

Imbibing Wisdom of Environmental Impact Assessment

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Introduction

The background to the development of Environmental Impact Assessment (EIA) and the resulting techniques and procedures, or legislation, have been presented by many authors; for example, Canter (1977), Munn (1975), Porter (1985) and Thomas (1987). During the past decade many people have become involved in the practice of EIA, but how they have been trained for this involvement is not well documented. To contribute to the documentation, I will explain the development of a module which can be adapted to suit the time available for the coverage of EIA, and the varying capabilities of undergraduate and post graduate students enrolled in environmental engineering/ management/ planning/ policy/ science/ studies courses.

Following sections examine, firstly the relationship between the objectives of EIA and those of the module, which I will refer to as *Environmental Assessment*. Next the constraints which influence the form of the subject, and the range of possible training techniques are discussed. Finally, the details of *Environmental Assessment's* structure are presented along with some comments on its approach.

The EIA concept

Frequently the objectives of EIA are not clearly articulated. The following selected examples are some of the more precise attempts to clarify the purpose of EIA.

- * "To the developer, (EIA's) short-term purpose is to comply with regulations imposed by some authority. To the public its long-term purpose is to protect the environment". (Spry, 1976; 254)
- * "The object of the (Environment Effects) Act is to ensure that the environmental effects of proposed new developments which could be of environmental significance are carefully described and considered before any decisions are made." (Ministry for Conservation, 1983;1)
- * "The object of this (Environment Protection Impact of Proposals) Act is to ensure, to the greatest extent that is possible, that matters affecting the environment to a significant extent are fully examined and taken into account..."

(Commonwealth of Australia, 1974;1)

- * "Environmental impact assessment (EIA) is the systematic gathering of information about the consequences for the environment of proposal to change it, a process which ideally involves seeking the views of interested parties and individuals on the effects of alternative methods, of achieving the proposal's objectives, so providing a major opportunity for public participation in decision-making." (Mosley, 1976;267)

These statements suggest that the objective of EIA is to identify the possible risks to the environment that may result from a proposed action. This information is then used to decide whether to proceed with the action, and on what conditions. If the likely effects of a proposal are known in advance, steps may be taken to avoid or make allowance for any adverse effects. While public involvement usually does not appear as an objectives of legislation, there are often provisions for the public to be given the opportunity to comment on the proposal and its possible consequences. In summary, four principal objectives of EIA can be identified (Thomas, 1986):

- a) to identify the potential environmental effects of undertaking a proposal;
- b) to present these effects to decision-makers;
- c) to enable decision-makers to take these effects into account, alongside other relevant factors;
- d) to provide the public with the opportunity to be informed about the proposal and to comment on it.

These objectives may be understood by those who are experienced with EIA, but the wider community seems to hold two particular misconceptions of EIA:

- a) that it is designed to protect the environment by stopping 'bad' development;
- b) the preparation of an Environmental Impact Statement (EIS), or similar document, is all EIA entails.

The first is especially important for the training of EIA 'users' in that they must appreciate that the EIA process provides only advice on environment effects, and how they should be handled. It is necessary to understand this limitation on the power of EIA, if the restrictions it imposes are to be overcome. The

second point has repercussions for the scope of a training program, as to whether it covers only preparation of the EIS or the full decision-making process.

Scope of EIA training

The general backgrounds and experiences of participants of a training course influence its scope. A course for practitioners of EIA could be expected to concentrate on specific aspects and therefore be much narrower than a course for people with little knowledge of the topic. Lee (1987) suggests that the training of technical specialists should build upon their existing disciplinary backgrounds, while being related to the context in which their expertise would be applied; multi-disciplinary experience and practical work are preferable to undisciplinary and exclusively theoretical learning. However, for people involved in less technical and more decision-making roles, Lee considers their training should develop an inter-disciplinary understanding of EIA to comprehend the basic principals and ideas of the relevant disciplines which have to be integrated into the EIA process. He also identifies three categories of training (general awareness, specialised technical training, and EIA project management training) and notes that some students may have needs which require involvement in more than one of these categories.

