

TOWARDS A NATIONAL GEOGRAPHY CURRICULUM FOR AUSTRALIA

Written by

Towards a National Geography Curriculum for Australia Project Steering Committee

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June 2009

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1. INTRODUCTION

This Paper has been written as a contribution to the development of a national geography curriculum for Australia.

In 2008 the Australian Government established a National Curriculum Board (now the Australian Curriculum, Assessment and Reporting Authority—ACARA) to develop national curricula from Kindergarten to Year 12 in English, the sciences, mathematics and history in the first phase, followed by geography and languages (and now also to include the arts). In response to this initiative the Australian Geography Teachers Association (AGTA), the Institute of Australian Geographers (IAG) and the Royal Queensland Geographical Society (RGSQ) started a project with the aim of gathering ideas on the shape of a national geography curriculum, and presenting a combined submission to the Board. This project, titled *Towards a National Geography Curriculum for Australia*, commenced in late 2008. It is managed by a Steering Committee consisting of:

Malcolm McInerney (Chair, representing AGTA)
Kath Berg (Secretariat, representing RGSQ)
Nick Hutchinson (AGTA)
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The Steering Committee alone is responsible for the views in this Paper. Time constraints have prevented formal endorsement by geographical organisations prior to its presentation to ACARA.

The first phase of the project involved the establishment of a website (<http://www.ngc.org.au>), a call for submissions on a range of questions, and consultation meetings on these questions across Australia. The questions asked included:

1. How should geography be defined in the curriculum?
2. Why is it important for students to study geography?
3. What should be the objectives of a geographical education?
4. What are the core geographical concepts that must be included in the curriculum?
5. What skills should a geographical education develop?
6. What are the core areas of geographical knowledge that need to be included?
7. Do you favour a curriculum with concepts or topics as an organising structure, and why?
8. Which topics engage students, and why; and which topics do not engage students, and why?
9. How should the delivery of the geography curriculum be organised at the different stages of schooling—early years, primary, junior secondary and senior secondary?

Over 120 online responses were received, along with a number of printed submissions. Rob Berry and Roger Smith, with assistance from Lucy Rahaley on primary school geography, were engaged by the Project to manage this work, and to prepare a report on the outcomes. They were also asked to:

- document the reasons for including geography as a subject in the national curriculum
- undertake a literature search and provide a summary of key findings and recommendations from Australia and elsewhere
- gather research findings into geography curricula from Australia and elsewhere
- present alternative models for organising a geography curriculum, and
- present ways of teaching geography appropriate to different contexts.

A draft Background Report was completed in March 2009, and this became the focus of a second round of consultation meetings in all Australian states and territories, which finished in early June. Comments on the Background Report were also invited online. All of this input has been incorporated into the final Background Report, completed in June 2009. This report can be viewed and downloaded from the Project website. It provides a wealth of information on the teaching of geography in Australia and overseas, and on respondents' views on a future national curriculum.

This Paper has built on the Background Report. The Steering Committee has selected from the responses in the Report those it believes represent the most appropriate ways to guide the development of a national curriculum. Others may use the Report to reach different conclusions. The Paper does not attempt to define the content of this curriculum, but it does take a position on some of the key structural issues that have to be decided in shaping this curriculum. These are:

- the definition of geography
- the contribution of geography to the education of young Australians
- the nature of procedural and substantive knowledge in geography, and
- the structure of the curriculum.

The Paper also includes some recommendations on how the content of the curriculum could be chosen. In developing an argument for its position on these issues the Steering Committee has sometimes reworked and extended the material in the Background Report and included additional evidence on which to base its judgements.

2. HOW SHOULD GEOGRAPHY BE DEFINED IN THE CURRICULUM?

Introduction

Any attempt to define geography is likely to be contentious. Some academic geographers believe that the discipline is too diverse and too contested to be definable, while others advocate a variety of definitions. As discussed in the Background Report, respondents to the Project's survey chose six different definitions of the subject. The most popular was some version of geography as the study of human-environment relations, followed by geography as the study of the earth or the earth's surface, geography as the study of physical and human environments, geography as the study of the world, geography as the study of places, and geography as the study of spatial variation or spatial patterns. The Report also states that consultation forums consistently advocated a definition of geography as the study of natural and human environments and the interactions between them.

