



Research Study

The status and quality of Year 11 and 12 Science in Australian Schools

Australian Academy of Science

2011

Introduction

With the implementation of an Australian science curriculum: years F to 10 for all Australian students, it is appropriate that our attention focuses on years 11 and 12. It is important for the prosperity of our nation that we fully understand the status and quality of upper secondary science in Australian schools.

These years are critical as students prepare to embark on university and work careers. The President of the United States of America recently said:

Over the next ten years, nearly half of all new jobs will require education beyond high school, many requiring proficiency in math and science. If we want to win the global competition for new jobs and industries we've got to win the global competition to educate our people.

This is, of course, equally true for Australia.

The purpose of the study is to outline a research approach by which we can develop a clear understanding of Year 11 and 12 Science in Australian schools.

The research approach will develop two pictures. One represents the ideal situation that embraces our high but realistic aspirations for our Year 11 and 12 students. The other is a clear and honest appraisal of what is actually happening in our schools at the present time. With these two pictures established based on the available data the report will author how we can realistically move from the actual to the ideal.

Broad objectives of the research:

1. Describe our expectations for Year 11 and 12 school science – the ideal picture
2. Describe what is happening with Year 11 and 12 school science – the actual picture
3. Develop a series of recommendations to show how we can move from the present actual situation to one that is in keeping with the nation's expectations

