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The University of Sydney

Learning Centre

Student Services

Writing a Thesis Proposal

Independent Learning Resources

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Objectives

After you have worked through these materials, you should be able to:

- Focus your thesis topic
- Understand the purpose of the thesis proposal
- Understand the general structure of a thesis proposal
- Understand the purpose and structure of the introduction of a thesis proposal
- Be clear abot how to formulate research questions, aims, objectives.

Some sections have exercises for you to complete. Some of these exercises provide an answer key marked with the symbol

(1) Introduction

There is no one "definitive" way to chose a research topic and to get it accepted. In fact, there are probably as many ways as there are departments in a university. Some departments require a proposal, others don't. Some departments require a detailed proposal, others are satisfied with a general preliminary outline. Some departments require students to present their proposals at a research seminar, others circulate proposals among staff and often a student will have an interview with a potential supervisor. Despite this variety of procedures, there are still some general issues that all students should consider before they start their research, even if they don't have to write a proposal at all.

1.1 Different Degrees - Different Theses

A thesis is usually required from students who do Honours, Masters and PhD degrees. At the Honours level, the thesis is one part of the overall degree, at the Master or other Doctoral level it can be one part of the degree in conjunction with coursework or the whole degree, and at the PhD level, the thesis constitutes the sole requirements of the degree.

Length, scope, depth and originality of the thesis depend on the degree which it is for. The following table presents an overview of the general expectations of a thesis at Honours, Master's and PhD level.

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	HONOURS	MASTERS MINOR THESIS	MASTERS MAJOR THESIS	PHD
DEFINITION	A substantial project which demonstrates an understanding of the research process and scholarly conventions of the discipline.	• An ordered, critical exposition of knowledge gained through student's own effort. • Demonstrates sound under-standing of research process.	Shows evidence of advanced knowledge in a specialist field.	Candidate has: • conducted a substantial piece of research; has been conceived • conducted and reported by the candidate under academic supervision in an academic environment for a prescribed period.
SCOPE	Similar to Masters minor thesis.	• Not necessarily new line of enquiry or contribution to knowledge, but still locates topic in context of critical review. • Demonstrates knowledge of appropriate methodology.	Not necessarily new line of enquiry, but shows that student has mastered research and synthesising skills in producing a contribution to knowledge.	Similar to Masters Research degree, but deeper, more comprehensive treatment of subject.
SCHOLARSHIP		Demonstrates ability to present study in a disciplined way in scholarly conventions of the discipline.	• Shows evidence of independent investigation and testing of hypotheses. • Ability to make critical use of published work. • Appreciation of relationship of topic to wider field of knowledge. • Competence in independent work. • Understanding of approaches and techniques appropriate to research question. • Should draw generalisations or further hypotheses for testing.	• Demonstrates authority in candidate's field and shows evidence of knowledge in relevant cognate field. • Mastery of appropriate methodological techniques and awareness of limitations. • Makes a distinct contribution to knowledge. • Originality of approach or interpretation. • Ability to communicate research findings effectively in professional and international contexts. • Research apprenticeship is complete and holder is admitted to the community of scholars in the discipline.
LENGTH	Varies by department; depends on weighting against coursework.	10,000 - 20,000 words, depends on weighting against coursework.	Varies by faculty; max. 50,000 words.	Max. 100,000 words.

(adapted from Powles, 1994:24-25)

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1.2 Differences According To Disciplines

There are also considerable differences between the sciences, the humanities and the social sciences as far as students' range of topic choice, students' degree of freedom in choosing specific research questions, and the overall timing of the research project is concerned. The following table provides an overview of disciplinary influences on topic selection.

	SCIENCES	HUMANITIES	SOCIAL SCIENCES / APPLIED PROFESSIONAL FIELDS
RANGE	restricted range of choice; suitable topics made available by department according to staff expertise, research interest and research funding	students usually required to initiate own topics; take into account supervisor's interests and availability of data	wide range of practices: from close direction of science model to deliberate absence of direction of the humanities model
DEGREE OF FREEDOM	students may have more freedom on deciding research question, but often close direction by supervisor	supervisor reluctant to interfere in topic choice, theoretical perspective, method, specific research question	topics and research questions often derived from field of student's professional practice
GUIDANCE / TIMING	research question decided early; schedules, timelines, deadlines are important	supervisor guides student in understanding how the chosen theoretical framework is situated against existing theoretical development in the field or in related fields	identification of specific research question may take considerable time as students require a good deal of disciplinary and method-ological grounding before they are able to formulate specific research questions

(adapted from Parry and Hayden, 1996:2-3)

Exercise

Think about the following questions:

- Into what disciplinary area does your research field fall? Can it be clearly located in one area or does your research go across disciplines?
- Depending on the amount of preparation you have already done, what has been your experience with regard to topic choice, degree of freedom and guidance?
- If you are still very much at the beginning of your research, think about what problems you might encounter and how you might deal with them.

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1.3 Is My Topic Feasible?

You may start with a rather vague idea of a research topic. It is then necessary to assess how the topic can be narrowed down to potential sub-topics for more thorough consideration. The following checklist contains one set of general questions, and five sets of specific questions for specific types of topics. It is recommended that you read all the questions in all sub-sections because the questions may trigger ideas that you have not considered previously. Also, you will not be able to answer all the questions at this stage. Rather, use them to guide your thinking.

(a) Questions about the topic in general

(1) Is there current interest in this topic in your field or in a closely related field?
(2) Is there a gap in knowledge that work on this topic could help to fill or a controversy that it might help to resolve?
(3) Is it possible to focus on a small enough segment of the topic to make a manageable thesis project?
(4) Can you envisage a way to study the topic that will allow conclusions to be drawn with substantial objectivity. Is the data collection approach (i.e. test, questionnaire, interview) acceptable in your school?
(5) Is there a body of literature available relevant to the topic? Is a search manageable?
(6) Are there large problems (i.e. logistic, attitudinal) to be surmounted in working in this topic? Do you have the means to handle them?
(7) Does the topic relate reasonably well to others done in your department? If not, do you have any information about its acceptability?
(8) Would financial assistance be required? If yes, is it available?
(9) Are the needed data easily accessible? Will you have control of the data?
(10) Do you have a clear statement of the purpose, scope, objectives, procedures, and limitations of the study? Do you have a tentative table of contents? Are any of the skills called on by the study skills that you have yet to acquire?

(b) Questions for topics employing a research question or hypothesis

(1) Do you have acceptable statements of research questions or hypotheses?

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(2) Can you specify how you will answer the questions or test the hypotheses?
(3) Would the thesis be a contribution if the findings do not support the hypotheses or fail to answer the questions?
(4) Have subsidiary questions or hypotheses been identified that deserve study along with the major ones?
(5) Are there alternative questions or hypotheses that might explain the findings anticipated?

(c) Questions for topics requiring interviews for data collection

(1) What style or type of interview is best suited to the objectives of the study?
(2) Does an interview protocol exist that fits the purposes of the investigation? Has it been pilot tested?
(3) How will the data be recorded and collated for optimum speed, accuracy, and reliability?
(4) How will matters of confidentiality and permission be handled?
(5) How will bias in the interviewer and the respondent be minimised or measured?

(d) Questions for topics using a questionnaire approach

(1) What form of questionnaire will be most productive for this kind of study? Has it been tested?
(2) How will questionnaire items be related specifically to the purpose of the investigation?
(3) Why is the questionnaire the tool of choice for data collection?
(4) How will it be assured that the questionnaire will be answered?
(5) How will the questionnaire responses be validated? Analysed?

