Let him step to the music which he hears, however measured or far away."

"Be a Columbus," he advised, "to whole new continents and worlds within you, opening new channels, not of trade, but of thought."

Many other distinguished North American transcendentalists of this time also produced works that accurately reflect their beliefs. For instance, Ralph Waldo Emerson demonstrated the belief in anti-materialism when he wrote,

*The horseman serves the horse,
The neat-herd serves the neat,
The merchant serves the purse,
The eater serves his meat;
'Tis the day of the chattel,
Web to weave, and corn to grind,
Things are in the saddle,
And ride mankind.*

'Emmerson's 'things in the saddle' are the products of mass production, that is to say the 'stuff' which, from the beginning of the 19th century, became increasingly available for everyone to buy.

Stuff was firmly in the saddle and riding humanity at a gallop. In an escapist essay entitled 'Nature', Emerson sets up the forest as a place of recuperation from impersonal galloping consumerism.

"In the woods is perpetual youth... There I feel nothing can befall me in life - no disgrace, no calamity, which nature cannot repair. Standing on the bare ground - my head bathed by the blithe air and uplifted into infinite space - all mean egotism vanishes. I can become a transparent eyeball; I am nothing, I see all; the currents of the Universal Being circulate through me..."

The greatest delight which the fields and woods minister is the suggestion of an occult relation between man and the vegetable. I am not alone and unacknowledged. They nod to me, and I to them."

Benjamin Franklin, another transcendentalist, expresses relatively the same phenomenon, but from a different angle when he says,

"Get what you can, and what you get hold; 'Tis the stone that will turn your lead into gold."

In Emerson's individualism some have seen a defence of free market capitalism and even admiration for the successful businessman who asserts his power within the dynamics of the market. There is, no doubt, some truth to this as is evident in the following quotations from a lecture he gave in 1844 entitled "The Young American":

"The philosopher and lover of man have much harm to say of trade; but the historian will see that trade was the principle of Liberty; that trade planted America and destroyed Feudalism; that it makes peace and keeps peace, and it will abolish slavery."

But far closer to the truth is that Emerson hated the vulgarity of the excesses of the marketplace. He characterizes the emerging capitalist economy as

"a system of selfishness... of distrust, of concealment, of superior keenness, not of giving but of taking advantage." He goes as far as to claim, "there is nothing more important than to resist the dangers of commerce."

Here Emerson reminds us of the importance and nobility of culture. In his ability to make nature sacred, and to sanctify the mundane, he adds values of elegance and beauty to our everyday experiences. We have only to open our eyes to them. Ohio's original forest land covered more than 24 million acres. By 1883, only 4 million acres remained. Most of the trees were simply cut down and burned, much of the ash, as a one off harvest, went to Procter and Gamble's soap making enterprises. In 1909 wild turkeys and white-tailed deer were declared extinct in Ohio and blamed on widespread loss of forests and uncontrolled hunting. A global symbol of what was to come is "Martha", the very last passenger pigeon in the world, which died at the Cincinnati Zoo in 1914. Passenger pigeons were once thought to be the most numerous bird species in the world. Single flocks sometimes contained billions of birds.

Boston's transcendental philosophers did not catch up with Cincinnati's city fathers until 1911 when the Mount Airy forest park was established. Conceived as the nation's first urban reforestation project, the park has developed over the years-especially during the Depression and post-World War II period- into an urban park with a variety of areas, spaces and structures designed to accommodate intensive recreational, social, and educational activities. It was one of

the earliest, if not the first, urban reforestation project in the United States. Mount Airy Forest covers 1,471 acres and includes natural areas, planned landscapes, buildings, structures, and landscape features with numerous hiking trails, bridle paths, walls, gardens, and pedestrian bridges.

Although it took some time for Cincinnati to make belated efforts to bring back trees it had always been self-evident throughout the world in all ages that trees have a special relationship with humanity, being bigger than us both physically and metaphorically. This has ensured that down the ages woodland has always had been a persistent cultural thread with its own spiritual value. Adam and Eve were expelled from Eden for eating from the Tree of Knowledge and the great tree Yggdrasil was central to Norse mythology. Tacitus, followed by German nationalists and historians of liberty, located freedom in the German forests. Medieval forests were both protected hunting parks and the refuge of outlaws. Shakespeare contrasted the simplicity of life in the Forest of Arden with the artificial manners of the court, and poets from Virgil to Hardy have drawn cultural inspiration from trees.

