

Australian Tertiary Environmental Courses: A Status Report

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Introduction

During the 1970s and 1980s there has been a growing awareness of the environment. This has been particularly evident in the general community through:

- passing of environmental legislation;
- growth in status of environment groups;
- media coverage of environmental issues.

As a result the direction of formal education has been influenced. For example, through the Victorian State Conservation Strategy, the community has indicated the direction for tertiary institutions, where one of the objectives of this strategy is to:

promote and strengthen inter-disciplinary environmental education programs in schools and tertiary institutions. (Victorian Government, 1987, p.89)

Similarly, the Australian Government's Ecologically Sustainable Development process (ESD) has proposed the incorporation of ESD, in tertiary curricular (Ecologically Sustainable Development Steering Committee, 1992).

Linke (1979) has described the development of environmental education curricula during the 1970s whereby consideration of aspects of the environment became more common. Most activity was noted to be in primary and secondary sectors, however, at tertiary level a range of subjects focussing on the environment were apparent, as were several courses which were specifically designed to provide training in environmental understanding.

Subsequently, Smith and Ealey (1981) undertook the first survey of tertiary institutions in the Pacific Region to determine the extent to which environmental courses had been developed. The courses operating in Australia were at both undergraduate and postgraduate levels, and in all states, and the Australian Capital Territory. This listing of courses provided the basis for consideration of their structure (Thomas, 1990), and for several meetings of representatives of these courses between 1984 and 1991 (Unesco, 1990).

Reports concerning tertiary courses and informal information indicate that with the interest in the environment generated during the late 1980s, a number of new courses have begun. However, there has been no comprehensive listing of the range of courses which have developed, nor is there an overall picture of the niche(s) they fill, their influence (in terms of size), nor the role(s) their graduates play in the workforce.

In short, given the expansion of interest that has been shown in environmental issues, it is apparent that this has not been matched by information on what is happening in tertiary education. A status report on the situation would be valuable to enable co-operation between courses, to avoid unnecessary overlap, and to provide advice to prospective students.

The opportunity to explore the situation of tertiary courses was provided by the provision of research grants from the Faculty of Environmental Design and Construction, at Royal Melbourne Institute of Technology, in 1990 and 1991. The following sections outline the scope of the research and a summary of the results; readers interested in more detailed material are referred to Thomas (1992).

Research approach

The overall aim of the research was to produce a status report on the extent of environmental courses at tertiary institutions in Australia.

To achieve this, the objectives were to collect data about the courses:

- administrative structure
- educational focus and structure
- size (staff and students)
- attraction for particular disciplines (for postgraduate courses)
- roles of graduates in the workforce.

Methods

In order to achieve description and understanding of Australian courses a questionnaire was designed to obtain both qualitative and quantitative data. The first eight questions related to the administration of the course, the next two explored the course's direction, then three questions sought details of the course, three focussed on details of the students, two sought information about the graduates, and the final question asked if aspects of the course had been evaluated.

As a result of the meetings of representatives of Australian tertiary environmental courses a list of institutions running these courses was available. A questionnaire was sent to the co-ordinator of each course in late 1990 in which it was noted that environmental courses were those where 'the primary focus is to provide understanding of the physical/natural environment, with appreciation of the role of society, to explore actions to avoid environmental impacts'.

Roughly half the courses responded so the survey was repeated in 1991, using the same questionnaire, which was sent to new courses which had not been included in the previous survey, and those which had not responded at that time. Over the two surveys questionnaires were sent to 46 institutions, and 65 questionnaires were returned from 27 institutions. These data were transposed 'by hand' to summary sheets which were directly related to the questions of the survey form. Summary tables of the data were then compiled.

What was found

Responses were obtained about:

- ~ 33 undergraduate courses
- ~ 32 postgraduate courses, being 11 graduate diplomas
14 Masters
7 PhD/Doctoral programmes.

These courses can be broadly categorised as follows:

<u>Scope of Course</u>	<u>Undergrad.</u>	<u>Postgrad.</u>	<u>PhD</u>
Education	1	4	1
Science	5	4	-
Applied Science	5	-	-
Environmental Studies	5	9	2
Environmental Science	3	1	-
Environ'l Management	14	7	1
(no category)			(3)

Generally, Environmental Studies courses displayed a focus on both social and bio-physical environments, while Environmental Science courses emphasised the bio-physical environment. Environmental Management courses focussed on aspects of the bio-physical environment, within a social context.

