

Categorising Tertiary Environmental Education In Australia

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Since the late 1980s governments have become conscious of the potential for tertiary environmental education to play a greater role in movements towards sustainable forms of development. In Australia various Conservation Strategies and the Ecologically Sustainable Development process have suggested that environmental education should have a higher profile at tertiary institutions (Victorian Government 1987, Commonwealth of Australia 1992).

It is clear that tertiary environmental education activity has been expanding and government rhetoric is lending support to that expansion, but the picture of environmental education at tertiary institutions in Australia is a confusing one. Courses appear to have developed in an ad hoc way very much according to the enthusiasm and interests of individual academics or groups of academics. Courses are taught from within a range of traditional disciplinary areas and the concept of what constitutes an 'environmental course' varies. Greenfield's (1993) directory of Australian courses categorised environmental courses into 19 types suggesting that the scope of what was seen as an environmental course was expanding or, more worryingly, becoming fragmented.

This paper, based on a survey of environmental courses in Australia, builds on the work of Thomas (1993) by looking at the kinds of courses which have been developed, what characterises them, and what the employment prospects are for graduates. The paper reports the results of a follow-up survey carried out in late 1993 and in part returns the results of the survey to those who participated while

A B S T R A C T

The diversity of environmental courses at tertiary level continues to increase. Following from a survey of these courses in the early 1990s the current study revisited the courses to investigate their characteristics. In 1993 tertiary courses with 'environment' in their title were surveyed through a postal questionnaire to gain an understanding of their philosophy and approach to teaching in the environmental field, of the capabilities the courses sought to assist the graduates to develop and of the extent to which graduates were being employed. The paper presents and discusses the results of this survey and offers suggestions about enhancing the role of environmental education in tertiary institutions.

providing a broad picture of the courses to all involved in environmental education. The final sections present some thoughts on the directions of tertiary environmental education which it is suggested need to be considered by the survey participants and all those concerned about the field.

Currently it is difficult to gain insights into the features of particular environmental courses and the skills they provide for graduates. There is no 'clearing house' for environmental courses and because they are taught from within a range of academic faculties even academics teaching in the field lack information about other similar courses. Guides such as Cockburn et al. (1995), Greenfield (1993), Victorian Association for Environmental Education (1994) and the information accessed through 'Net pages', particularly EnviroNet (1996) provide a starting point for prospective students, but may not provide much insight into the characteristics of a course. The survey reported here had the principal objectives of gaining a more accurate picture of the evolving field of tertiary environmental education and of complementing the information contained in the recent guides. A secondary interest was to see how environmental courses defined themselves through their practice.

The study and its results

In late 1993 a questionnaire containing a mix of structured and unstructured questions was sent to the coordinators of all the tertiary environmental course which could be identified at that time within Australia. (Copies of the questionnaire are available on request.) The term 'environmental course' was taken broadly to include those courses with 'environment(al)' in their title, and those which contained an identifiable environmental stream of study; this included degrees in Arts, Education, Engineering, Science and Social Science. The survey was targeted at all full degree courses, rather than at individual 'environmental' subjects. In total about 150 undergraduate

and postgraduate courses were identified and surveyed. Sixty course coordinators responded to the survey, a response rate of approximately 40%.

The courses were categorised into four groups; the numbers of courses within each were as follows:

- Environmental Studies, which included courses with titles incorporating planning, design and heritage—8 undergraduate, 10 postgraduate
- Environmental Science, which included courses with titles incorporating applied science, management, recreation, health—29 undergraduate, 5 postgraduate
- Environmental Engineering—5 undergraduate, 0 postgraduate
- Environmental Education—1 undergraduate, 2 postgraduate

The generic tertiary level of courses ranged from Advanced Certificate to Masters; the number of courses at each level was as follows:

	Number of courses
Undergraduate Advanced Certificate	2
Associate Diploma	3
Major stream of a Bachelor degree	3
Bachelor degree	33
Postgraduate Graduate Diploma	7
Graduate Diploma/Masters	3
Masters	9

Responses to the survey questions were grouped under the four categories of environmental courses as a convenient way of gaining an overview of the range of courses, and to help identify differences in the kinds of courses.

To begin with a general indication of the size and history of the courses was obtained through identifying the year in which each commenced and the size of the first year intake. The numbers of courses starting in the three decades are shown in Table 1. The results indicate that courses starting in the 1990s generally had a smaller intake than the longer established courses. Also there has been a strong growth in the number of environmental science and engineering courses, especially in the 1980s and 1990s, while a small increase in environmental studies and education courses has occurred.