(e) Questions for topics involving mathematical analysis of data

(1) What quantitative analyses are planned? What will they produce?
(2) Are the quantitative analyses appropriate to the kinds of data collected?
(3) What level of confidence will be accepted as significant? Why?
(4) Are there computer programs that will save time, energy, and money? Are they available?
(5) What rational and subjective interpretation will be needed to be given to the statistical findings to make them meaningful?

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(f) Questions for topics making use of existing data from other sources

(1) Are the data relevant? Reliable? Valid? Complete?
(2) Are there limitations on the present or future availability or utilisation of the data?
(3) Why is it better to use these data than to collect one's own afresh?
(4) What additional data need to be collected? What and why?
(5) What obligations to the other sources go along with publication based on these data?

(g) Questions for topics involving tests and testing in data gathering

(1) Are the tests the most valid and reliable obtainable?
(2) Do the tests discriminate against significant groups in the sample?
(3) Do the tests provide direct measures of the key variables in the study?
(4) How will confidentiality be preserved?
(5) What interpretations will be needed to make the test results meaningful in relation of the purpose of the investigation?

(adapted from Mauch and Birch, 1989:47-49)

From these questions we can extract a number of issues that are relevant to most research topics:

- Solution to some problem
- Importance of "how"
- Justification of "how"
- Objectivity vs. bias
- Importance of interpretation

In addition to these, when your research deals with human beings or with sensitive material:

- Confidentiality

The answers to these questions are by no means easy, and some questions may even seem unanswerable at this early stage of your research. But keeping these questions in mind and **trying to think** of an answer will force you to refine and polish your topic until the project becomes acceptable and manageable.

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Exercise
Think about the following:
(1) Which of these questions and issues are relevant to your research?
(2) What further questions and issues do you think may be relevant for your research?
(3) Can you think of any preliminary answers how you might deal with these questions?

1.4 Focusing The Topic

Exercise
The following represents three consecutive drafts of a thesis outline. In which order do you think these drafts were written? Which draft do you think found the supervisor's approval and why?

Outline A

(1) The conflicting ambitions of the two great power rivals, the Soviet Union and Great Britain in Iran from 1921 to 1941.
   (a) The concept of rivalry
   (b) The area of influence in international relations

(2) International events as external elements of rivalry in Iran

(3) Internal decisive elements which made the two great power rivals interested in competing against each other in areas such as oil and security belt.

Outline B

(1) Great Powers - USSR and GB - perception and nature of interests in the Middle East, especially in Iran, from 1921 to 1941.
   (a) perception of each other
   (b) nature of their rivalry

(2) Middle powers as pawns in a geopolitical area which involves great power rivalry

(3) How such rivalry impacts upon the internal and external policies of Iran.

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Outline C

(1) Types of Iranian foreign policy vis-a-vis outside rival powers since nineteenth century:
   (a) Membership of an alliance
   (b) Establishment of acknowledged sphere of influence
   (c) Neutrality
   (d) Balance of power
   (e) Collective security

(2) Domestic spheres of the time and policies adopted
   (a) Socio-cultural
   (b) Economic - military
   (c) Political

(3) International and regional systems of the times

(4) Discussion of the relevance and coherence between the respective spheres and the different policies together with evaluation of the efficacy in maintaining the Iranian integrity and independence.

(c) was the first draft. The topic is far too broad and general, and the proposal is purely descriptive.

(a) was the second draft. The topic has become more focused and there is now an interpretive element, “rivalry”; but still, the argument is not very clear.

(b) was the final draft and the supervisor was happy with it. The focus has become even stronger and a clear thesis has emerged: The middle powers as pawns between the great powers.

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(2) What is a Thesis Proposal?

2.1 Purpose Of A Thesis Proposal

In the most general sense, a thesis proposal is *"a document that **presents a case** for an idea and the action one proposes with respect to it."* (Krathwohl, 1988:12, emphasis added)

Its purpose is *"to **justify** what you plan to do in order to gain approval for it."* (Thornquist, 1986:3, emphasis added)

2.2 Why Write A Thesis Proposal?

- A thesis proposal lays the **groundwork** for the research you're planning to do.
- Because it forces you to think through the whole project from beginning to end, you will be able to anticipate problems that may occur during the course of your study and to be prepared for them.
- If you have an idea where you're going it's easier to get there.

2.3 Requirements of a Proposal

In order to achieve its purpose, a thesis proposal must fulfil the following general requirements:

- Establish a context for your research and demonstrate the need for it
- Show that your study will meet this need, and how it will meet this need, i.e. the method you will use

More specifically, a research proposal should have the following elements:

- **Introduction**
  Nature of the problem
  Why the problem is important
  How your research would contribute to the solution of the problem

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- **Research question or hypothesis**
  For example, what is the relationship between two or more concepts, variables, phenomena, things, events, etc. This should also include a definition of terms. This section can also state subsidiary questions or sub-hypotheses.

- **A review of the relevant literature**
  This should not simply be a list of summaries with some comments added on, but an integrated statement that **explains why** these studies or theories are important to your research. (See what we said earlier about "present a case" and "justify what you plan to do"!)

  Note: The Learning Centre offers a special workshop "Writing a Literature Review".

- **A description of the procedure.**
  This can include:
  - a description of the theoretical or conceptual framework
  - sources of evidence and authority
  - analytical technique and research design
  - a timetable for completing the study.

- **A trial table of contents**
  This has the following advantages:
  - it shows the reader the dimensions of the research topic
  - it provides the writer with a temporary organisational framework.

- **Bibliography**
  At this stage the bibliography does not need to be complete. Its purpose is to give the supervisor an indication of the quality of sources available, and it enables the supervisor to suggest additional sources that you may have overlooked.

  (adapted from Powles, 1994:23)

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3. Writing the Proposal

3.1 Audience

The proposal should be written for "an intelligent, well-informed person, but one *who is not* deeply involved in the particular problems you are addressing." (Mauch and Birch, 1989:65)

3.2 Getting Started

The first step in preparing a research proposal is to prepare a rough draft. The following questions, and any additional questions that may be relevant to your study, can provide a framework for this.

Start by writing preliminary answers to these questions. At this stage, the answers do not have to be, and cannot be, complete. This is merely a means to get you over the first hurdle.

(1) What is the tentative title?
The emphasis here is on "tentative". The title will change as your research progresses.
(2) Why do you want to do this research? What do you think you will be able to say when your research is complete?
(3) What steps will you have to take to accomplish what you want to do? Can you put these steps into a sequential order?
(4) What facilities will you need?
(5) What kind of help from other people will you need?
(6) What kind of permission will you need?

(adapted from Mauch and Birch, 1989:57-58)

If your research involves human being or animals, your research will need to be approved by the relevant Ethics Committee. Some general information is available from the University of Sydney website at http://www.usyd.edu.au/ethics/ (This is general information only. You will need to contact the Ethics Committee yourself and obtain any clearance and permission that may be required.)

While the answers to these questions are still rather rough and tentative, you should take some time to edit this preliminary outline once or twice so that it becomes a cohesive text, not simply a string of answers. Also, while the content of

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this draft is still quite informal, the proposal should be written in an acceptable formal academic style.

It is also a good idea to consult university and departmental guidelines about formal requirements and editorial matters at this early stage of your research. This will save you much time later. The most comprehensive and authoritative guide for the Australian context is the *Style Manual for Authors, Editors and Printers*, Canberra: Australian Government Printing Service.

Note: The Learning Centre offers workshops on "Clearer Writing" and "Writing in an Academic Style".

3.3 Structure Of The Proposal

Of the proposals examined for these materials, there were not two that followed the same structure. But all were considered to be good proposals by the respective supervisors, and all were successful. Below is an overview of the structure of four proposals from four different disciplines.