Undergraduate courses

a) Administration and structure

- ~ The earliest courses have evolved from programmes with a science base; then in the 1970s courses with an education focus and some science courses with a special tag/stream developed. During the 1980s there has been the development of applied science courses with either a focus on a specific aspect of the environment or a broader environmental planning/management (or environmental science) scope, there were only two examples of courses with a social science focus.

- ~ Courses are typically regulated by a Faculty Board (or similar) or Dean, and occasionally by a programme committee.
- ~ With the exception of four courses, which have a (relatively) large staff primarily involved, there is usually a small core staff (primarily involved with the course), with partial involvement of a significant number of additional staff, while in some cases there is a degree of reliance on casual staff.
- ~ Courses are usually 3 years duration (or 4 years for the few with an honours year, or providing teacher training), while a slight majority provide for part-time study.
- ~ The aim of courses varies - 9 stress vocational issues
7 focus on society- environment interactions
9 promote a science understanding with respect to the environment
5 stress science/ecology
1 has an education direction.

- ~ The focus of courses varies -
environment/resources management for 15
environmental planning/assessment for 5
applied/practical environmental science for 5
social-environmental issues and policy for 4
ecological research for 2
adequate skills for 1.

- ~ The philosophy of many courses (10) was aligned with vocational/practical issues, otherwise scientific understanding and research (particularly the Honours programs) were each noted by 3.
- ~ The majority (17) indicated that the courses were inter-disciplinary, 7 were multi-disciplinary, 5 trans-disciplinary, and 2 disciplinary.

b/ Course components

- ~ The vast majority of courses have elective subjects, and 90-100% coursework although in some cases over 20% may be via research.
- ~ Most involve some teamwork sometimes using a variety of approaches (14 as consultants, 14 as inter-disciplinary teams, while 22 noted students worked in teams for collection of data).
- ~ Where research forms part of the course this is often (15) in a project (about equally mixed as team and individual pieces of work), sometimes (5) there is a choice of individual thesis or team project, while Honours programs have individual theses.

c/ Students

- ~ The size of courses varies considerably with from 11 to 360 entering the first year. There are few overseas students.
- ~ Some courses show a marked dominance by males, occasionally there is a majority of females, but most show a more equal gender mix.
- ~ For the majority of courses the vast majority of entering students are less than 21 years old, but some attract a noticeable number between 20 and 40.
- ~ The majority of students are full-time for the majority of courses, while only 3 appear to be orientated to part-time study.
- ~ Few students are supported by scholarships or the like.
- ~ On the basis of very limited data, the acceptance rate of students appears to be in the order of 70-90% of the offers made, and the graduation rate is 30-90% (generally over 60%) of those who began. Enrolments during the 1980s have been fairly steady or have shown a slight overall rise, except for one of the education focussed courses.

d/ Graduates

- ~ Apart from teaching, graduates find employment in environmental planning/management/policy, then in research and less so in science; graduates are represented in other areas but to a limited extent.
- ~ Most graduates are employed in government, especially at the state level, although many graduates from the environmental planning and health courses found positions in local government. Few were self-employed or working with consultants, but several were with private industry.

e/ Evaluation

- ~ A majority of courses have been evaluated (15 the whole course, 16 all subjects, 1 specific subjects).

Postgraduate courses

a/ Administration and structure

- ~ Early discipline-based courses have evolved to incorporate environmental exploration, and specifically designed environmental courses have begun throughout the 1970-1990 period.
- ~ The majority of courses are housed in the traditional Faculty and Departmental structure, but several come from Centres or have other arrangements (sometimes in association with faculties or departments). Faculty Boards regulate the majority of courses, but for a noticeable number a program committee is involved.

- ~ Generally there is only a small number of staff primarily involved with each course, while additional staff are partially involved. Sometimes there is a heavy reliance on casual staff, but occasionally the numbers of primary staff are such that reliance on other staff is not needed.
- ~ Duration is typically - 1yr full-time, 2yr sometimes 4 yr part-time for Graduate Diplomas
2yr full-time, 4yr sometimes 5yr part-time for Masters
2-3 full-time, 4-6 part-time for PhD/Doctoral.
- ~ The aim of courses is generally environmental education, ecology/environmental or resource management, developed research, integrative training, environmental problem solving and awareness.
- ~ Courses generally have a focus on environmental education, ecological research/application, with some giving more specific attention to scientific research, environmental decision-making, resource assessment and management, or catchment management, while several have a broad focus.
- ~ The philosophy of the courses is often to develop research skills, or in the educational courses to apply environmental educational principles, otherwise courses pursue development of professionals, environmental awareness, transdisciplinary problem solving, independence, and informed action.
- ~ Most courses were categorised as inter-disciplinary, while several transdisciplinary were noted, also disciplinary and multi-disciplinary were represented.