Trees provided the aesthetic and philosophical infrastructure around the English country house movement, which began with the creation of Blenheim Palace and Park (1716-22) by a grateful nation for the Churchill family of commoners embodied in general John Churchill, 1st Duke of Marlborough. From that time, estate woodland represented a self-contained world in miniature, when tree planting maintained and expressed the position of wealthy rural families in society.

While eighteenth-century up-and-coming aristocrats desiring to emulate the rise of General John Churchill controlled trees in plantations around their houses, Romantics delighted in vast untamed forests, and Henry Thoreau really withdrew into the woods to reintegrate himself with nature. Thoreau argued that 'in wildness is the preservation of the world' and humanity needed forests for inspiration and our true re-creation. In 1859 he advocated that each township should have a woodland of between 500 to 1000 acres for such inspirational purposes. This North American theme of preservation of landscapes with trees was taken up by George Marsh in his book *Man and Nature* published in 1864. The idea was that excessive felling had disrupted a balanced environment and forest management was therefore economically as well as ethically desirable. In the same year, the Yosemite district of western Sierra Nevada, including its groves of giant redwoods, became the first of the national parks designated to protect so-called wilderness for the physical and mental regeneration of all the people. In 1872 New York State Park Commission's first report took the view that forest had to be retained as a measure of political economy. The Adirondacks Park is a six-million acre patchwork of public and private lands located in north eastern New York State, which became a forest preserve in 1892 to be 'kept forever as wild forest lands'. Throughout history, our views of trees have been affected by the changing use of woodland and the effects of deforestation and urbanization. How we see trees today will dictate how nature is treated in the future.

The fourth pillar of the conservation management curriculum is keeping a resilience in community. This emerged in Ohio in January 2011 with the publication of the state's standard hazard mitigation plan. This was initiated in 2002 and involved the participation of numerous state and federal agencies, adjacent state representatives, and various experts. The plan was approved by in 2005, and updated and re-approved in 2008. The 2011 revision of the plan details Ohio's highest priority hazards: riverine flood, tornado, winter storm, landslide, dam/levee failure, wildfire, coastal flooding, earthquake, coastal erosion, drought, severe summer storm, invasive species and land subsidence hazards.

To conclude, the history of the past 130 years in Ohio has seen the United States become a global leader in technological innovations of all kinds that have increased prosperity, improved health, and provided positive opportunities for all humans throughout the world. But within this tiny fraction of human history we have already exceeded the carrying capacity of our planet, even ignoring future potentially catastrophic impacts upon food and water security owing to anthropogenic global warming.

If present trends continue, there will be at least 8,5 billion people in the year 2025. Clearly, more people make greater demands on the earth's resources. However, human impact on the earth is not determined only by numbers of people, but also by how much energy and other resources each person uses or wastes. Sustainable living is possible only if human numbers and demand for resources are kept within the earth's carrying capacity. A conservative estimate is that today humanity uses the equivalent of 1.4 planets to provide the resources we use and absorb our waste. This means it now takes the Earth one year and five months to regenerate what we use in a year. Turning resources into waste faster than waste can be turned back into resources puts us in global ecological overshoot, depleting the very resources on which human life and biodiversity depend. The result is collapsing fisheries, diminishing forest cover, depletion of fresh water systems, and the build up of pollution and waste, which creates problems like global climate change. These are just a few of the most noticeable effects of overshoot. Overshoot also contributes to resource conflicts and wars, mass migrations, famine, disease and other human tragedies - and tends to have a disproportionate impact on the poor, who cannot buy their way out of the problem by getting resources from somewhere else.