It is important to choose a definition of geography that students, parents, principals and the public will understand, that is comparable to the definitions of other school subjects, and that encompasses the various views of the subject held by teachers in the survey. After having reviewed a number of discussions of geography and how it should be defined (Bonnett, 2008; Commission on Geographical Education of the International Geographical Union, 1992; Cresswell, 2004; Geography Education Standards Committee, 1994; Matthews and Herbert, 2008; Waitt et al., 2000), examined the current syllabus statements in Australia and overseas included in the Background Report, and considered the views expressed by survey respondents, the Steering Committee proposes a definition based on geography as the study of places, as described below.

Proposed definition

Geography is the study of places—their biophysical and human characteristics, their interconnections and interdependencies, and their variation across space. In studying places, students are invited to explore and ask questions relating to:

- the characteristics of places
- relationships between places
- sustainable use of places and ways of living
- spatial patterns
- cause and effect processes
- how and why places and their relationships with other places differ across space and time
- possible, probable and preferred futures in places
- the nature of place and how it is interpreted.

The *Macquarie Concise Dictionary* (2006:924) defines 'place' as 'a particular portion of space, of definite or indefinite extent'. Cresswell (2008:134) defines a place as '... a meaningful segment of geographical space', and argues that it is not scale specific. A place can therefore be a suburb, a town and its hinterland, a river catchment, a coastal zone, a metropolitan area such as Melbourne, a region such as the Wheatbelt of Western Australia, or a whole country. Places are defined by people, and may be perceived, named and defined

differently by different people. Through the study of places at different scales students build up a knowledge of the world (Maude, 2009).

At whatever scale, places have porous boundaries and are connected with other places. The unique character of each place is determined by local environmental, economic, social and political conditions, and by the relationships between the place and other places. In this sense places are both local and global (Castree, 2009; Creswell, 2004; Jackson, 2006; Matthews and Herbert, 2008:12-13; Taylor, 2005).

A curiosity about places is often at the core of people's interest in geography, as described by Johnston (1996:59).

People are attracted to the study of geography for a range of reasons ... For many, the initial fascination is aroused through an interest in places, their characteristics and variety. That appeal may be stimulated by direct experience of one or more places, by the study of documentary evidence such as maps, or, increasingly, by exposure to places through visual media. Whatever the origin of the curiosity, however, the goal becomes the same: to appreciate the diversity which characterises the earth's surface, and to understand its origins.

The characteristics of places that geographers study are both biophysical—climate, landforms, soils, vegetation, water resources, minerals and scenic quality—and human—populations, built environment, economy, communities and cultures. Geography therefore straddles the natural and social sciences, as it has done since the beginnings of the subject in ancient Greece, but it is also increasingly incorporating the humanities, as in studies of how places are portrayed in literature and film, or how people assign meaning to places.

The main reason for choosing the study of places as the definition of geography, rather than a definition based on the interaction between natural and human environments, as preferred by many survey respondents and participants in the consultation forums, is that the former provides a way of including all the existing definitions of geography, as well as some of the newer branches of the discipline (for example, cultural geography). This is because the characteristics of a place can be understood through a variety of geographical approaches. These include:

- a locational approach, which examines the influence of the location of places on their characteristics
- an integrative approach, which studies the cause and effect relationships between phenomena within places that create their unique character—it incorporates the study of the interrelationships between people and their environment, and their sustainable use of that environment
- a spatial interaction approach, which examines how the characteristics of places are influenced by cause and effect relationships with phenomena and events in other places, and develops an awareness of the interconnectedness and interdependency of places
- a spatial analysis approach, which studies how the characteristics of places can be explained by an analysis of the spatial distribution of phenomena—this approach develops an ability to think spatially
- a human agency approach, which examines how the characteristics of places can be explained by individual, group or organisational geographical behaviour, such as a decision on where to live or where to locate a business—this approach incorporates

an awareness of the differences between people and of the varying constraints on their choices and decisions

- a structuralist/political economy approach, which examines how the characteristics of places are influenced by wider economic, social and political factors
- a cultural/social constructivist approach, which examines the different ways that places and issues are perceived, constructed or represented by different people, and how these differences are contested and negotiated.