Proposal Headings:

Biology (PhD)	**Anthropology (PhD)**	**Polit. Science (PhD)**	**Education (MEd)**
Aim: 1. to describe 2. to test theory ...	An introduction showing why the research is important and what the gaps in existing research are.	Problem	1. The problem 1.1 Background 1.2 Introduction 1.3 Purpose of study 1.4 Hypotheses 1.5 Definitions 1.6 Delimitations 0000and limitations
Background	Literature review (short)	Subproblems (7 questions)	2. Theoretical framework and lit. review 2.1 ..... 2.2 .....
Additional questions	Method	Hypotheses (4)	3. Methodology 3.1 ..... 3.2 .....
Theory	Map	Delimitations	4. Application of findings
Timetable	Bibliography	Definitions of terms	5. Conclusion
		Methodology	References
		Basic reading list	
Length: 6 pages	Proposal: 8 pages Bibliography: 19 pages	Length: 9 pages	Length: 19 pages

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(4) The Introduction

No matter what heÅading you choose for the introductory section of your proposal, it should, in the most general sense, do two things for the reader:

- It should provide a "map" of what is ahead
- It should make the reader want to find out more about your research.

More specifically the introductory section to a thesis proposal should tell the reader something about the following:

- What is the study about?
- Why is it important?
- What is the problem, question, hypothesis, theory to be tested, etc.?
- What is some of the most important relevant work done in this area?
- What further research is needed in this area?
- What can be the usefulness of your study?

(adapted from Mauch and Birch, 1989:65 and Thornquist, 1986:6-7)

In terms of sequencing this information, a move from the general to the specific would be appropriate in many cases. The following questions can serve as a guideline:

QUESTION		PURPOSE OF INFORMATION
What is the topic?	→	Orientate the reader by giving some general background to the topic
Why is the topic important?	→	Justify your research by explaining to the reader why this is an important area of research
What do we know about the topic in general?*	→	Provide the reader with a context for your research by giving a brief summary of past research
What are some gaps or weaknesses in our knowledge about the topic?*	→	Justify your research by showing gaps, weaknesses, etc.
What are you going to do about these gaps?**	→	Give the reader a general statement about the purpose of your research

The questions marked * can be developed in more detail in a literature review. The question marked ** can be developed in more detail in a section that states your research questions, aims, objective, hypotheses etc.

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Exercise

Examine the following introduction to the proposal *Determination of Range Carrying Activity.*

- What information does it provide for the reader?
- What information is missing?
- What could be improved?

Determination of range carrying capacity is one of the most fundamental aspects of range management. Several methods are used depending on the required precision and available funds, time and manpower. Although the clipping and weighing method for range carrying capacity determination is the most accurate, its high cost and time consumption limits its wider usage. So it is worthwhile to use a faster method with an acceptable level of accuracy for larger rangelands.

Determination of range land production by measuring vegetation cover is such a method. Payne (1974) showed that vegetation cover determination is a good indicator of the weight of many grasses. I have studies the relationship between canopy cover, foliage cover and basal area with range plant production for 13 species. The highest correlation coefficient was observed between the canopy cover, foliage cover and plant production for all species. No significant correlation was found between basal cover and plant production. Since basal cover will be affected less than canopy cover by grazing or by short term wether changes and sometimes it is not practical to prevent grazing for determination of range carrying capacity, it is worthwhile to study the application to basal cover for estimation of range production. Therefore I am interested in following this line of research.

AIMS:

(1) to study the relationship between basal cover and plant production by inclusion of plant height in the method

(2) to fund out the relationship between canopy cover and foliage cover and range production in other species not mentioned in my previous study and compare this method and the clipping and weighing method in terms of costs, timing labour, and expertise required.

There is some information about the importance of the research, and the writer describes his own work in this area, however, the reader would probably like a better overview of some of the relevant research in this area.

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An Alternative Introduction

Exercise

The writer of the following introduction used a different criterion to organise the information in the introduction. What criterion did the writer use?

Policy Evauation on Retaining Boarding/Lodging Houses for the Accommodation of Low Income Aged People in Waverley Municipality

(1) Problem

The changing use of Boarding/Lodging Houses (B/LH) from housing for low income aged people to other uses, mainly tourist budget accommodation, has affected the housing stock available to low income people in Sydney. The government realises the negative impacts of this process, such as homelessness, youth crime, and other social problems. Much of the government's effort has been directed towards the provision of low income accommodation, either directly or indirectly, but the stock of low income accommodation is tending to decline. One government policy to counteract this trend is to retain the function of the B/LH for the accommodation of low-income aged people by using SEPP 10 from the State Government and through Local Government LEPs. Nevertheless, in Waverley municipality for example, these policies have not worked as expected, as seen in the reluctance of the B/LH owners to maintain their properties and continuing change in the usage of these properties.

The writer states a general problem, then states a solution which has been unsuccessful "*Much of the government's effort ... One government policy to counteract this trend...*". Then the writer re-states the problem and provides a specific example: "*Nevertheless, in Waverly municipality*"

Exercise

Try and draft a general introduction (one or two paragraphs) to your research. What criterion are you going to use to organise the information in your introduction?

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(5) Making the Purpose Clear

The general purpose of the study can be stated at the end of the introduction. See the example below:

An Investigation of Some Aspects of Science Education Cognitive Structure Research in a Tertiary Physics Education Context

Background

TV lectures have been used for some years in the first year physics course at the University of Sydney. Many of these TV lectures have been revised and redeveloped. Five new lectures on Electricity have recently been produced by the Veterinary, Medical, Agricultural and Life Science students. The School of Physics has decided it is an appropriate time to review this teaching structure. It has convened a working party comprising of two physicists, Director of Television Services, and myself to advise it on future development and use of TV lectures. It has been decided to use the development and implementation of the Electricity series of lectures as a case study for the review.

The topic, Electricity, comprises five TV lectures, three live lectures and a set of lecture notes. The TV lectures include a number of demonstrations, graphics etc. The live lectures summarise, go over difficult points and work through some problems associated with the lecture material. The lecture notes include a set of objectives, some pre-lecture reading summary and in some cases further amplification of the TV lectures, some post-lecture reading including mathematical proofs etc. and some problems for the students to work through. There is no set text or recommended list of references for the course.

> *The aim of the present review is to provide the School with information and views appropriate to assisting it determine its immediate policy on the future development or redevelopment of TV lectures. In particular the review will*
>
> *(1) describe the production process and subsequent use of the TV lectures*
> *(2) collect views of the various participants on the development and use of the TV lectures*
> *(3) examine the use of the TV lectures in the context of the course in general.*

But quite often the purpose is shown more clearly in a separate section (see figure "Proposal Headings").

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The purpose of a study can be expressed in three ways:

- as aims and objectives
- as research questions
- as hypotheses

or a combination of these.

5.1 Aims And Objectives

Example 1

The purpose of this study is to investigate the relationship between foreign/second language learners' knowledge of vocabulary and their comprehension in reading formal prose such as that exemplified by secondary and tertiary level textbooks and journals. A further subsidiary aim is to investigate the relationship between scores on vocabulary tests composed of a random selection of contents items deleted from the cloze tests and scores on the standardised vocabulary test, using the same subjects.

Example 2

This research proposes to evaluate the group influence in China's decision making in the case of the vibrations in China's macroeconomic policies between decentralisation and centralisation in economic planning and management to and from local authorities and economic entities during the course of implementation in the decade of the 1980s.

Example 3

My research has two aims: firstly to describe the life history of a newly discovered diverse fauna living in mangrove swamps around the Sydney district; and secondly to test ecological theories on settlement and recruitment which have been formulated to explain patterns of distribution and abundance on species living on rocky intertidal shores.