Table 1: Number of environmental courses beginning in Australia the period 1970–1990

Started in:	1970s	1980s	1990s
Environmental Studies			
Undergraduate	3	2	3
Postgraduate	5	2	2
Environmental Science			
Undergraduate	7	10	12
Postgraduate	2	1	2
Environmental Engineering			
Undergraduate	-	-	5
Postgraduate	-	-	-
Environmental Education			
Undergraduate	-	1	-
Postgraduate	-	-	2

The 'mini explosion' of science/engineering courses raises questions about the pace of development of environmental courses and whether this indicates merely a reworking and renaming of existing disciplinary courses.

Section 2 of the survey concentrated on gaining an understanding of the characteristics and directions of environmental courses. Questions were asked about the disciplinary focus, the meaning of the term 'environment', and about each course's philosophy. Respondents were asked to indicate whether and how their course sought to incorporate the approaches of different disciplines. The results are presented in Table 2.

Table 2: Course disciplinary focus

Course type	Disciplinary focus (number of responses)				
	S	M	C	I	T
Environmental Studies					
Undergraduate	-	1	1	4	2
Postgraduate	1	4	2	3	-
Environmental Science					
Undergraduate	4	15	2	4	-
Postgraduate	1	1	-	3	-
Environmental Engineering					
Undergraduate	-	4	1	-	-
Postgraduate	n/a	n/a	n/a	n/a	n/a
Environmental Education					
Undergraduate	-	-	-	-	1
Postgraduate	-	-	1	2	-
Key to disciplinary focus					
S Single, M Multi, C Cross, I Inter, T Trans					

Additional insight into the breadth and complexity of the categories of environmental courses was gained by considering interpretations of the concept of 'environment'. To explore this the respondents were asked to provide their definition of the term 'environment'; a summary of replies is shown in Table 3.

Table 3: Definitions of 'environment'

Course type	Definitions provided by respondents
Environmental Studies	
Undergraduate	<ul style="list-style-type: none"> • Interconnections of natural, social and personal worlds • Influences which comprise a context for humans' environments
Postgraduate	<ul style="list-style-type: none"> • ecological and human systems • interactions of humans with their surroundings
Environmental Science	
Undergraduate	<ul style="list-style-type: none"> • biophysical elements • interaction of physical factors with recognition of humans in physical systems
Postgraduate	<ul style="list-style-type: none"> • natural, built/occupational environments • context of individuals' and societies' actions
Environmental Engineering	
Undergraduate	<ul style="list-style-type: none"> • natural environment • as per the Institution of Engineers (Australia)
Postgraduate	Not applicable
Environmental Education	
Undergraduate	<ul style="list-style-type: none"> • natural world and its relationship with humans
Postgraduate	<ul style="list-style-type: none"> • biological, cultural and historical

In order to discover whether there were differences in the focuses of the courses respondents were asked for an outline of the philosophy of their courses. A summary of the replies is contained in Table 4.

Table 4: Philosophy of course

Course type	Main comments from respondents
Environmental Studies	
Undergraduate	<ul style="list-style-type: none"> • provide an environmental qualification and understanding of environmental management issues • develop understanding of social context and complexity of environmental problems and operate in interdisciplinary teams
Postgraduate	<ul style="list-style-type: none"> • provide enhanced knowledge in environmental science/management policy • develop understanding of biophysical and social components • enable a balanced analytical appraisal of environmental issues and enhance environmental values
Environmental Science	
Undergraduate	<ul style="list-style-type: none"> • provide professional education • meet industry and community needs • sustainable human-environment interaction is possible if impacts can be measured
Postgraduate	<ul style="list-style-type: none"> • improve understanding outside previous science training • provide solutions involving social and physical elements
Environmental Engineering	
Undergraduate	<ul style="list-style-type: none"> • reconcile engineering and the environment • provide a rational basis for decision making regarding human-environment impacts
Postgraduate	Not applicable
Environmental Education	
Undergraduate	<ul style="list-style-type: none"> • appreciate an ecological paradigm
Postgraduate	<ul style="list-style-type: none"> • train and equip people working in environmental education

The teaching approaches adopted in a course was another element which might have helped to distinguish between environmental courses. Table 5 presents a summary of the respondents' assessment of the teaching approaches adopted.