Geography as a study of places therefore encompasses a definition of geography as the study of natural and human environments (because these constitute the characteristics of places), a definition of geography as human-environment interaction, and a definition of geography as a study of spatial variation. Each of the approaches above also involves different ways of understanding and explaining, ranging from empirical scientific epistemologies that attempt to develop law-like explanations, to subjective postmodern ways that reject the possibility of such explanations. They also involve different methods of collecting and analysing information, from 'hard' quantitative to 'soft' qualitative modes of analysis and interpretation. The Committee believes that rather than narrowing the scope of the discipline, which concerned many forum participants, a definition of geography as the study of places provides scope to broaden the subject. This broadening is illustrated by some of the new geography curricula in the UK.

Another area of geographical interest in places is in the humanistic study of the role of 'place' in people's lives. This explores how people perceive places, the meanings they attach to places, how they experience places, and how their identity and culture is formed by this experience. While people make places, the study of 'place' is about how places make people.

Professional geographers do not attempt to study all aspects of places, but specialise in understanding specific characteristics, processes or problems. Physical geographers search for law-like explanations of environmental processes and the ability to predict environmental change, and to do this requires specialised and narrow research (Demeritt, 2009). The same can be said of some, but not all, branches of human geography. Geographers may therefore specialise in the study of vegetation, climate, hydrology, settlement, regional development, socioeconomic well-being or crime, and how and why these vary from place to place across space. These are areas of systematic geography that have become separate branches of the discipline. Geographers may also study the environmental and socioeconomic processes, like erosion, climate change, population mobility or globalisation, which create and change the characteristics of places, or the concepts, theory and methods that contribute to an understanding of these processes. These aspects of geography encompass the patterns, processes, concepts and skills with which geography teachers are already familiar.

Understanding the characteristics of places is of course only the beginning of the study of geography. In studying places geographers are interested not only in the unique features of individual places—the differences between them—but also in their similarities. Like most academic disciplines, geographers search for patterns, regularities, order and explanations to make sense and meaning of our world (Bonnett, 2008). This may involve the development of generalisations, the construction of models and the formulation of theories, depending on the subject matter and the philosophical approach of the researcher (Maude, 2009).

Geographers build on their understanding of the processes and interrelationships that produce the characteristics of places to examine some of the contemporary issues concerning places. Geography's strengths are in the study of issues that involve the biophysical environment, human-environment relations, spatial distributions, spatial interactions, and the management of local and regional places. Appropriate issues for geographical analysis include natural hazards such as bushfires and floods, land degradation, the management of water resources, population mobility, migrant settlement, planning of the built environment, the location of services and facilities, regional development, inequalities in welfare and opportunity, the changing nature of community, urbanisation, and the local effects of globalisation and climate change. Geographers investigate the causes of these issues, using the ways of explaining described in Section 5. They then explore and evaluate policies and strategies to manage these issues, and stress the need to adapt these policies and strategies to take account of the different conditions in different places. Geographers also question why things are the way they are. The subject challenges the preconceptions of students about a range of issues, and can help them to imagine other ways in which their world could be organised. Through the study of these topics students are able to develop informed opinions and attitudes about the issues of their own and other places. Geography also explores and evaluates strategies to manage these issues, and students learn how to evaluate these strategies against the criteria of environmental sustainability, economic benefits and costs, and social equity.

3. GEOGRAPHY'S CONTRIBUTION TO THE EDUCATION OF YOUNG AUSTRALIANS

The study of geography makes a significant contribution to the education of young people¹.

The aims of a geographical education, as distilled from the Project's survey, are to:

- respond to and inspire children's curiosity, geographical imagination² and appreciation of the world's diversity
- develop a deep knowledge and understanding of Australia's and the world's significant places, and their interconnections
- build an understanding of the basic biophysical and human processes that shape the earth's places, and how they interact with each other
- develop a wide range of skills—geographical skills to research (in the field and in the classroom), analyse and make decisions on issues; skills foundational to education; and adaptive skills relevant to the workplace
- equip students with key geographical concepts, knowledge and skills, and the ability to apply them to create solutions to future challenges
- provide students with opportunities to clarify their own values and attitudes to stewardship of the earth and living sustainably, active citizenship, social justice, intercultural understanding and geographical empathy².

The fulfilment of these aims contributes to the solid foundation in literacy and numeracy, the disciplinary deep knowledge and skills, and the general capabilities required by ACARA.

Geography's disciplinary knowledge and skills are covered in some detail elsewhere in this document, so only four examples are given here of the ways they contribute to young people's development.