Example 4

The objectives of this research are as follows:

(1) to conduct the mid-term evaluation of the sixth educational development plan
(2) to examine the influence of various variables on educational policy

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5.2 Research Questions

Example 1

(1) Why can an interest group approach to politics be applied to the study of socialist and Chinese politics?

(2) What do we mean by "interest", "group", and "interest group"?

(3) How could Chines elite interest groups be identified?

(4) What factors gave rise to the formation of Chinese elite interest groups and how did they recruit members?

(5) What were the respective interests of the identified groups?

(6) In terms of power politics, i.e. disputes over personal power allocation and policy disputes respectively, what were the major issues at stake during the conflict of different interest groups?

(7) How die the interest groups act to defend or advance their interests, that is, what were the modes of interaction between interest groups and decision-makers and with what success?

Example 2

The study will comprise two inter-related sets of research questions. The first set relates to the decision-oriented part and the second set to the conclusion oriented parts of the study. The research questions and the research itself should be seen as arising out of, and contributing to, the discussion of curriculum issues in science education. The major questions posed for the decision-oriented research are:

(1) What techniques are appropriate for investigating and representing cognitive and conceptual structures in the context of decisions to be made about the redevelopment of a unit of work in large enrolment introductory tertiary physics courses?

(2) What is the range of conceptual and cognitive structures impacting on and as a result of studying a unit of work in a large enrolment introductory tertiary physics course?

(3) How were the results of (1) and (2) above taken account of by the Review Committee reviewing the unit of work?

5.3 Hypotheses

The word "hypothesis" means "supposition" or "possible explanation" for a particular situation or condition. A hypothesis can be defined as "a shrewd guess, an assumption, an opinion, a hunch, an informed judgment, or an inference that is

provisionally adopted to explain facts or conditions or to guide how one starts to attack a problem" (Mauch and Birch, 1989:69)

In a research context, a hypothesis can also be a suggested solution to a problem. By suggesting a possible solution to a problem, research can take a certain direction, otherwise much time can be wasted in an investigation without direction. It will affect the kind of data to be collected and the method analysis of the data.

Example

(i) Students who score highly on the vocabulary tests are more likely to score likewise on the comprehension tests (cloze tests and reading comprehension texts).

(ii) Students are more likely to perform better on the multiple-choice reading test than on the cloze tests, given that lack of active vocabulary will more seriously affect performance on the cloze texts.

(iii) It is expected that scores on multiple-choice reading comprehension tests will be higher than on the cloze tests, and it follows that there will be a stronger correlation between multiple-choice reading comprehension tests and the standardised vocabulary test.

Hypotheses are more usual in but not limited to, experimental research. In non-experimental research, the hypothesis may not always be stated explicitly, but it can be implied. For example:

Statement of the Problem

The purpose of this study is to investigate the prevailing practices of selected school districts and municipalities in the United States with regard to continuous residency requirements for public school employees.
(Michaels, 1979, cited in Mauch and Birch, 1989:67)

The implied hypothesis here is that there is in fact a residency requirement.

5.4 Expressing the Purpose at Several Levels

It is also possible to move in the statement of your purpose from a general statement of aims to specific research questions and hypotheses.

Statement of the Problem

This research proposes to evaluate the group influence in China's decision making in the case of the vibrations in China's macroeconomic policies between

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decentralisation and centralisation in economic planning and management to and from local authorities and economic entities during the course of implementation in the decade of the 1980s.

The Subproblems

(1) Why can an interest group approach to politics be applied to the study of socialist and Chinese politics?

(2) What do we mean by "interest", "group", and "interest group"?

(3) How could Chinese elite interest groups be identified?

(4) What factors gave rise to the formation of Chinese elite interest groups and how did they recruit members?

(5) What were the respective interests of the identified groups?

(6) In terms of power politics, i.e. disputes over personal power allocation and policy disputes respectively, what were the major issues at stake during the conflict of different interest groups?

(7) How did the interest groups act to defend or advance their interests, that is, what were the modes of interaction between interest groups and decision-makers and with what success?

Hypotheses:

(1) Although in a communist political system, decision making in its final stage still remains in the hands of a relatively small group of leaders at the highest level of the party hierarchy, there has been participation of political interest groups in the crucial preliminary stages of policy deliberation and in the subsequent phase of implementation. Interest groups seldom possess constitutional or even practical sanctions to enforce their views on the topmost leaders, they may interpose their own viewpoints, presenting alternative policies for consideration, and endorsing, criticising, or sometimes resisting, the implementation of policies already resolved on. In other words, the communist system is a kind of imperfect monism in which, of the elements entailed, the topmost leaders are more powerful than all others but are not omnipotent. .....

(2) .....

Exercise
Try to draft a statement of purpose for your own research.

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(6) Bringing it all Together

Exercise

We have included some examples of thesis proposals in the Appendix. Read through them and think about those aspects of a proposal that we have discussed so far. How are the proposals similar/different? What are their strengths and weaknesses? How could they be improved?

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(7) Evaluation of the Proposal

The following list shows the criteria that committees and examiners look for in proposals and finished theses. It would be useful to keep those criteria in mind as you are writing your proposal and your thesis to focus on the relevant criteria. (The items marked * are used to evaluate the final thesis, not proposals.)

Characteristics Being Evaluated

(1) Title is clear and concise.
(2) Problem is significant and clearly stated.
(3) Limitations and delimitations of the study are stated.
(4) Delimitations are well defined and appropriate to solutions of the problem.
(5) Assumptions are clearly stated.
(6) Assumptions are tenable.
(7) The research projected by the proposal does not violate human rights or confidence.
(8) Important items are well defined.
(9) Specific questions to be studied are clearly stated.
(10) Hypotheses, elements, or research questions are clearly stated.
(11) Hypotheses, elements, or research questions are testable, discoverable or answerable.
(12) Hypotheses, elements, or research questions derive from the review of the literature.
(13) Relationship of study to previous research is clear.
(14) Review of literature is efficiently summarised.
(15) Procedures are described in detail.
(16) Procedures are appropriate for the solution of the problem.
(17) Population and sample are clearly described.
(18) Method of sampling is appropriate.
(19) Variables have been controlled.
(20) Data gathering methods are described.
(21) Data gathering methods are appropriate to solution of the problem.
(22) Validity and reliability of data gathering are explained.
(23) Appropriate methods are used to analyse data.

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(24) Sentence structure and punctuation are correct.
(25) Minimum of typographical errors.
(26) Spelling and grammar are correct.
(27) Material is clearly written.
(28) Tone is unbiased and impartial.
(29) Overall rating of creativity and significance of the problem.
(30)* Tables and figures are used effectively.
(31)* Results of analysis are presented clearly.
(32)* Major findings are discussed clearly and related to previous research.
(33)* Importance of findings is explained.
(34)* The relationship between the research and the findings is demonstrated with tight, logical reasoning.
(35)* Conclusions are clearly stated.
(36)* Conclusions are based on the results.
(37)* Generalisations are confirmed.
(38)* Limitations and weaknesses of study are discussed.
(39)* Implications of findings for the field are discussed.
(40)* Suggestions for further research are cited.
(41)* Overall rating of the conduct of the study and the final document.

* Not evaluated in proposal but in finished thesis only.

(Mauch and Birch, 1989:91-93)

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Appendix A

Thesis Proposals - Social Sciences

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Proposal 1

Research Proposal to Study Traditional Medicine in Milne Bay Province
Focussing on Sewa Bay, Normanby Island, D'Entrecasteaux

Abstract

I propose to do field work in Milne Bay Province. The focus of my research interest is the D'Entrecasteaux and, in particular, the comparative study of traditional medicine with a focus on Sewa Bay, Normanby Island (see map). A preliminary trip to the Province in December-January clarified my research objective.