b/ Course components

- ~ About half the courses supplied information on their structure. Of these coursework represented between 20-100% with most being around 60-80%. Presumably PhD/Doctoral and research Masters courses were entirely by research.
- ~ Except for two Graduate Diploma courses, all those noting coursework as a component had electives.
- ~ All but three of those noting coursework as a component indicated that students worked in teams: the Graduate Diploma teams were frequently for collection of data or were inter-disciplinary (and sometimes acted as consultants or otherwise); while three Masters courses had teams working as consultants, most were interdisciplinary.
- ~ For the research component PhD/Doctoral theses were individual. Graduate Diplomas show examples of individual and group

projects, and individual theses and projects. In three cases Masters courses had group projects or theses while the majority, whether by thesis or project, were individually completed.

c/ Students

- ~ Most supplied information indicating that PhD/Doctoral courses have small student numbers, Graduate Diplomas show a vast range (2-120), while Masters generally have less than 20 (except for one with 100).
- ~ Only two courses have a noticeable number of overseas students.
- ~ Overall there is a tendency for a majority of males to be enrolled.
- ~ PhD/Doctoral courses have students ranging in age from early twenties to late thirties. Graduate Diploma students were usually in their twenties, with some in their thirties. Most Masters students were in their twenties (except one with a high % in their thirties and some older).
- ~ Overall, part-time study is the favoured mode, but some courses have a high proportion of full-time students.
- ~ Few courses supplied information about the backgrounds of their students. Of those that did, few students with backgrounds in humanities/social science/economics/law were attracted, as were some from applied science/geography/ engineering/health, with reasonable interest from those with science backgrounds, and strong interest from educationists (for education orientated courses). Science courses attracted those with a science background, while environmental science/studies courses attracted a broad range of backgrounds.
- ~ On the very limited data available, less than 1/2 PhD/Doctoral and Graduate Diploma students finish, while about 2/3 Masters students graduate.

During the 1980s the number of students has fluctuated, but seem to be increasing towards the end of the period.

d/ Graduates

- ~ With the limited data available it appears that PhD/Doctoral graduates have gone into a range of employment areas. Graduate Diplomats have gone to a similarly wide range of jobs (environmental management and policy, sciences, management, and especially teaching). Masters graduates show the widest range with emphasis on administration, environmental policy and management, social science and teaching, but with representatives in science, engineering, environmental planning, design and research.
- ~ Limited data suggests that most graduates found employment with state government, some were self-employed, with limited numbers

going to other areas, but there were few in private industry.

e/ Evaluation

~ Generally there have been few evaluations of courses; 6 noted evaluations of the whole course, and 3 had reviewed subjects.

Interpreting the data

From the response rate it is apparent that the surveys have not been able to obtain data on all the 'environmental' courses initially identified. In addition there are likely to be some courses which did not receive a questionnaire, whether because of not being identified, the questionnaire not reaching the course co-ordinator, or because of the recent introduction of the course.

In the decade since the study by Smith and Ealey (1980) there has been a substantial increase in the opportunities for environmental education, which is now available throughout Australia at tertiary level. Even though some institutions did not provide input to the current study, an increase in the number of environmental courses since the 1970s is evident. Undergraduate courses have increased from 5 to at least 33. The number of postgraduate courses (excluding PhD/Doctorates) has nearly doubled.

Administration of environmental courses is generally traditional through the faculty structure, particularly for regulation, however, there is some use of program committees for course guidance. With regard to staff though, typically there is a small core staff with a larger number of staff partially involved, suggesting environmental courses may be in a similar position to other newer fields of study that are inter-disciplinary; as Milbrath (1990) comments:

Women's studies, peace studies, and environmental studies have been forced onto the teaching and research agendas of some universities by activists struggling against the dominator system. Administrators and faculty have generally refused to give these areas of inquiry mainstream status; instead they are kept on the margin, inadequately funded, and closed down at the first opportunity. Only when their inquiries have turned to technological solutions that do not threaten the dominator system are they looked upon with favour. (p.50)

Reliance on a small number of core staff may reflect a philosophy to encourage involvement of people from a variety of fields. However, the generally small numbers of staff suggest that Australian environmental courses accord with Milbrath's observation, being maintained on the margins of institutional activity.