Table 5: Teaching approaches

Course type	Main comments from respondents
Environmental Studies	
Undergraduate	<ul style="list-style-type: none"> • group problem solving • experiential learning • workshops/seminars • studios/project work
Postgraduate	<ul style="list-style-type: none"> • lectures, tutorials and seminars • workshops • field studies • group projects • research thesis/project • computer based projects
Environmental Science	
Undergraduate	<ul style="list-style-type: none"> • lectures and practical sessions# • field work# • projects • group work
Postgraduate	<ul style="list-style-type: none"> • lectures/seminars# • research project# • group work • field work
Environmental Engineering	
Undergraduate	<ul style="list-style-type: none"> • lectures, tutorials, laboratory and practical sessions# • group work
Postgraduate	Not applicable
Environmental Education	
Undergraduate	<ul style="list-style-type: none"> • participatory environment
Postgraduate	<ul style="list-style-type: none"> • cooperation, social criticism and reflection • learning by doing
#most frequently mentioned	

Focus, philosophy and teaching approaches among other influences can all be expected to produce a variety of competencies in the graduates of the four kinds of environmental courses. Table 6 presents the graduates' competencies as identified by the respondents.

Table 6: Identified competencies of graduates

Course type	Main skills/abilities noted by respondents
Environmental Studies	
Undergraduate	<ul style="list-style-type: none"> • research# • group work# • contextual understanding of environment# • interdisciplinary understanding • analytical problem solving
Postgraduate	<ul style="list-style-type: none"> • communication skills# • analytical# • integrative# • group work# • range of disciplinary understandings# • scientific approach# • practical • problem solving
Environmental Science	
Undergraduate	<ul style="list-style-type: none"> • disciplinary competency# • communication skills# • practical# • problem solving# • analytical# • holistic# • multi/interdisciplinary understanding • technical competency
Postgraduate	<ul style="list-style-type: none"> • critical, investigatory skills • scientific knowledge • integrative ability • multi-disciplinary perspective • problem solving
Environmental Engineering	
Undergraduate	<ul style="list-style-type: none"> • making rational decisions with limited knowledge • communication skills • technical competency • problem solving • multi-disciplinary understanding
Postgraduate	Not applicable
Environmental Education	
Undergraduate	<ul style="list-style-type: none"> • critical empowerment • intuitive awareness
Postgraduate	<ul style="list-style-type: none"> • facilitate social change • coordinate the energy of community groups • communicate environmental messages • teaching competency
#most frequently mentioned	

The final section of the questionnaire sought information about the employment of graduates. This data helps to expand the understanding generated by earlier studies (Thomas 1993) of the range of employment in environmental fields, and provides additional insight into the differences between kinds of environmental courses. Table 7 presents a summary of the factors which respondents considered had assisted those graduates who were employed to find their positions.

Table 7: Factors which assisted graduates to gain employment

Course type	Main comments from respondents
Environmental Studies	
Undergraduate	<ul style="list-style-type: none"> • memberships of professional associations • personal contacts
Postgraduate	<ul style="list-style-type: none"> • personal contacts and networking • memberships of professional associations • previous work experience
Environmental Science	
Undergraduate	<ul style="list-style-type: none"> • work experience through the course • membership of professional associations • reputation of the course • staff and students networks in the community • communication skills
Postgraduate	<ul style="list-style-type: none"> • previous work experience
Environmental Engineering	
Undergraduate	Not applicable
Postgraduate	Not applicable
Environmental Education	
Undergraduate	<ul style="list-style-type: none"> • personal drive • experiences during the course
Postgraduate	Not applicable

The responses to our survey indicated that few courses had data bases for their graduates' employment rates. Those who provided a response on employment indicated variable sources including estimates from anecdotal information. From these responses the limited data available indicated that unemployment rates for graduates ranged from about 5% for undergraduate environmental studies courses up to about 20% for postgraduate environmental science courses. For most kinds of courses a small proportion of up to 10% of graduates was involved in voluntary work while the percentage working in areas outside their qualification ranged from 10% of environmental studies undergraduates to 30% of environmental studies postgraduates; the

situation of those from environmental science courses was between these points. No data were available for environmental engineering courses. The little data available for undergraduate environmental education indicated that all graduates were employed apart from the 10% who had taken up post-graduate studies.