Appendix 2 Modelling new curricula for living sustainably

Paul Hawken wrote in the January/February 2000 issue of Sierra Club Magazine: *“There are in the United States today at least 30,000 nongovernmental organizations dealing with sustainability in the broad sense of the word. In the world, there are approximately 100,000 such groups. Numbers themselves, however, do not convey the power of this movement; what does are the underlying mental models and frameworks that inform it. In the past, movements that became powerful (Marxism, Christianity, Freudianism) started with a set of ideas and disseminated them, creating power struggles over time as the core model was changed, diluted, or revised. The sustainability movement does not agree on everything, nor should it ever. But, remarkably, it shares a basic set of fundamental understandings about the earth and how it functions, and about the necessity of fairness and equity for all people in partaking of the earth’s lifegiving systems. This shared understanding is arising spontaneously, from different economic sectors, cultures, regions, and cohorts. And it is absolutely growing and spreading worldwide, with no exception. No one started this worldview, no one is in charge of it, there is no orthodoxy.”*

This global movement is being nurtured in within higher education in the US in conjunction with by national and international organizations. The following section provides some background on a few of the organizations created to assist and encourage universities and colleges to incorporate sustainability into their operations and curriculum. These organizations and others maintain web-based databases that describe the evolution of sustainability studies at universities throughout the world. Among the leading organizations are:

- **The Association of University Leaders for a Sustainable Future (ULSF)** was created by a group of academic leaders. Presidents and other administrative leaders from about 280 universities around the world have signed the Talloires Declaration in support of sustainability education and operations. The mission of ULSF is to make sustainability a major focus of teaching, research, operations and outreach at colleges and universities worldwide. ULSF pursues this mission through advocacy, education, research, assessment, membership support, and international partnerships to advance education for sustainability. According to ULSF *“higher education is beginning to recognize the need to reflect the reality that humanity is affecting the environment in ways which are historically unprecedented and which are potentially devastating for both natural ecosystems and ourselves. Since colleges and universities are an integral part of the global economy and since they prepare most of the professionals who develop, manage and teach in society’s public, private and non-governmental institutions, they are uniquely positioned to influence the direction we choose to take as a society. As major contributors to the values, health and well being of society, higher education has a fundamental responsibility to teach, train and do research for sustainability.”* In addition The Association of University Leaders for a Sustainable Future wrote; *“We believe that the success of higher education in the twenty-first century will be judged by our ability to put forward a bold agenda that*

makes sustainability and the environment a cornerstone of academic practice.”

The Talloires Declaration and more about ULSF can be found at:

<http://www.ulsf.org/>.

- **Second Nature Inc.** is another educational non-profit dedicated to accelerating a process of transformation in higher education. While Second Nature will change in the near future due to budget constraints, for some time they have guided and nurtured higher educational institutions in their quest to make sustainability an integral part of the institution. Second Nature Inc., states, *“we must reinvent the world socially, economically and environmentally. A sustained, long-term effort to transform education at all levels is critical to the change in mindset necessary to achieve this vision. Higher education has the power to lead in this endeavor by exercising its role in training future leaders, teachers and other professionals and in producing wisdom needed to face the challenges of an increasingly complex world.”* Second Nature has maintained an extensive database, with examples of sustainability programs, courses and curricula at: <http://www.secondnature.org/>.
- For more than a decade, **National Wildlife Federation’s Campus Ecology Program** has been helping transform the nation's college campuses into living models of an ecologically sustainable society, and training a new generation of environmental leaders. They are at: <http://www.nwf.org/campusecology/>.
- The **International Institute for Sustainable Development** provides tools for campus leaders and educators wanting to incorporate sustainability into campus operations as well as the curriculum. They are at: <http://iisd1.iisd.ca/educate/>.
- HENSE, the **Higher Education Network for Sustainability and the Environment**, is a new North American network of individuals and organizations from academia, associations, government, non-profits, community interests and business who are dedicated to improving the quality of life for all through the realm of higher education. They are at: <http://www.hense.org/>.
- The **International Initiative on Science and Technology for Sustainability** (ISTS), which can be found at: <http://sustsci.harvard.edu/>, is an educational collaborative that seeks to enhance the contribution of knowledge to environmentally sustainable human development around the world. The Initiative is based on an evolving vision of "science and technology for sustainability" which they describe as:
 - *anchored in concerns for the human condition;* (it’s engaged in the world)
 - *essentially integrative;* (it’s holistic)
 - *regional and place-based;* (It’s local) and,
 - *fundamental in character;* (it addresses the unity of nature and society)

These organizations represent mainstream attempts to incorporate sustainability into university culture, operations and curriculum.