As with other undergraduate courses environmental courses are often vocationally driven. However, many emphasises scientific understanding usually with an appreciation of environmental interaction, while a lesser

number of courses place emphasis on social-environmental interactions. Environmental management (in its broadest sense) is the main thrust, and is probably a distinguishing feature of environmental courses

However, Tighe and Taplin (1990, p.4) argue that '...environmental studies is the focus of a new body of knowledge'. They propose that the distinctiveness of environmental studies is its trans-disciplinary approach to education and research. While a minority of the undergraduate and postgraduate courses responding to the survey considered that they were trans-disciplinary, it is apparent that this distinguishing approach cannot be used to identify all those courses which lay claim to be providing environmental education (in terms of the definition used for this study). This distinction could be useful in helping to explain some of the differences between the current environmental courses. However, the current study did not collect sufficient data to permit an adequate analysis of this point.

Environmental education is evident at postgraduate level, with a focus of some courses on scientific research or environmental decision-making. In this respect particular courses illustrate features of either traditional disciplinary courses (research skilling and educating professionals) with a particular tag (environment), or have multi-disciplinary dimensions. Most postgraduate courses also displayed broad agendas, indicating an inter-disciplinary, or multi-disciplinary, approach.

Since environmental education emphasises practice alongside theory, it is appropriate that both undergraduate and postgraduate courses would generally involve elements of research, either through projects or theses. Frequently elements of undergraduate courses are approached through teamwork. Projects are frequent, being reported individually or by group report, and some courses have an individual piece of research, as with the later years of other fields of study. Masters degrees (except for Masters by research) also have a strong course-work component, while their research component embodies team work; some Masters teams work as 'consultants'.

The student profiles of the environmental courses are generally as expected for tertiary courses. Undergraduate courses attract younger full-time students, while in postgraduate courses the students are older, and often part-time. At either level, few are on scholarships and few overseas students are involved. Compared with Smith and Ealey's (1980) survey, a much higher proportion of females are now participating in Masters courses.

Based on very limited data it appears that undergraduate and Masters courses have graduated over half of their students while PhD and Graduate Diploma courses graduate less than half. For the postgraduate courses these seemingly low rates probably reflect the situation that most students are part-time and may not be vastly different for other types of courses. The reasons for the number of 'discontinuations' were not sought, but may be related to the general pressures on part-timers (see Thomas, 1989). The graduation rate for undergraduate courses may reflect student interest in involvement in

'environmental' causes rather than study. With greater competition for places in courses these rates may increase.

Again the data is limited, but it appears that postgraduate entrants frequently come from science and education backgrounds; similar to the situation reported by Smith and Ealey (1980). Given the multi-disciplinary emphasis, this relatively narrow intake is surprising, however, the figures could be overshadowed by the number of courses with a resource/management or teaching direction. Nonetheless, some courses show a wide range of backgrounds in their student bodies.

Undergraduates find jobs mainly in teaching and environmental 'management' (similar to the findings of Smith and Ealey (1980)), with state government and sometimes with local government, consultants and private industry. From postgraduate courses graduates go into teaching and environmental 'management', but also sciences, research, administration and others areas, mainly with state government. Hence, although the data is again limited, it appears that there is not a lot of mixing within the job types and professions. Reporting of the very small number of graduates working outside the government sector is consistent with the findings of the general occupational assessment of environmental scientists conducted in late 1990 (Department of Employment, Education and Training, 1990).

Reviews of undergraduate courses (as a whole or with a focus on subjects) were the norm, but postgraduate reviews were in the minority. Whether this reflects greater scrutiny given to undergraduate courses, or reflects their generally non-university origins, is unknown (10 of the responses were from courses which began in institutions that were not then universities). Given that most of the postgraduate courses have been in operation for many years, more examples of reviews could have been expected.

Given the data provided in the survey, there are features which appear common to environmental courses, which can be used to distinguish them, and which help to separate these courses from traditional disciplinary courses. These features are:

- ~ interdisciplinary, or multidisciplinary, approach
- ~ team work for consultant and interdisciplinary research projects
- ~ while undergraduate courses often have a vocational and knowledge direction (e.g. science), and postgraduate courses may emphasise research and professional training, there is an additional and overall focus on issues of environmental understanding and management; usually through consideration of interactions of the physical and social environments, or training teachers with this type of background.

This may explain the types of jobs which graduates go to. Of particular concern, if an intention of the courses is to influence the environmental understanding of all parts of the community, is the apparent concentration in government service; private industry is not being catered for to any noticeable degree.

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