Discussion

Data collected in this survey do not provide insight into the forces which led to the variety observed in environmental courses. Remaining open to speculation are the effects of a series of factors including the role of the disciplinary area or department which spawned the course, the personal interests of the initial and subsequent staff, changing interests of students, the developing educational experiences of students in secondary schools, changing staffing and research needs of government and private industry, influence of the reported state of the global environment, the needs of international students and the effects of amalgamations and rationalisation within the tertiary sector. However the point of this survey was not to spend time trying to unravel the history of the courses but to use the data to provide a 'snap-shot' of them in the early 1990s.

There has been a substantial growth in the number of environmental courses over the past two decades, particularly in the areas of Environmental Science and more recently in Environmental Engineering. Environmental Studies courses have remained small in number as have Environmental Education courses.

Information collected by Cockburn et al. (1995) has suggested that since the present survey was conducted the number of courses expanded considerably to well over 300, and that the difference in size between the environmental sciences and environmental studies areas has remained. In the later survey particularly there was some 'double-counting' of courses because of the articulation of many postgraduate courses, especially where a masters course was essentially an extension of a graduate diploma and where some courses were included in one or more categories such as management/science/natural resource. Nonetheless the data indicated that there had been a continuing growth in the number of courses which were called 'environmental'.

The structures and content of tertiary environmental courses surveyed were varied and complex; tertiary environmental education might be seen as lacking coherence and clear direction. The emphasis was on environmental science, with some of the later courses in environmental science appearing to be renamed versions of other science courses. The apparent conversion of courses from science to environmental science might be seen as a reaction to the reduced interest from secondary school students in traditional science courses and as an attempt to attract students by 'cashing in' on the great surge of interest

in environmental matters of the late 1980s and early 1990s.

Course descriptions presented by Cockburn et al. (1995) tended to reinforce this observation as there were few indications of adequate coverage of social constructions of science or environment.

Viewed more positively the emphasis on science might have been an indication that science courses were becoming more inclusive of environmental concerns; from the courses' definitions of environment and their stated philosophies, however, indications were that most tertiary environmental courses were—using the terminology of O'Riordan (1973)—still more technocentric than socially critical.

The distinctions between courses were not always clear. There was a not surprising similarity between environmental science and engineering courses, and also between environmental studies and education courses. This was particularly evident from the definitions of the 'environment' used in the various courses; refer to Table 3. The stated philosophies of all four categories of courses were very similar; refer to Table 4. Either there was a consistency of philosophy across the courses or the language used was such that general differences in practice were hidden.

However differences in practice emerged when teaching approaches were considered; refer to Table 5. Across the range of courses there was a reliance on group work and projects or field work, but there were indications that the environmental science and engineering courses relied more on lectures and tutorials/practical sessions in their teaching methods. Environmental studies and education courses used a wider variety of teaching approaches, and explorative and interactive learning opportunities were fostered.

A fundamental characteristic of socially critical environmental education is the involvement of a range of disciplines (Thomas 1993), preferably presented in situations which assist students to integrate interdisciplinary or trans-disciplinary experiences. In its report on British environmental education the Committee on Environmental Education in Further and Higher Education (1993) noted that most environmental science and environmental studies courses referred to themselves as inter-disciplinary although many were thought to exhibit more multi-disciplinary characteristics. A number of courses in this study which claimed to be single disciplinary, as shown in Table 2, also described themselves as environmental. A large number of courses described themselves as multi-disciplinary or cross-disciplinary rather than interdisciplinary or integrative. Some while describing themselves as interdisciplinary seemed to offer little material on interdisciplinary problem solving or integrative approaches.

Many courses used the term 'environment' in their title or for their promotion and had a focus on environmental

concerns, yet appeared not to exhibit the interdisciplinary approaches nor the social analyses that might logically be expected. The indications were that some courses although 'environmental' in name may have exhibited little of the content and understanding which would give students the experience of an interdisciplinary environmental education. If we take Fensham's (1987) description of environmental education as being education *about* the environment, *in* the environment and *for* the environment, that is seeking ways to bring about improvements, then some of the courses in this survey should probably not be regarded as offering environmental education.

The increase in the number of courses raises concerns for the employment of graduates. According to results of this survey, which indicated the proportion of graduates not in employment related to their degree, it was already difficult for many of them to find work. At the time of the survey the 'economic climate' was not propitious with all graduates finding it harder to gain full-time employment. The *Graduate Destination Survey 1994* indicated that there was then some improvement occurring in graduate employment opportunities with 1994 graduates faring better across the board than those of the previous year (Graduate Careers Council 1995).