Students enrolled in 'environmental courses' typically have had little involvement with an EIS, some have 'come cross' an EIS, while most have only heard of the EIA process. In these courses, broader training than for technical specialists is desirable, but students are also expected to be capable of contributing to the preparation and/or assessment of an EIS. Further, these courses usually endeavour to facilitate development of a responsible and caring stance to the environment so that, in the context of *Environmental Assessment*, students would be expected to use their understanding of EIA to promote environmental interests. Hence the aim of Environmental Assessment is to provide a general understanding of EIA; its background role and applications. Where time permits these areas can be explored in detail, and additional attention can be given to the techniques of predicting and assessing environmental impacts.

Environmental Assessment has four objectives:

- a) **Knowledge of the EIA process**
To ensure that candidates have an appreciation of the scope of EIA, they need understanding of the background to EIA; both the need for the process, and resultant legislation. Knowledge also means awareness of when and how EIA is used, plus its relationship to other government processes and general decision-making. Worldwide there is a variety of approaches to EIA so it is useful for candidates to be exposed to the major differences.

Inevitably candidates would focus on the approach most relevant to them (such as their State legislation), however, through comparisons with other approaches they can appreciate the strengths and weaknesses of the 'local' method.

b) Understanding EIA

The EIA process has five essential steps:

- i) identification of actions which should be examined within EIA (the approach used in most legislation is to consider actions which could result in 'significant environmental effects' as being candidates for EIA investigation);
- ii) preparation of the documentation about the investigation of environmental effects, i.e. the EIS or similar report;
- iii) assessment of the EIS and associated public and (government) departmental comment;
- (iv) making decisions about whether the recommendation of the assessment (and/or EIS) would be followed and who would be responsible for carrying out the recommendations;
- (v) monitoring the environmental effects of the action (to assess the accuracy for predictions and effectiveness of safeguards) and auditing of the EIA process (to assess effectiveness and highlight aspects requiring improvement).

It may be tempting to concentrate on preparation of the EIS since this is the focus of attention for professionals and the public. However, in terms of the objectives for EIA it is equally important to ensure that relevant actions are identified, and that 'correct' decisions are made (through monitoring/auditing).

Hence, to reflect the practice of EIA a training course should give stage (ii) (preparation of an EIS) emphasis, while giving attention to other stages to establish an overall understanding of EIA. Consideration of all stages also serves broader objectives since the EIS can be examined in its social and technical contexts, while stages before and after preparation of the EIS can be related to this documentation phase.

c) Experience of an EIS preparation

An EIS is probably one of the most difficult types of report of write. There are conflicting objectives of it being a source of technical information and being understandable to a lay audience; requiring a balance between adequate detail and simplicity. Further, an EIS is prepared for the proponent of an action, but it is also a principal means of providing opponents with information. Hence, a universally acceptable document is

unlikely. Finally, an EIS is both a technical report and a political document; since environmental effects are difficult, if not impossible, to quantify there are disparities between 'objective' and 'subjective' assertions which lead to recommendations that are ultimately considered by politicians.

Preparation of an EIS requires awareness of:

- * requirements of the proponent and government agency responsible for the EIA process;
- * the relevant issues of be considered;
- * sources of information;
- * sources of expertise;
- * ways of assessing environmental effects;
- * report writing issues;
- * data presentation options;
- * project management (to balance resources for data collection and presentation against available resources and deadlines)

Each of these aspects could occupy a number of training courses, and much time which is not available unless preparation of EIS was a person's sole occupation. The limited time available in an EIA training course means that most of the above aspects must be covered somewhat superficially. However, because each is directly relevant to the EIS, it provides a context to learn about the components.

d) Explaining methods used in EISs

At most stages of EIA alternative methods are available. In the identification of actions (stage (i) or 'screening' of proposals) methods range from the use of informed opinion to forms of check lists (for example see Tomlinson, 1984). Methods for monitoring are numerous and relate to the factor being monitored; whereas auditing usually relies upon descriptive investigation of the effects of an EIA approach over a number of years.

There are a number of optional methods associated with data collection, evaluation and presentation; see for example Bisset (1984), Shopley and Fuggle (1984), Thomas (1987) and Wathern (1984). There are also options available for the identification of relevant issues (ie. 'scoping'); for example relying on previous examples, checklists or expert opinion, or seeking public input. Facilitation of input from the community has a variety of methods as well.

Time available for an EIA course is unlikely to permit more than an introduction to the types of methods available. Ideally students should have the opportunity to use a variety of methods to appreciate a method's limitations, and advantages. In practice, a concise review of methods and summary of the 'pros and cons' may have to suffice.