Normanby Island has significant gaps in its ethnographic record. Erhard von Schlesier, Carl Thune and Daryl Feil have worked in East Normanby, but Sewa Bay was last recorded briefly by Geza Roheim in 1930. Traditional medicine has been given little attention. I view my research as essentially collaborative and concerned with the cultural heritage. The aim is to secure a record which the people will cherish.

I want my study to be comparative, involving other areas. I propose starting field work for 12-15 month IN Sewa Bay later this year.

Research Methodology, Relevance and Timetable

"...if the anthropologist is to retain his claim to some inside knowledge he must continue to struggle with problems of language expression and symbolism. This is, of course, a prime field to be taken over eventually by indigenous scholars, but the outside worker can make his contribution still, and use the opportunity to test his explanatory models against his views of the educated insider"

Andrew Strahern (1)

"...discussions of medicine in Papua New Guinea are most often and obtrusively couched in a different form - that of dualism or pluralism. The contrast, and opposition, is presented as one between Western medicine and the local system ... It is extremely easy to fall into this dualistic way of thinking; but it is misleading. The convenience of thinking in terms of simple dichotomies is always a temptation. It seems to clarify issues, but the simplification distorts them. It is misleading to speak of "system" when referring to local modes of treatment for the sick. The local forms are not usually formulated as a unified system of theory, practice and medical institutions"

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Stephen Frankel & Gilbert Lewis (2)

In her 1984 review of the study of ethnomedicine in Papua New Guinea, Carol Jenkins wrote: "*... next to nothing is known empirically about the medical botany of Papua New Guinea. Even less is known about the full diagnostic and treatment regimes available traditionally*" (1984:3; my emphasis). Donald Denoon quotes Jenkins at the start of his recent historical study of Public Health in PNG, but makes little reference to traditional medicine again. The reason for this is not hard to find: scientific medicine (like the colonialists themselves) was kept completely separate - indigenous medicine was given no official encouragement, and there was relatively little curiosity about it. Yet, it is of interest to note that Miklucho-Maclay published a long list of plants used by people of the Maclay Coast in 1886 (1886).

In the 1981 Milne Bay Development programme (Vol. 3, Background Papers) in the chapter devoted to health, there is a section on traditional medicine. It is recognised that traditional medicine is significant and that many people rely on traditional practitioners. Three specific research problems are identified. First, why do people who have access to an Aid Post persist with traditional medicine? Secondly, what types of traditional treatment might be included or incorporated into the health services? And, thirdly, it is suggested a study be undertaken to identify traditional practitioners whom (*sic*), it is implied, might also be incorporated into the health services (1981:132). There has been some research on traditional herbs and plants based in the schools; but the three main questions have still to be answered by field research.

The subject of whether traditional medical practitioners should be incorporated into the health service was put forward for debate in the Provincial Government in 1986. The motion was approved, but not debated. There is little doubt that more research into traditional medicine would assist any policy decision in the matter. And it is here that the anthropologist has a role.

About two-thirds of the world rely on traditional medicine. The WHO has recognised that if it is serious about getting "Health for all by the year 2000" then it must take seriously that knowledge and practices of traditional practitioners. Only a few countries have taken legislative action to promote traditional medicine. These include India and Sri Lanka. While China has a comprehensive support for the system (*sic*). The British National Health has shown some flexibility and tolerance, but the French have completely outlawed any form of "folk" or alternative medicine. The colonial legacy left Papua New Guinea close to the French model: Western medicine along, until recently, has had official sanction. But this is now changing. The National Health Plan 1986-1990 has sought the collaboration of the scientific and traditional healing systems.

Traditional medicine, like traditional religion, has been actively suppressed in PNG. Knowledge concerning the use of traditional plant medicines is being lost (Stopp 1963; Holdsworth 1975; Wesche 1987:72). It has been professionally ignored so that it remains incomprehensible. Charles Leslie has observed that the education of Western health professionals makes for an occupational perspective that distorts their comprehension of other systems. The education involves a kind of "trained incapacity" (Veblen's term): that is the incapacity among specialists in Health Care to observe even-handedly traditional health concepts and practices (1983:314-15). This problem can never be underestimated and is applicable to the training of health professionals in PNG as elsewhere. Yet, as David Wesche points out: "Research on traditional plant medicines and their use is a vital step towards providing knowledge which will strengthen health practices and extend support and services to people in a culturally appropriate way" (1987:77).

Short Literature Review

Norman-Taylor (1963, and subsequently), Hornabrook & Skeldon (1977, and subsequently), Jilek (1985), Stratigo & Hughes (1987), Denoon (1989), Frankel & Lewis (1989), and Burton-Bradley (1990) provide useful bibliographical material on ethnomedicine in PNG. Michael Young in his study on children's illness and adult ideology on Goodenough (1981, 1989) has pointed the way for significant research in health care in Milne Bay (Denoon 1989:90-91). And Ruta Siniva Sinclair (1987) underlines the important changes in perspective which anthropologists have adopted when they have approached the analysis and description of traditional medicine in PNG over the last forty years. Some of the pitfalls are clearly set out in the essays edited by Frankel & Lewis (1989). And these traps and pitfalls must be relevant to the study of belief and practice in Milne Bay. Importantly, how, and in what ways, are Western (Dimdim) and traditional medicine perceived as two separate systems or as one integrated system - what is the nature of the "medical" pluralism?

Research problems relating to traditional medicine are as thorny as any in anthropological research. But some of the key questions are, on the surface anyway, quite straight forward. For example, for what illnesses do people always resort to traditional practitioners; and what is the (scientific) effectiveness of particular traditional herbs? While there is much anecdotal support for the therapeutic success of herbal medicine, there is still little hard evidence of its efficacy (Aitken 1985; Wesche 1987). Cecil Hellman provides useful Clinical Questionnaires as a research guideline (1984:194-201).

In brief, along with surveys, questionnaires, and participant observation, I propose to document the lives of traditional medical practitioners. This will be done by extensive interviews. By taking a life history approach to the subject, I hope to offset part of the resistance I anticipate meeting in trying to record secret

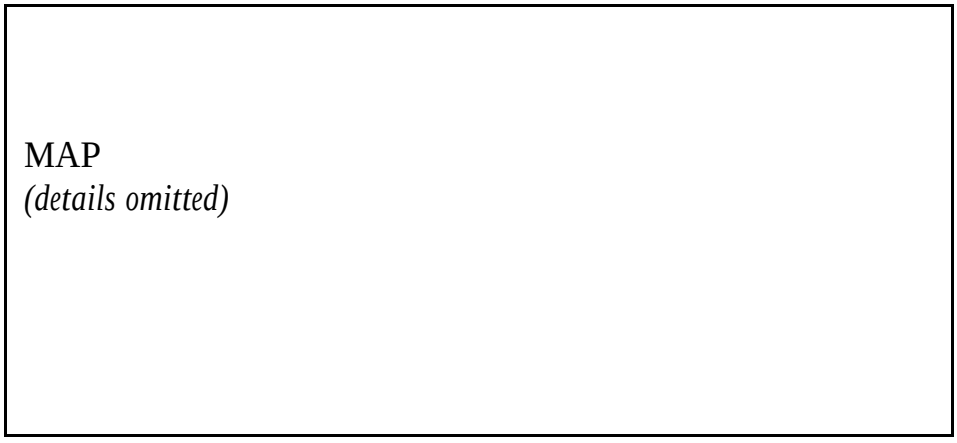
knowledge. After initial fieldwork in Sewa Bay, which will last 12-15 months, I propose to document the knowledge of traditional medical practitioners elsewhere in Milne Bay so that I will be able to make a comparative study. With local research assistants acting as interpreters, I want to work in at least four places with contrasting flora (but time will be a determining factor here). I would like to compare the traditional medicine of the Mainland (near Alotau) with the coral islands (the Trobriands), the D'Entrecasteaux, and the Lousiades.