It appeared that environmental courses were generally producing graduates capable of meeting the demands of Australian employers. Brown and Clarke (1996) found that graduates from interdisciplinary environmental courses had been sought after by employers. Analytical capacity, communication skills, problem solving and group work skills were among the main competencies indicated by business people as important (Marginson 1993). The list of graduate competencies set out in Table 6 shows there were some differences of emphasis across the four course categories, but it is difficult to discern specific trends. The environmental education courses however indicated broader socially orientated competencies compared to those of the other courses which tended to be more skills focussed. Overall across the categories of courses there was a close match between Marginson's findings and the perceived competencies of graduates. This match suggests that staff of environmental courses can promote them confident that experiences offered by the courses will assist graduates to gain employment.

It is probable that employers were not fully aware of the differences between courses and particularly of the character of environmental studies courses. In this regard the findings of the Committee on Environmental Education in Further and Higher Education in Britain (1993) may also apply in Australia:

Broadly based degree courses in Environmental Science and Environmental Studies have a potentially important part to play in the development of an environmentally responsible workforce. In many cases, however, there is a need for a careful reappraisal of course content and

objectives in the light of employment opportunities actually available. There is also a need to ensure that graduates' capabilities are more widely understood by employers, particularly in industry

Comments about factors which helped graduates to gain employment are shown in Table 7. It appeared that staff were already aware of the benefits of informing potential employers of the abilities of their graduates. Most of the responses indicated that networking and exposing employers to students' work assisted students. Respondents gave these ideas considerably more attention than matters related to specific course content or academic standard which might also have given graduates of a particular course a 'market advantage'.

There is presently a need for tertiary environmental educators to have a clear understanding of the employment market. This is particularly important since 'environmental positions' can be poorly defined. The recent work by Brown and Clarke (1996) indicated that employers, rather than defining an 'environmental graduate' narrowly, were tending to keep their options open by making the degree specifications broad and indicating in duty statements the environmental area or background they were seeking. Building on insights such as this a deeper understanding of employment opportunities and of the market may come through the development of additional links with 'outside' organisations and through working closely with professional associations such as the Environment Institute of Australia with its recent attention to accreditation of courses.

Taking tertiary environmental education forwards

This picture of diversity in environmental studies in Australia is similar to that found by Brough (1992) in the USA where environmental studies on campuses had "...grown in fits and starts...but academia [had] not yet offered an unconditional welcome to this still-maturing subject". More particularly, she estimated that only some 10% of institutions offer environmental studies as a major and concluded with the observation that:

If environmental studies is to be an enduring academic tradition...academia may have to relay its foundations. It will have to value an integrative approach to learning and support that approach with the rewards it currently reserves for its specialists'.

These observations and the data presented in this paper indicate that tertiary environmental educators need to be involved in more sustained discussion about the character and direction of their courses. Greater cooperation in and coordination of efforts to provide diversity and interest in course offerings would help avoid duplication. It is critical to the employment of graduates that clear understandings of the foundations of environmental education and of the different emphases of the various courses be developed, particularly amongst employers. Further, if environmental

education is to become an established part of all tertiary academic curricula, then environmental educators need to coordinate their efforts so that the value of different kinds of environmental courses can be clearly articulated and promoted.

In the past loose networks have been developed with the intention of promoting cooperation. The Environment Institute of Australia has discussed the issues associated with the accreditation of environmental courses. However these efforts have been inconsistent particularly in regard to the role of postgraduate courses.

A catalyst for discussion of these matters would be a broad review of the status and direction of environmental education in Australian tertiary institutions similar to the Toyne report undertaken in Britain (Committee on Environmental Education in Further and Higher Education 1993). Such a review would necessitate a consideration of what the hallmarks of environmental education are. As occurred in Britain the review could lead to proposals for the development of a policy for environmental or green curricula in Australian tertiary institutions. This was hinted at in the National Strategy for Ecologically Sustainable Development (Commonwealth of Australia 1992), but there has been little evidence of subsequent interest by the government or its agencies.

Such a review would provide opportunities for environmental course educators to assess how their courses related to one another and to the more traditional disciplinary courses. Discussion of the merits of such a review and development of a broad environmental education policy may both be generated if we press our professional associations and institutions to generate support for the proposal. Environmental course educators have a reputation for being politically active when it comes to the future of their courses; it seems that the time has come for us to become active again. 🌱

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