1. Geography draws on both the natural and social sciences, and its integrated approach to the study of the biophysical and social characteristics of places is unique among school subjects. This link between the physical and the human is a major strength in assisting students to make sense of the world around them, and can be a very sound basis for decision-making in a range of social and environmental areas.

2. Geography helps young people understand the conditions and events that influence their lives, through a study of the environmental, economic, demographic and social characteristics of the places in which they live, and of the places with which they are connected through environmental processes, population movements, trade and investment, tourism, cultural influences and political relationships. Through an understanding of their own place and its significance to them, and of how their place relates to the wider world, students can develop their personal sense of identity. Through an understanding of the

¹ This section draws substantially on *Australians Need Geography*, a statement endorsed by Australia's geographical organisations (Australian Academy of Science National Committee for Geography, 2007).

² Geographical imagination is the ability to imagine other places, and geographical empathy is the ability to understand why people in other places think and behave the way they do.

geography of their nation and its distinctiveness, students can develop their identity as Australians (Maude, 2009).

3. A geographical education develops the ability to see 'the world in spatial terms, focusing on how geographic information is compiled, organized, stored and made accessible in a variety of ways' (Geography Education Standards Committee, 1994: 61). Students gain an in-depth understanding of essential geographical and spatial concepts such as location, scale, spatial distribution, association, interaction and interdependence. Spatial technologies, such as interactive web-based programs and GIS (Geographical Information Systems), are increasingly used in geography classrooms. ANZLIC (2002:2), the intergovernmental Spatial Information Council, has noted that Australia's 'economic growth, and social and environmental interests are underpinned by quality spatially referenced information'.

4. Geography builds the skills of graphicacy, a visual-spatial 'intelligence', through work with maps, diagrams, photographs, remotely-sensed images and other visual images. Balchin (1972) argued that there are four basic modes of human communication which have developed into graphicacy, articulacy (now often called oracy), literacy and numeracy, and that these should be fundamental in education. He concluded that geography, English and mathematics, which best deliver these skills, should be foundational school subjects.

Geography's general capabilities include:

Literacy and numeracy

As the study of geography is qualitative and quantitative, it is well placed to develop skills in literacy and numeracy. Geography presents varied and stimulating opportunities to reinforce and strengthen these skills. Students undertake purposeful reading and writing tasks in a variety of forms, ranging from reports to poetry. Constructive spoken communication (oracy) is encouraged in activities such as role-plays, presentations and fieldwork interviews. Numerical skills are developed in contexts which can be both extrinsically and intrinsically motivating since they are concerned with real life situations. For instance, students may collect numerical data in activities such as stream monitoring and traffic surveys. They may then process the data using statistical analysis, and produce graphs and tables to present their findings. In using maps, students work with scale, distance and area. Geography is recognised as contributing to:

extended written expression involving complex analysis and synthesis of ideas; ... short written communication involving reading, comprehension and expression; ... basic numeracy involving simple calculation, and graphical and tabular interpretation; ... solving complex problems involving mathematical symbols and abstractions (Queensland Studies Authority, 2008:1).

Information and communications technology (ICT)

Geography provides many opportunities to master ICT, which can be embedded in all stages of a geographical inquiry. Spatial technologies provide students with opportunities to develop geographical skills and understandings in the classroom and at home. Students might use GPS (Global Positioning System) in the field to identify a location, collect up-to-date information from an authoritative website, make observations using Google Earth or a webcam, and record information in a spreadsheet. Students can use GIS to help analyse and synthesise data. Students could present their findings by creating a web 2.0 site, or exchange information with other schools electronically. All these examples are being used in Australian geography classrooms today.

The British Educational Communications and Technology Agency's research overview concluded that ICT can have positive effects on the teaching and learning of geography. 'Geography provides a rich and varied context for the use of new technologies to enhance both learning in the subject and to reinforce existing ICT skills' (Becta, 2004:1)—see Appendix.

Thinking skills

Thinking skills lie at the heart of geographical education. The section on procedural knowledge goes into some detail on the geographical inquiry method. In geography, students are given frequent opportunities to develop the skills of critical thinking, problem-solving and decision-making, backing up their arguments with evidence. It is important therefore that the curriculum not be overloaded with content so that students and teachers have the time to work through geographical inquiry methods. Also of relevance here is Leat's (1998) Thinking Through Geography program, directed at improving the cognitive development of students (see Appendix).