A global approach to education for living sustainably at all levels of education was set out under four thematic headings for the UN Decade for Promoting Education for Sustainable Development. It is important to begin discussion on curriculum development with this categorisation because it defines a total education system for living sustainably as a life long process of learning.

1 Promotion and improvement of basic education

Education for Sustainable Development promotes the availability of quality life-long education and learning opportunities for all peoples regardless of their occupation or circumstances.

The content and duration of basic education differ greatly around the world. Access to basic education remains a problem for many, especially girls and illiterate adults, the majority of whom are women. However, simply increasing basic literacy and numeracy as currently taught will not significantly advance sustainable development. Instead, basic education needs to focus on sharing knowledge, skills, values and perspectives throughout a lifetime of learning in such a way that it encourages sustainable livelihoods and supports citizens to live sustainable lives. This approach to basic education also supports public participation and community decision-making, which in turn, help communities to achieve their sustainability goals.

2 Reorienting existing education at all levels to address sustainable development

Education for Sustainable Development requires the reorientation of many existing education policies, programmes and practices to address the social, environmental and economic knowledge, skills, perspectives and values inherent to sustainability.

Rethinking and revisioning education from nursery school through university to include a clear focus on the development of the knowledge, skills, perspectives and values related to sustainability is important to current and future societies. This implies a review of existing curricula in terms of their objectives and content to develop transdisciplinary understandings of social, economic and environmental sustainability. It also requires a review of recommended and mandated approaches to teaching, learning and assessment so that lifelong learning skills are fostered. These include skills for creative and critical thinking, oral and written communication, collaboration and cooperation, conflict management, decision-making, problem-solving and planning, using appropriate ICTs, and practical citizenship.

3 Enhancing public awareness and understanding of sustainability

Progress towards sustainability requires that the growing global awareness of social, economic and environmental issues is transformed into understanding of root causes and that local, national and global visions of what it means to live and work sustainably are developed.

Thus, achieving the goals of sustainable development requires widespread community education and a responsible media committed to encouraging an informed and active citizenry. This includes educating people to promote sustainable consumption and production patterns. In this the media can play an important role.

4 Training and skills development for the world of work

Sustainable development depends upon the provision of specialized training programmes to ensure that all sectors of society have the skills necessary to perform their work in a sustainable manner.

All sectors of the workforce can contribute to local, regional and national sustainability. Business and industry are thus key sites for on-going vocational and professional training so that all sectors of the workforce have the knowledge and skills necessary to make decisions and perform their work in a sustainable manner.

The search for the basis for a world syllabus was taken up on-line by UNESCO. This organisation has taken the view that despite the variety of cultures around the world, all share common beliefs about the need to have an education which stresses care for other people and the natural environment. Such beliefs are essential to a sustainable future. Therefore, although the search for a common syllabus for living sustainably is unlikely to be attainable the world's three major conservation groups, the World Conservation Union (IUCN), the Worldwide Fund for Nature (WWF) and the United Nations Environment Program (UNEP), have identified a range of cross-cultural values that could provide an ideational framework for developing curricula based on 'ethic for sustainable living'.

These values provide principles that can guide human relationships with each other (social equity, peace and democracy) and with nature (conservation and appropriate development), and include:

Social Justice Values: People to People Interactions

- Meeting basic human needs
- Ensuring intergenerational equity
- Respecting human rights
- Practising democracy

Conservation values: People and nature

- Respecting the interdependence of all things
- Conserving biodiversity
- Living lightly on the Earth

These values are similar to the principles and ethics in the Earth Charter

<http://www.earthcharterinaction.org/content/pages/What-is-the-Earth-Charter%3F.html>.

The principles reflect values that are common in many religions and cultures. However, it is not the only possible one. For example, the people in The Monk's Story in Module 19 planned the development of their village in south-west Sri Lanka around six principles for living sustainably that are consistent with their Buddhist religion and their culture. These six principles are:

- Harmony with nature
- Variety and diversity
- Quality of life
- Small is beautiful
- Self-reliance
- Co-operation and peace

People of other cultures emphasise different principles. For example, the Garifuni people in Belize in Central America are guided by the following five principles for living sustainably:

Unity All people are connected to the Earth in a common and interdependent whole.

Reciprocity Every human being has a number of rights, but also mutual obligations and responsibilities.

Co-operation Related to reciprocity, each individual has responsibilities for his/her brother or sister, just as each brother or sister has responsibilities for him/her.