Training approach

Several mechanisms for imparting information to students are available to educators; these include lectures, laboratory sessions, case study reporting, seminars and workshops. Each have advantages and limitations. Traditionally lectures have been relied upon with laboratory sessions and seminars to provide opportunities for practical experience and clarification.

A factor in selecting teaching methods is the background of the student body. With postgraduate students, many have had experience in research and report writing, as well as with aspects of collecting and interpreting environmental data. These people often have much to contribute to the classes. Undergraduate students will generally have more restricted experiences to bring to EIA. However, all will have levels of knowledge and skills, gained from other undergraduate subjects, and from projects undertaken in their senior secondary years. Teaching methods which encourage all students to lend their experience assist both the store of knowledge of the class and the satisfaction gained by the student.

In *Environmental Assessment* two main teaching approaches have been adopted: where a number in the class would have some experience relevant to the topic, their involvement and interchange between members of the class is facilitated; where most of the class will be exposed to 'new' information the traditional lecture format is used with opportunities for two-way exchanges, and extension of the material through practical exercises. (Lee (1987) notes that EIA courses generally have been considered successful where 'learner active' methods have been used.)

The overall philosophy of the training program is also important. Fensham (1987) describes the features of environmental education as being education about the environment, in the environment and for the environment. Environmental Assessment follows these three principles, with its material relating to the environment, drawing on the practice of EIA, and orientated to ensure that EIA would be conducted to give due weight to protection of environmental values.

Influences on the design of environmental assessment

a) Time available

EIA may be a small part of a broad program; at best a semester length subject at worst 3 - 4 weeks of a general environmental subject.

- b) **Resources**
The range of materials related to EIA and EIS has gradually expanded, but while there is adequate information describing EIA and its theory, there is little which presents an analysis of EIA practice. Frequently there is a dearth of current EIA examples when needed for the practical application of EIA techniques; old or fictitious examples abound, but may not encourage candidates to take the exercise seriously.
- c) The varied backgrounds of students is both an advantage and a constraint for the subject. Variety brings a wealth of experience which expands and stimulates other students. It also means that for all students to obtain a good overview of EIA, time has to be spent on background material rather than pursuing details of EIA that would assist those who were more advanced.
- d) EIA inevitably requires the participation of more than one person; and preferably more than one discipline. Students consequently need exposure to working with others if they are to understand the practice of EIA. This also provides the opportunity to introduce learner active approaches.

Environmental assessment

The foregoing illustrate the types and range of topics which are part of EIA. Given the design of the module it *Environmental Assessment* looks at three main areas:

- providing understanding of EIS preparation;
- illustrating the relationship of EIA to decision-making;
- drawing parallels between EIA and other assessment techniques (for example Social Impact Assessment).

Based on eight years experience of involvement in EIA training at under and postgraduate levels and the feed-back from these students, *Environmental Assessment* has evolved a core set of information and activities, with the option for additional exploration if time is available.

The *core* comprises:

- i) Lectures to provide knowledge of EIA; these cover the background of EIA, brief comparisons of international and interstate EIA processes, the relationship of the EIS to the assessment report (which provides advice about the proposal), content of the EIS, techniques for scoping and evaluating environmental impacts, the role of EIA, and the roles of other assessment approaches, (for example risk assessment and technology

- impact assessment);
- ii) An individual assignment requiring the critique of an EIS: depending upon the weight which Environment Assessment has been given, this graded 500 - 3000 word critique ensures students gain some familiarity with the content, structure and style of an EIS;
 - iii) A group project requiring 3 - 6 students to prepare the outline of an EIS again depending on the weight given the module an input of 1000 - 3000 word (equivalent) per group member gives students an introduction to the complexities of producing an EIS.

The formal (lecture) sessions are supported by a comprehensive set of notes (see Thomas, 1987) and reference to general texts on EIA. The context for their exploration is given by preparation of the EIS, without which general exploration of EIA theory would be somewhat aimless and of little interest. This 'problem solving' aspect is intended to stimulate continuing interest in the topic, and inquiry directed at understanding EISs; as such, it is similar to the problem based teaching methods promoted by Feletti (1988).