Creativity

A geographical education gives students the capacity to apply key geographical concepts, understandings and skills to new situations and to create solutions to problems—now and in their future lives. The futures perspective in geographical education encourages students to think innovatively about possible, probable and preferred futures (Hicks, 2007).

Rawling and Westaway (2003:8), the geographers involved in the UK Qualifications and Curriculum Authority Creativity Project, identified some of the key ways that children had demonstrated their creativity in geography. The children:

- found innovative ways of tackling enquiry ...
- made connections within and beyond the subject ...
- explored and presented their own personal meanings ...
- appreciated how language and media can change and extend meanings ...
- applied or reconceptualised 'big ideas' ...

In addition they noted the 'two key emphases which geographical work brings to creativity are: the focus on interpreting and understanding place and environment; and the use of maps, graphical representations and visual images, often alongside text'.

Self-management

As with other subjects, geography gives students opportunities to manage and reflect on their own learning. There is a progression in self-management so that students reach a point where they can undertake self-directed projects, for instance, a field-based research project on a geographical issue in their local neighbourhood.

Teamwork

Through group projects students develop their interpersonal skills working cooperatively with others in teams. They learn to appreciate the different insights and perspectives that other group members bring. Teachers have long observed the particular effectiveness of fieldwork in developing teamwork skills and student's self-awareness of their own strengths and weaknesses. This observation is supported by English surveys that link quality fieldwork with improved 'interpersonal and collaborative skills' (HMI, 2005b).

Intercultural understanding

One of the aims of a geographical education is to develop geographical imagination and geographical empathy—the ability to imagine other places and to understand why people in other places think and act the way they do. In geography, students examine the perspectives of different groups. This applies to subgroups with Australia’s mainstream culture, and also to different cultural groups. Geography’s content includes spatial inequalities within and between nations, and an understanding of the varying biophysical and social contexts of different cultures. Students are encouraged to value diversity, a key geographical concept. All these aspects contribute to students developing a respect for other cultures and an empathy with people from those cultures.

Ethical behaviour

Geography has had, and will continue to have, a strong focus on encouraging ethical behaviour in students, in the context of their investigations of issues at a local, national and global scale. This involves students in analysing and clarifying their own values, understanding and respecting the values of others, and reflecting on what their own response to an issue should be.

Social competence

Having a strong sense of personal identity is an underlying factor in social competence and here geography has a role to play. Psychologist Christopher Spencer (2005:308), after reviewing the work of mainly environmental psychologists, concluded:

It is clear that the plausible, intuitively persuasive, case for the importance of place in the development of a complete, rounded self-identity has begun to be made. And it is also clearly arguable that the subject of geography, and its early-years teaching, can have a major role to play in partnership with parents and peers and personal exploration of the neighbourhood. ... One could also make a parallel case for its importance for the sense of community and citizenship, as one moves the focus from individual well-being to that of the wider social world of the child.

Fieldwork, that essential component of geography, contributes to the development of social competence. The UK House of Commons Education and Skills Committee report on education outside the classroom ‘highlighted the contribution that outdoor learning, including geographical fieldwork, makes to developing students’ social, interpersonal and collaborative skills’ (HMI, 2005b).

Indigenous perspectives

As discussed above under ‘Intercultural understanding’, in geography students consider the perspectives of groups other than their own, and this includes the Aboriginal and Torres Strait Islander ways of knowing, viewing and relating to the world. Australia’s Indigenous peoples’ close connection to place resonates with the core of geography. This aspect is included, for instance, in AGTA’s recent publication *Keys to Fieldwork* (Kleeman, 2008). Geography gives students the opportunity to study many contemporary issues that affect Indigenous people, for example, environmental management, population structures, local economies, and spatial differences in access to services.

Indigenous perspectives in geography are not merely the analysis of Indigenous issues. The privileging of the physical, cultural, temporal and relational aspects of place is as key an element to geography’s ways of knowing as it is to the Aboriginal and Torres Strait Islander communities’. Geographers’ understanding of the world through patterns and natural

systems has a strong correlation to how Australian Indigenous peoples make sense of the world. Geography acknowledges the ongoing relationships between the traditional custodians and the spiritual and cultural practices of the local area.