The study of traditional medicine will benefit the people by helping to secure and record the cultural heritage. I see my research as essentially collaborative. And, I trust my work will add to a small, but significant number of studies of Papua New Guinea traditional medicine (e.g. Lewis, Frankel, Mayer).

Notes

I am particularly grateful to John Beaumont, Ann Chowning, Debbora Barraglia, Richard Dawana, Linus Digim'rima, Brent Ingram, John Kabual, Jerry Leach, Andrew Strathern, Carl Thune, and especially Michael Young and Darly Feil for help over this proposed research.

(1) From "The future of research in Melanesia" (1975), p.30-31
(2) From "Patterns of Continuity and Change" in Frankel & Lewis (1989) p.32



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(18 pages)

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Proposal 2

RESEARCH OUTLINE FOR THE PhD. DEGREE
(POLITICAL SCIENCE)
(NO TITLE)

THE PROBLEM AND ITS SETTING

The Statement of the Problem

This research proposes to evaluate the group influence in China's decision making in the case of the vibrations in China's macroeconomic policies between decentralisation and centralisation in economic planning and management of and form local authorities and economic entities during the course of implementation in the decade of 1980s.

The Subproblems

1. Why an interest group approach to politics can be applied to the study of socialist and Chinese politics?
2. What do we mean by "interest", "group" and "interest group"?
3. How Chine elite interest groups could be identified?
4. What factors gave rise to the formation of Chine elite interest groups and how did they recruit members?
5. What were the respective interests of the identified groups?
6. In terms of power politics, i.e. disputes over personal power allocation, and policy disputes respectively, what were the major issues at stake during the conflict of different interest groups?
7. How did the interest groups act to defend or advance their interests, that is, what were the modes of interaction between interest groups and decision-makers and with what success?

Hypotheses

1. Although in communist political system, decision-making in its final stage still remains in the hands of a relatively small group of leaders at the highest level of the party hierarchy, there has been participation of political interest groups in the crucial preliminary stages of policy deliberation and in the subsequent phase of implementation. Interest groups seldom possess constitutional or even practical sanctions to enforce their views on the topmost leaders, they may interpose their own viewpoints, presenting

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alternative policies for consideration, and endorsing, criticising, or sometimes resisting, the implementation of policies already resolved on. In other words, communist political system is a kind of imperfect monism in which, of the many elements entailed, the topmost leaders are more powerful than all others but are not omnipotent.

Chinese policy-making process may thus be regarded as one in which interaction among participants at different levels of the political structure generates a conflict of dominant tendencies of articulation, through which alternate lines of policy are identified, authoritatively decided, and implemented with regard to specific values. Fluctuations in value allocations or in the policy line may be seen as shifts in the relative influence of conflicting tendencies in response to changing domestic and external circumstances.

2. Group processes take place in Chinese politics in way of loose and informal coalitions of elites and intermediate actors. Interest groups in communist systems should not be mistaken for their counterparts in the Western societies. They do not stem from organised interest among the people at large. They are rather subsystems within an almost ubiquitous governmental administration. They can advance the interest of their members only when they act in ways that do not threaten the Communist part hegemony. They do not officially lobby the party on behalf of their special interests and they do not explicitly criticise or assail current policies. Their effectiveness has rested, to a certain extent, on the support of national top elites.
3. Mobilisation to fulfil the tasks of modernisation in china has necessitate a greater effort to encourage some sort of creative initiative and rational planning rather than merely the enforced compliance and coerced enthusiasm from the intermediate actors. Lack of consensus about the means of modernisation at the leadership level has been another essential pre-condition for the growth of intermediate participation and of interest groups. Within the limits of an ambivalent party line, articulations by intermediate actors have been permitted or even been sponsored.
4. In communist political systems, government agencies often not merely decide on public policy, but also serve as the main source of inputs for policy, too. Units of government administration are, therefore, included as groups in the analysis.

The Delimitations

This study will only attempt to study the behaviour of Chinese bureaucratic interest groups. We exclude mass societal organisations from different consideration here because they have less effective means to express their interests and to press those responsible for policy making to place their demands

on the public and formal agendas for consideration. They are designed reather to transmit the party's conception of national interest.

Aside from this, the bureaucratic agencies act as the exclusive interest aggregators in Chinese society. It is only bureaucratic elites, or cadres, who can mobilise substantial political resources to back demands and convert demands into policy alternatives. Moreover, the positions of bureaucratic elites legitimise the handling of controversial issues and provide them sore sort of protection against the possibility of exclusion from the political process. Demands espoused by bureaucratic groups are therefore especially powerful in authoritarian societies. Bureaucratic articulation of interests is the primary means for presenting demands to the centre of power. "Cadres" for the most active and salient political interest groups in China.

The study will also be limited to the change in foreign trade policy. China's foreign trade is an area in which nearly all salient interest groups consciously attempt to engage and about which information is easier to obtain.

Assumption

The attitudes of an individual member of a social or occupational groups (*sic*) are not always determined by his belonging to that aggregates. Hence within an occupational group there may be members of different interest groups.

Definition of Terms

An *interest* can be defined as a conscious desire to have public policy, or the authoritative allocation of values, move or continue to move in a particular general or special direction.

Basically, "*group*" can be distinguished between on the one hand "categoric group" i.e. a set of individuals who have some characteristics in common and on the other hand "social group", which develops some common attitudes based on a minimum frequency of interaction and from which arises certain common habits of response.

An *interest group* is any group that, on the basis of the shared attitudes and the behaviourally revealed preference on the matter of concern, makes certain claims on other groups in the society for the establishment, maintenance, or enhancement of forms of behaviour corresponding to the shared attitudes and the preference. A *political interest group* is present when the expression of these interests lead to the making of claims on government institutions. it is only when a common attitude leads to an expressed common claims on those in authority for action that a political interest group may be said to exist.

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A *political articulation* may be regarded as an act of communication in which an expectation about the authoritative allocation of a value or set of values is conveyed by one political participant to another.

A mass of common articulations which persists over time may be regarded *as a tendency of articulation*.

Interest aggregation consists of the processes that combine demands into policy alternatives and mobilises political resources behind policy alternatives. Demands become major policy alternatives when they are backed by substantial political resources.

The concepts of interest articulation and interest aggregation is similar in meaning to the concept of *agenda building*, which can be defined as the process by which demands of various groups in the population are translated into items vying for the serious attention of ultimate decision makers.

There are two types of agendas: the public agenda consists of all issues which have achieved a high level of public interest and visibility by being printed in publications which have been approved by the censor: the formal agenda in the list of items which decision makers have formally accepted for serious discussion.

Intermediate actors are referred to the party and government officials and professional personnel who receive special training and enjoy a higher social and economic status than the mass of the population. They belong to the elite groups in the regime. They do not, however, occupy leading positions in the Communist Party's Central Committee or the State Council.

Methodology

As we regard Chinese interest groups as loose and information coalitions of elite and intermediate actors, we shall not start by identifying social groups and then to determine from their political views and interactions between them whether they constitute a political interest group. We shall rather carry out the study in four stages. In the first place, it is to determine the presence of uniformities in the interest articulations in a given period or event. Second, it is to seek underlying reasons for the occurrence of the observed converging expectations of policy. The third stage will be concerned with subsystem interaction and its effects on the relative influence of the policy alternatives. Finally, suitable variables, such as the performance of the economic reforms and the preference of decision makers will be cited to explicate the course of conflict.