The importance of Mother Earth The land is sacred and can not be sold or bought.

Respect for others People should be tolerant of the views, aspirations, values and beliefs of others. This includes respect for the rights of all species and for the spirit of life.

Regarding the approaches of educational institutions there is a wide range of approaches to defining the way the above values are formalised to present to students. For example, the Maharishi Academy of Total Knowledge in New Hampshire USA bases its curriculum on the Unified Field, or %superstring field,+is the dynamical origin of all the laws of nature- the field of Total Natural Law. All the laws of physics, chemistry, physiology, etc., can be systematically derived from the Unified Field and its associated equations. The Unified Field thereby constitutes the long-sought, mathematically rigorous, inter-disciplinary foundation for all the sciences, and for the whole field of academic study. It presents sustainable living is essentially living in a way that can be sustained over time. Currently our interdisciplinary curriculum includes the following topics:

Self Sustainability . develops the student's total inner potential through
Consciousness-Based education

Bio-Geophysiology . provides the foundations of ecology and geology as the model
for sustainability

Renewable Energy . includes solar energy, wind energy, and biofuels

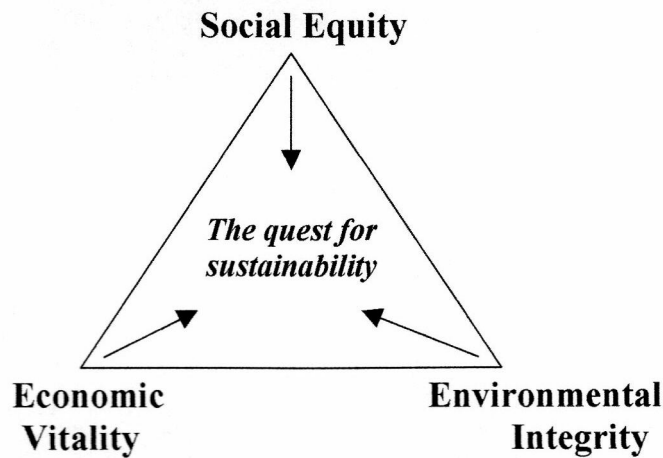
Sustainable Agriculture . emphasizes organic agriculture and permaculture design
practices

Eco-Architectural Design . focuses on creating buildings and communities in
harmony with the laws of nature.

http://www.maharishiacademy.org/academics/sustainable_living.html

Staff of the University of Massachusetts at Amherst believe that living sustainably should be part of this national movement, not only to serve students today and in the future, but for its own institutional health. The Amherst syllabus adopts a general four-part model which may be used for the development of a sustainability curriculum based in any academic discipline. The quest for sustainability is the integrating process at the center of the following syllabus diagram which defines the holistic nature of the course of study. A

sustainability curriculum should include academic courses and/or educational experiences from all four sectors of the model.



A starting point is the belief that the science community has generally ignored societal and political issues affecting the sustainable development. This estrangement from so-called non-scientific issues has prevented the research and education establishment from making significant contributions to global sustainable development. The Amherst academics call for a new sustainability science that is different in structure, methods and content from the science of the past.

Specifically, they say that the new sustainability science will need to approach problems from a holistic perspective that: 1) transcends spatial scales from economic globalization to local farming practices; 2) accounts for temporal inertia of global affects such as atmospheric ozone depletion and the movement of toxins; 3) deals with the functional complexity of interacting systems and subsystems; and 4) recognizes and honors a wide range of divergent opinion within the scientific community and between science and society. Sustainability science calls for new integrative processes that bridge science and politics, nature and society, and developed and developing nations. Finally, sustainability science will use participatory procedures to engage scientists, stakeholders, advocates, active citizens, and users of knowledge in the inquiry process. This thinking is a call for a transition from *logos* to *holos*, or from reductionist thinking to holistic, systemic thinking. This shift does not represent the abandonment of rational, objective thought, but the evolution of human thought toward holism or systems thinking, which includes but is not limited to rational analysis. The evolution from *logos* to *holos* involves a shift in the following attributes:

| Logos | Holos |
|------------------------------|---|
| <i>Reductionist thinking</i> | <i>Holistic thinking</i> |
| Objective | Subjective |
| Competitive | Interdependent/collaborative |
| Individualistic | Community-based |
| Head-oriented | Whole being (head, heart, body, spirit) |

| | |
|--|--|
| Separate from nature Fragmented Linear | Connected with nature/ecological Interconnected Systems oriented |
|--|--|

Course work in holistic studies might include: leadership development, spirituality, holistic and integrative courses, systems thinking, community studies, and particularly experiential education. **At the heart of the proposal is a recommendation to require students have at least one semester of experiential education (described below).**

The triangle icon recognises that existing courses can be used to enter the holistic syllabus.