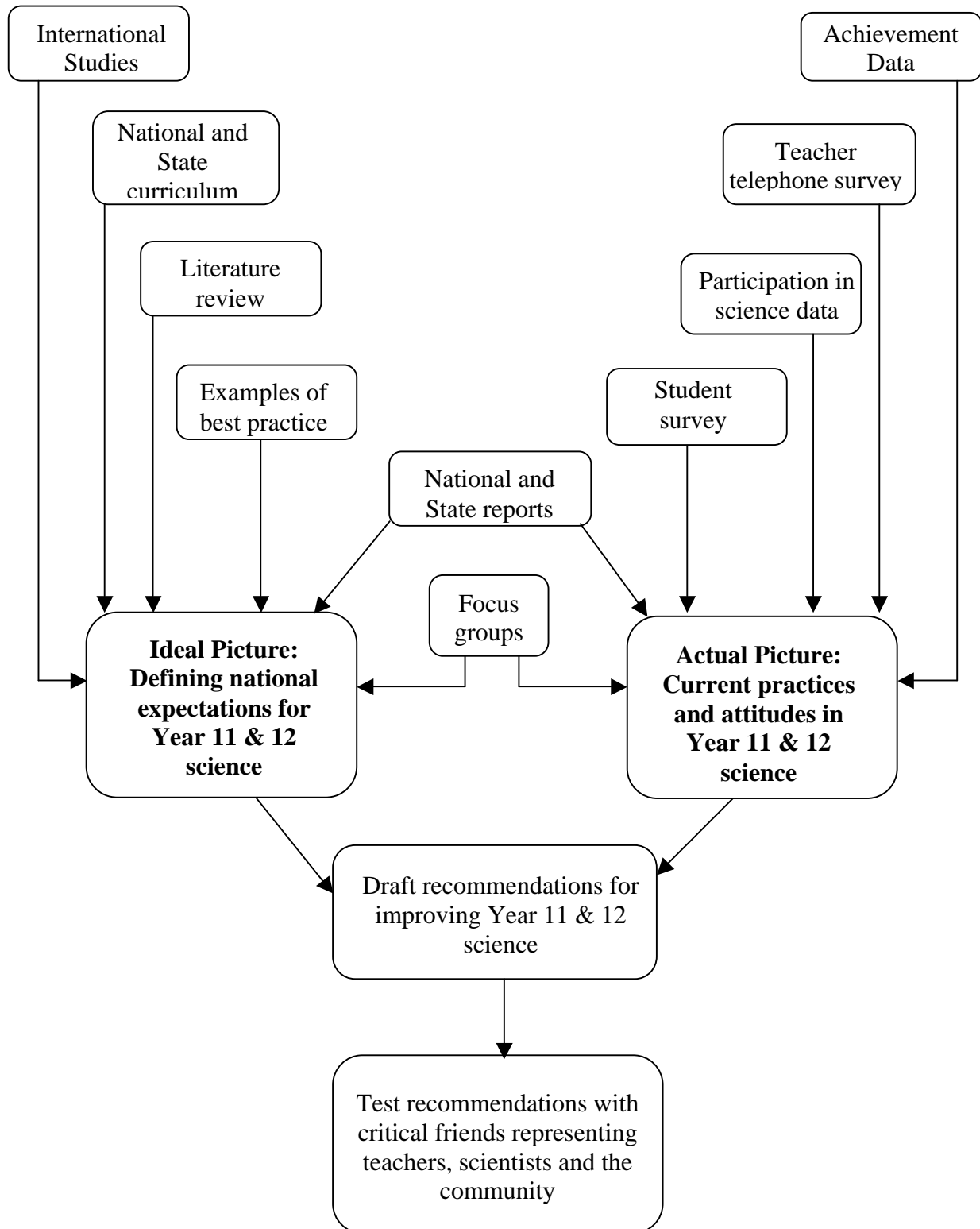
Research team

The research team will be led by Professor Goodrum, Executive Consultant of the Academy's *Science by Doing* early secondary school program, and conducted with the assistance of the program's Director, Amelia Druhan, and Education Specialist, Joanna Abbs.

Research design

The research design framework (summarised in Figure 1) shows the various data sources that will be used to provide information from which the two pictures will be constructed.

Figure 1: Research design framework



Data sources

1. Literature review

The science education literature and general education literature from material and international sources will be reviewed to identify factors that influence and contribute to upper secondary science.

2. National and State curriculum documents

Curriculum documents produced by states and the Australian Curriculum Assessment and Reporting Authority (ACARA) will be analysed to identify learning expectations and science curriculum organisation for Years 11 and 12 science.

3. International Studies

Selected international studies will be examined that report on graduating secondary students especially in the area of science.

4. Examples of best practice

Examples of perceived best practice and innovation in upper secondary science teaching and learning will be identified through consultation with state and national organisations.

5. National and State reports

The range of national reports and selected state reports will be examined with the focus on what aspects affect upper secondary science teaching and learning.

6. Focus groups

There will be three different types of focus groups established;

- Groups of Year 11 and 12 students
- Group of teachers that teach Year 11 and 12 science courses
- Group of scientists and community representation that includes such organisations as Questacon, Australian Science Teachers' Association, CSIRO.

These groups will be generally convened in the ACT because of time and financial restraints with the exception of the student focus groups in which there will be a student group convened also in NSW and SA. The student groups will consist of Year 11 and 12 students who are studying science as well as those who are not studying science.

7. Teacher telephone survey

A carefully chosen representative sample of Year 11 and 12 science teachers will be surveyed by telephone to identify typical practice in teaching and student attitudes in Year 11 and 12 science. The teachers will be selected from two states probably New South Wales and South Australia and from one territory the Australian Capital Territory because of time and financial constraints. A telephone survey has been chosen because it has a high response rate and therefore can remain representative. Because it is interactive it can also maximise the collection of relevant and valid data.

8. Student survey

Student's views will be gathered by a questionnaire to investigate attitudes to science and science learning, career aspirations and the importance of science to modern society. Again because of time and financial constraints the survey will be limited to selected schools in New South Wales, South Australia and the ACT.

9. Participation in science data

The enrolments in Year 12 science courses will be examined. This data is publicly available to 2007 but will require some efforts to update to the present time.

10. Achievement data

The international achievement data from Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA) will be examined as well as the available state and national data.

Analysis and interpretation of data

Data analysis will be done to develop a consensual picture of the ideal Year 11 and 12 science education and contrast this with the picture of what students, teachers and others say is the actual picture of current practice. From these two pictures recommendations will be drafted. During each of these stages input from critical friends will be sought.

Timeline

August	<ul style="list-style-type: none">• Seek approval from education systems to conduct the outlined research in schools
	<ul style="list-style-type: none">• Begin review of literature, reports, participation data, curriculum documents.
	<ul style="list-style-type: none">• Prepare teacher telephone survey protocol and trial.
	<ul style="list-style-type: none">• Prepare student questionnaire.
September	<ul style="list-style-type: none">• Contact schools to organise student questionnaire administration
	<ul style="list-style-type: none">• Conduct focus groups for students, teachers, scientist/community representation.
	<ul style="list-style-type: none">• Conduct teacher telephone survey.
October	<ul style="list-style-type: none">• Analysis of data.
	<ul style="list-style-type: none">• Beginning to develop tentative ideal and actual pictures.
	<ul style="list-style-type: none">• Prepare initial recommendations.
	<ul style="list-style-type: none">• Prepare initial report which is shared with critical friends.
	<ul style="list-style-type: none">• Complete final report.