Information is to be obtained through the following devices:

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1. Content analysis of newspapers and other periodical literature dealing with the issues in which interest groups were directly involved.

2. Informal discussions with informants from the fields of academics, business and journalism in Hong Kong.

Basic Reading:

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Appendix B

Thesis Proposals - Science and Engineering

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Proposal 1

Proposed Research Project. Presented for conversion to the degree of PhD

Ecology of Barnacles in Mangrove Swamps in the Sydney District

My research has two aims: firstly to describe the life history of a newly discovered diverse fauna living in mangrove swamps around the Sydney district; and secondly to test ecological theories on settlement and recruitment which have been formulated to explain patterns of distribution and abundance on species living on rocky intertidal shores.

1. Life History

Barnacles in mangrove swamps have been little studies. Recently three species of barnacles were found in N.S.W. mangrove swamps. Previous work has recorded barnacles on particular substrata in the mangrove swamp, for example, *Elminius covertus* on leaves and trunks of *Avicenna marina*, *Hexaminius popeiana* on trunks exclusively and *Hexaminius foliorum* on leaves and saplings of the grey mangrove, *Avicennia marina*.

Questions I initially formulated from this information are as follows:

1. What are the distribution and abundance patterns of the three species throughout the year?
2. When does each species reproduce, settle and recruit into the reproductive population?

Unlike the two dimensional rock platform, the mangrove tree supplies a tri-dimensionality (from roots to leaves), so to answer question 1 it was necessary to divide the mangrove swamp into three spatial components. These are:

- Horizontal (tidal zones): seaward:middle:landward
- Positional (on a mangrove tree relative the shore) seaward:landward
- Vertical (height of the tree) upper/lower surface at each height.

To enable a precise calculation of population density a stratified random sampling program was designed and implemented. This means each substratum was sampled separately.

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This program has thus allowed for estimation of the variation that exists among tree trunks, among twigs on trees, among leaves on trees and among saplings of the grey mangrove, *Avicennia marina.*

The sampling program has been in progress sing August 1987 at two locations: Wolooware and Careel Bay. It will be completed in February 1990.

These samples taken each season (and additional samples taken in months when densities were not being sampled), have enabled an accurate estimation of when the population is reproductive. Consecutive growth studies on plates in the field (in progress since February 1988), have also given information on how long it takes a barnacle to recruit into the reproductive population, throughout zones in the mangrove forest.

Results of growth studies have highlighted density an important factor in determining growth rate. An experiment to investigate this has been designed and was implemented in January 1989.

Additionally, the following questions will be important to answer to fully understand the life history of barnacles in mangrove swamps:

(1) Are cyprids selecting particular substrata to settle on, or settling at random, and not surviving to adults?

To answer this rearing of cyprids in the laboratory and subsequent settlement and growth will allow identification of newly settled stages. (Completed for *E. covertus* by field work, in progress for *H. popeiana* and *H. forliorum* Dec/Jan 1989).

(2) a. Can cyprids select young versus old leaves to settle on?
b. How long does a leaf containing barnacles last on a tree?

These questions are especially relevant when considering the ephemeral nature of leaves. An experiment was set up in Dec. 1988 to answer these questions.

2. Ecological Theories

Most theories on intertidal ecology have been formulated from species on rocky shores. When comparing mangrove swamps to rocky shores one interesting question is: Are the same factors that affect patterns of distribution and abundance of species on rocky shores responsible for observed patterns of barnacles in mangrove swamps, which have reduced wave action, diverse substrata, greater turbidity, and much more patchily spaced resources of hard substrata?

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The patten of vertical and horizontal distribution and abundance of species has generally been understood as the result of differential mortality (physical and biological), operating on a barnacle-covered substratum (i.e. post-settlement processes).

Alternative explanations have been suggested. These focus on the importance of pre-settlement (i.e. survival and transport of larvae), and settlement processes (i.e. habitat selection), determining the distribution of patterns of adults, including invertebrates and fish.

In the second part of my project I will evaluate the relative importance of larval availability, settlement and post-settlement (i.e. recruitment factors, both physical and biological), in determining adult distribution and abundance on diverse substrata.

A bi-monthly quantification of recruitment has been in progress since October 1987 and will be completed in March 1989. The results have been analysed and pose questions concerning settlement.

Settlement is defined as the moment a larvae (cyprid) attaches itself to the substratum. It has generally been determined by daily counts (24 hours), however, it is known barnacle mortality is greatest immediately following settlement, and it is possible that death has occurred in the intervening hours after settlement, before measurement. Thus, erroneous conclusions may be made on the relationship between settlement and recruitment.

A program designed to quantify settlement every 12 hours (after one high tide), has been in progress since July 1988. Initial results have been obtained and analysed for *E. covertus* on trunks. My plans are to repeat this for *H. popeiana* and *H. foliorum* on trunks and leaves.

Initial results of settlement and plans to investigate these patterns are as follows:

(1) Between zones: Settlement is greatest in the seaward zone and significantly less in the landward zone.

    Plans: To quantify larval availability by taking plankton samples throughout the zones in the mangrove forest, in July 1989 and Jan. 1990.

(2) Within a zone: Settlement is not significantly different between heights or surfaces.

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Plans: To quantify mortality after settlement in Jan. 1989 and July 1989.
Long term: Setting up of experiments in 1990 to investigate factors affecting mortality (physical and biological).

(3) Lunar cycle: Settlement peaks are occurring on the full moon.

Plans: To investigate what effect arriving early on the full moon cycle may have on mortality of cyprids compared to those cyprids arriving late.

Thus on completion of this work, a detailed account of the life history of the mangrove barnacles will be obtained. Also, the relative importance of larval availability, settlement and post-settlement factors will be determined in forming adult distribution and abundance patterns of each species on each substrata. This information will then provide a comparison to ecological theories about settlement and recruitment mostly formulated on exposed rocky shores on other invertebrates and fish.

This research will be completed as outlined in the schedule below.

Dec/Jan/Feb. 1989

Quantification of settlement of *H. popeiana/H. foliorum* on trees and leaves respectively.
Quantification of mortality after settlement of *H. popeiana/H. foliorum* on trees and leaves respectively.
Setting up of experiments on growth and density of *H. popeiana/H. foliorum.*
Setting up of experiments on leaf twist and leaf age.
Rearing of *H. popeiana* and*H. foliorum* in the laboratory to solve identification problem of newly settled stages.
Last seasonal sample at Careel Bay.

March/April 1989

Last bi-monthly recruitment collection
Lab work accumulated from above experiments
Writing up of above experiments (including a paper on leaf age and leaf twist)

June/July 1989

Quantification of settlement of *E. covertus* onto trunks and leaves
Quantification of mortality after settlement of *E. covertus* on trunks and leaves
Setting up of experiments on growth and density of *E. covertus* onto trunks and leaves
Setting up of experiment on leaf twist

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Quantification of lunar cycle and settlement

Sept/Oct. 1989

Lab work accumulated from above experiments in June/July
Writing up of above experiments

Jan/Feb. 1990

For *H. popeiana* and *H. foliorum*
Experiments on factors affecting settlement on tree trunks (e.g. shading against desiccation, the effect of microalgae on settlement)
Plankton samples throughout zones in the mangrove forest
Quantification of the lunar cycle and settlement

March/April 1990

Lab work accumulated from Jan/Feb.
Analysis of data. Writing up of results for thesis

June/July 1990

For *E. covertus*
Experiments on factors affecting settlement on tree trunks (e.g. shading against desiccation, the effect of microalgae on settlement)
Plankton samples throughout zones in the mangrove forest

Sept/Oct. 1990

Lab work accumulated from Jan/Feb.
Analysis of data. Writing up of results for thesis

By April 1991

Completion of writing and production of thesis.