The individual critique is usually distributed around one-third of the way into the lecture program, and is required within one or two weeks. This ensures that students are exposed to an EIS before they tackle the group project. However, the exercise requires the availability of a set of EISs easily accessible to the students.

The group project focusses on the case study of a topical EIA proposal and provides some experience with EIS preparation, enabling students to 'get their hands dirty' (education in the environment). It is presented to students around two thirds through the lecture series, so students have a short time to come to grips with the task before lectures finish. The time allowed for completion can be made flexible to fit with other subjects and the students' workload.

To fully appreciate the subtleties of EIA, students have to experience an EIS which is used as a vehicle for highlighting the issues of EIA; such as public involvement, utility of assessment techniques, subjectivity of evaluation, as well as presentation and review of data. These can be pointed out, but have more impact when students make their own discoveries. In the early years of Environmental Assessment, students only read an EIS and reviewed (assessed) it, but showed less insight and interest in the role of EISs than when involved in the steps to prepare such a document.

Ideally students would prepare a complete EIS. However, the time and resources to allow this are seldom available. As a compromise students are required to prepare only a comprehensive outline for their EIS to clearly show:

- issues to be covered;
- sources of data and analysis method for each issue;
- style of evaluation of information;

- format of EIS and presentation;
- public consultation program.

The topic(s) for the outline are chosen from current proposals for which an EIS has not been prepared, but where there is some easily accessed basic information about the proposal. The aim of the exercise is not to have students spend their time collecting primary data, but to have them identify and broadly assess the main issues.

The context for this outline (as given to the students) is that they are acting as consultants or as an internal task force within an organisation, and are presenting what amounts to a progress report to their client/boss to act as input and guidance for the next stage of completing the EIS detail. If it can be scheduled, the outline is then presented to the class as if the EIS team were making a presentation as 'consultants', to the proponent of the EIS proposal. Such an opportunity enables candidates to acquire practice in organising their material and speaking to (small) groups, as would be the situation in EIA practice.

Many *options* are possible. The following provide some additional activities which can be used when time is available to expand the understanding developed by the 'core':

- **Guest Lecturers**
Since there are a variety of perceptions about EIA (Thomas, 1986) a lecturer can be drawn from a government department and/or private industry which has had experience with EIA, a consultant who has produced EISs, and a conservation group having involvement with the EIA process. The students' experience with the EIS critique and preparation of the EIS outline will, if the lectures are late in the module, provide the bases for many questions. Two lecturers could be brought together during the same session. However, the difficulty of having them evenly 'matched' in terms to expertise and experience may mean that one dominates the discussion.
- **Other Impact Assessment approaches**
A session (lecture and tutorial/practical or workshop) could easily be spent detailing social/technology/health/regulatory impact assessment, and risk/energy analysis.
- **Additional assignments**
After completing the outline, students could prepare a short assessment of one of the other team's EIS outline. This would ensure that they are exposed to different points of view about the EIS, and gives them the opportunity to demonstrate their understanding of EIS preparation. Previously, students were required to write a short Assessment Report

of a published EIS. This exercise had the same purpose and had the advantage of ensuring that they looked closely at one (full) EIS.

However, they did not become involved to the same extent as with a team topic, and tended to be forced into superficial comments because they lacked the context of the project.

Students could also be given the opportunity to undertake a report on some aspect of EIA particular interest to them, to allow exploration of aspects of EIA more deeply than presented in the timetabled sessions. When this assignment has been set for postgraduate students they were encouraged to develop their own topic so long as it is related to EIA. Between 1984 and 1987 the most 'popular' topics were public involvement, other assessment processes (risk and social impact) and EIA in particular overseas countries.

Students can also be required to report the salient points of their work to the class to provide the groups with more information about the parts of EIA which they may not otherwise have considered.

Concluding comments

EIA is a complex topic which makes EIA training courses more so. While still under some development, *Environmental Assessment* is a flexible module which has achieved a structure with the capability of providing a broad coverage of the main aspects of EIA to a range of students. Requiring them to grapple with the contents of an EIS (an outline) gives them a context for learning about EIA.

Environmental Assessment has been presented as an example of an EIA training program. Its approach is by no means the only one possible. However, such programs can be made effective by taking account of the expertise and potential role of the students, developing opportunities for making the training relevant (practical) and utilising interactive learning situations.

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