Course examples from the social, economic and biophysical departments are:

Anthropology 208: Human Ecology - The study of human/environmental interactions. Emphasis is on biological and cultural responses by contemporary human groups to pervasive environmental problems.

Economics 308: Political Economy of the Environment . Application of the theories of political economy to environmental problems and issues. Topics include regulatory and market approaches to pollution and natural resource depletion; cost-benefit analysis and its economic and political foundations; and case studies of specific environmental problems such as acid rain, deforestation, and global warming.

Plant & Soil Sciences 297A (soon to be 265): Sustainable Agriculture . Ethical, practical and scientific aspects of the quest for long-term agricultural sustainability. Students learn about the economic, social and environmental impacts of food production systems and how personal choices, technology, and policy impact sustainability.

In addition to these few examples, other courses that contribute to sustainability education can come from the following academic departments.

| | | |
|-----------------------|------------------------|------------------------|
| Afro-American Studies | Environmental Sciences | English |
| Biology | Geosciences | Food Science |
| Communications | History | LARP |
| Education | Legal Studies | Management |
| Entomology | Resource Economics | Natural Resources Mgt. |
| Nursing | Political Science | Nutrition |

However, for a program at a higher educational institution to adequately respond to meeting the challenges of education for sustainable development, a virile, dynamic and living curriculum is essential. Because the needs of society are always changing due to continuously changing technology, market forces, and the growing awareness of society to environmental issues, the relevance of higher education to the society is synonymous to the readiness of the programs to adapt to these changing needs. In other words, the objectives of the training each academic program aims at achieving must be synchronized with both current and future societal needs.

Appendix 3 Wiki learning about conservation management

A Wiki is a web technology that allows a web site to be collaboratively constructed and edited with no specialist tools and very little technical know-how. Wikis are fully editable websites; any user can read or add content to a wiki site. This functionality means that wikis are an excellent tool for collaboration in an online environment.

This is of interest in learning and teaching as a wiki can offer students and educators a more active, participative relationship with web based materials. It has been argued that wikis provide one possible tool to help bridge the gap between teachers and students. In particular, wikis draw upon the best aspects of print and secondary orality by offering a medium in which information is neither fixed in format (as it was in the print age) nor limited to locale (as it was before the print age) but still changeable to meet the needs of the community, freely accessible to remote parties, and easily archived for future use.

There is much evidence that Wikis have been used successfully in education and research has shown that teachers and students can get very creative and develop innovative and useful activities for learning. For some students, wikis become objects to think with, for others, wikis can help build an understanding of a community's shared knowledge.

The following pdf file <http://livingsustainably.wikispaces.com/file/view/wikis+in+e-learning.pdf> presents wikis as a useful tool for facilitating online education. Basic wiki functionality is outlined and different wikis are reviewed to highlight the features that make them a valuable technology for teaching and learning online. Finally, the paper discusses a wiki project underway at Deakin University. This project uses a wiki to host an icebreaker exercise which aims to facilitate ongoing interaction between members of online learning groups. Wiki projects undertaken in America are outlined and future wiki research plans are also discussed.

<http://www.educause.edu/wiki/Wiki-based+Collaborative+Learning>

These wiki projects illustrate how e-learning practitioners can and are moving beyond.

Living sustainably wiki

<http://livingsustainably.wikispaces.com>

Conservation management wikis

http://en.wikipedia.org/wiki/Conservation_management_system

http://en.wikibooks.org/wiki/Applied_Ecology/Conservation_Management

http://en.wikipedia.org/wiki/Applied_ecology

http://en.wikibooks.org/wiki/Applied_Ecology/New_Societies_and_Cultures

http://www.sddu.leeds.ac.uk/online_resources/wikis/