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Proposal 2

Aspects of the Biology and Culture Techniques of the Canine-catfish Eel (*Plotosus canius* Ham.)

Significance:

Demand for fish in the Philippines, as elsewhere in Asia at least, as a source of high quality protein, is ever increasing, obviously because of the ever-growing human population. Thus, the search for fish species to be domesticated is always a major concern. specifically for aquaculture, the need to screen potential species for domestication in suitable culture systems is due to the fact that several key species currently reared in aquaculture systems are approaching their natural limit of growth and additional inputs are necessary to increase production. And certainly, any scheme to develop appropriate culture techniques for an aquatic species will depend upon biological data vital to the rearing process.

The "Alimusang" or canine catfish eel (*Plotosus canius* Ham.) is one such promising species and aspects on its biology and culture deserve serious scientific investigation. these aspects are virtually (if not totally) unexplored to date. At most, preliminary studies have been done in India and Australia. The first aspect involves studies of the spatial and temporal distribution, growth, sexual maturity, fecundity and food and feeding habits of this species. This biological information is an important base to the culture aspect, which generally involves the development of appropriate aquaculture technologies, including the nutritional requirements and artificial propagation of the fish. Specifically, these will constitute studies in tanks and ponds to evaluate its growth and survival at varying management levels. Water quality and biological variables in these culture systems also need to be regularly monitored. Relevant to these, the proposed work will employ multivariate analytical tools, in contrast to the classical analysis of variance, to make the greatest use of these parameters in predicting yield and yield-related variables.

At present, the marketable *P. canius* which are being sold (at prohibitive prices because the fish is a delicacy) in public markets (notably in the Bicol Region, Philippines) have been caught in the wild. This system of resource utilisation is definitely not dependably stable and prospects for resource development and management are poor. The two aspects (to be referred to as Study 1 and Study 2 hereafter) mentioned are vital in looking into the feasibility of culturing *P. canius* under controlled and semi-controlled conditions toward a desirable production goal to augment supplies for domestic consumption. The proposed work will utilise the stock of *P. canius* from the wild population.

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Study 1 - Aspects of the Biology of the Canine-catfish Eel (*Plotosus canius* Ham.)

Specific Objectives:

(1) To determine the relative temporal and spatial distribution of *P. canius*.

(2) To determine its relative fecundity based on samples collected from the wild.

(3) To determine its sexual maturity.

(4) To describe each of the sexes through its external features.

(5) To determine its food and feeding habits based on mouth structure, alimentary tract and gut content analysis.

(6) To obtain preliminary growth data of the fish reared in concrete tanks.

Materials and Methods:

(1) Determination of spatial and temporal distribution of P. canius through surveys and on-site observations. Appropriate statistical survey design will be considered. Habitat in areas of occurrence will be described.

(2) Relative fecundity will be determined by gravimetric method using specimens collected from the wild monthly and reared in tanks. The relationship of specific and relative fecundities with selected morphometric characters will be determined.

(3) Sexual maturity of the eel will be evaluated from the samples. Stages of egg development and size of the egg will be obtained from the specimens.

(4) Sexual dimorphism will also be noted from the samples. The morphology of each sex will also be described. Some morphometric and meristic characters will be obtained and possible relationships among them will be evaluated using regression analysis techniques.

(5) Food habits will be inferred from gut content analysis of samples. Feeding habits will be assessed from the mouth and alimentary tract structures of the fish.

(6) Fish sampling every 30 days, for length and weight determination using a fish measuring sheet calibrated by a caliper and an electronic analytical balance, respectively.

(7) Total harvesting. After 10 months culture, the stock will be totally harvested. Growth and growth-related parameters will be obtained from the harvest.

(8) Data Analysis. Statistical design is simple Completely Randomized Design (CRD). Analysis of variance and multivariate analyses will be used as statistical tools. Statistical software packages will be implemented on an IBM PC Compatible (All American, NEC).

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Proposal 3

Studies of Blends of Polyethylenterephthalate with Nylon 6

Introduction:

When two or more polymers are mixed together the composition is generally referred to as a polymer blend or polyblend, and can assume many forms. the forms depend on the degree of miscibility or immisicibility of polymers, including a random copolymer or block or graft copolymer.

Commercial progress in the area of polyblends during the past two decades has been tremendous and was driven by the realisation that new molecules are not always required to meet needs for new materials and that blending can usually be implemented more rapidly and economically that the development of new chemistry. Also the tailoring of multicomponent polymer systems is less expensive than producing a novel homopolymer. It is likely that polyblends will continue to proliferate.

For several practical applications homopolymers may not satisfy all the end use requirements, while suitable blending of two or more polymers can provide the required balance of properties and such considerations form the basis of the study of polymer blends. This study will describe the development of polymer blends by the incorporation of nylon 6 to polyethylenterephthalate (PET) to facilitate the use of P.E.T. as a moulding thermoplastic and consider the compatibility of the two polymers. Such a study is expected to develop new kinds of materials to fit a wide range of engineering applications. The shortcomings of PET which have made its applications restricted include the following:

(a) its low melt viscosity and, hence, low melt strength creating difficulty in its processing
(b) its low impact strength for engineering application
(c) high glass transition temperature (t g)
(d) slow rate of crystallisation making it highly amorphous in normal moulding processes.

There are many ways to remove the above problems, but my aim in this study is to minimise most of them by choice of nylon 6 which might be blended with PET and considerations of the compatibility characteristics among the components in this polymer blend should be taken into account.

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Methodology:

(a) Literature review:

At first I have to do a literature review and a survey in the library of the UNSW and other sources in the world from international data banks by computer and telex. Finding all papers about this study, and all information which is related to this study.

(b) Materials and instruments:

Thinking about materials and instruments and preparing some of them.

Materials such as: polyethylenterephthalate, nylon 6, solvents, etc.

Instruments such as: Extruder, injection moulding, differential scanning calorimetric, input tester, Universal testing machine for evaluations of tensile strength, scanning electron microscope etc.

(c) Preparation of blends:

There are at least five distinct techniques for the preparation of polyblends, melt solution latex blending, block and graft copolymers and synthesis of interpenetrating networks.

In this study for preparation of blends I will use melt blending process, in which two polymers are mixed in the molten state. In this process there are no impurities and it requires no removal of extraneous solvents and the degree of mixing depends on temperature, shear and time. These three factors must be controlled, because the will also cause degradation, cross linking and formation of block and graft copolymers, all of which will affect our understanding of the product and its properties. The samples of blends with various composition in this study will be prepared by extrusion and injection moulding.

(d) Characterisation and testing:

- consideration of compatibility of blends of O.S.C., S.E.M., etc.
- morphological observation
- consideration of mechanical properties such as tensile properties. Impact strength, flexural properties, etc.

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Structure of Thesis:

- content

Chapter 1: Introduction
This chapter includes background description, summary of previous research related to this study and aims.

Chapter 2: Experimental
This chapter includes materials, methods of the preparation of blends, characterisation, testing methods and experimental results.

Chapter 3: Discussion and Conclusions.

Timetable:

- Literature review - 6 months
- Experimental - 24 months
- Writing of thesis - 6 months

References:

(1) Encyclopedia of Polymer Science and Engineering, second edition 1988, vol.12
(2) Encyclopedia of Polymer Science and Technology. Supplement volume 2, 1977
(3) R.P. Burcord. Polymer blends and networks, a survey. School of Chemical Engineering and Industrial Chemistry, University of New South Wales.