Sustainable patterns of living

One of geography's key questions is what impact human actions have on places. Understanding this is basic to imagining what sustainable patterns of living might be and what actions might be taken, personally and by society as a whole, to bring probable and preferred futures closer together. Much of geography's content gives opportunities to examine environmental sustainability and stewardship, as well as social equity. The geographical concepts of place, spatial distribution, interaction and interdependence are particularly relevant to exploring these values. The skills and knowledge developed in geography help students make reasoned decisions and take informed actions.

Asia and Australia's engagement with Asia

Geography is well-placed to help deliver the Australian Government's emphasis on engaging young Australians with Asia. With Australia being part of the Asia-Pacific region, existing and future geography curricula ensure that places in Asia are selected as topics or case studies, reinforced by the need to study Asian countries because of their importance in world affairs. Geography's ability to nurture intercultural understanding also contributes to giving students the skills to engage with Asia. Geography teachers around Australia have worked with, and benefited from, the programs run by Asia Education Foundation.

Futures orientation

A key component of geographical study is to develop in students a futures orientation in terms of making recommendations and suggesting actions as a result of their acquired geographical knowledge, application of skills and reflective analysis. Such involvement builds students' capacity to be responsible agents for social change; to see that they can have an impact on the future if they have valid and considered evidence for their ideas and proposals. As one respondent is quoted in the Background Report: 'We cannot change the past. By educating students in geography maybe we can change the future.'

Active and informed citizens

Geography builds on an understanding of the processes and interrelationships that produce the characteristics of places, in order to examine some of the contemporary issues of places. These include the management of natural resources, the state of the local economy or the planning of cities. Geography also explores and evaluates policies and strategies to manage these issues. Geography equips young people with the knowledge, skills and values to make informed decisions on local, state and national issues as future citizens. However, geography students do not wait till they reach voting age. While still in the classroom, they can take on a citizen's role, for instance by communicating the outcomes of their investigation of a local issue to their government representatives.

Geography gives students a sound and essential knowledge of the world beyond their personal experience, and of its countries and places, and provides them with the opportunity to examine global issues such as population growth, globalisation, urbanisation and climate change. It can help to develop an empathy for other people and other places, and a sense of global citizenship. Geography's links with global education are strong, and in New South Wales and Victoria (which are without dedicated Global Education Centres)

AusAID's contracts for professional development of teachers in global education are delivered by the state geography teachers' associations.

Inclusivity

Geography can be a very motivating subject for students with a range of strengths and abilities, through its emphasis on active learning strategies and its ability to engage directly with the world of students. Students positively enjoy the fieldwork that is an essential part of geographical education. Geography lends itself to a variety of learning styles which gives students wide opportunities for self fulfilment, for example: verbal/linguistic—listen to expository teaching, interview for a survey, write essays; visual/spatial—interpret aerial photos, create climate graphs, produce field sketches; logical/mathematical—classify and categorise information, analyse data, solve problems; bodily/kinaesthetic—undertake practical fieldwork, build models; interpersonal—work in groups, empathise with others' perspectives on an issue; and intrapersonal—reflect on own learning.

This section details why geography is vital to the education of every young Australian in the 21st century. A quality national geography curriculum through the primary and secondary years will make a substantial contribution to giving our young people the understandings and skills necessary for the economic, environmental and social future of Australia.

4. LEARNING, PEDAGOGY AND VALUES IN THE GEOGRAPHY CURRICULUM

The curriculum should be based on an understanding of how students learn geography, of how geographical knowledge is actively constructed, and of the most effective methods of teaching the subject. There is much written on teaching styles and strategies in geography classrooms and there is an emerging body of practitioner-based research. However, there is less research on the cognitive abilities of children studying geography that relates to curriculum development, or on how they gain geographical understanding, than in some other subjects. Consequently this Paper also looks at the research literature on learning in history and the sciences, which overlap geography from different directions. On the basis of this literature (see Appendix) the Paper divides geographical knowledge into substantive knowledge and procedural knowledge. *Substantive knowledge* is knowledge of the content of geography, and of the factors, processes and principles that help in understanding this content. *Procedural knowledge* is knowledge of the perspectives, questions, methods and skills that geographers use to gain new substantive knowledge, of the ways of knowing that they use to interpret that knowledge, and of the concepts they use to organise and make sense of that knowledge.

The significance of this classification of knowledge is that research into how primary and secondary school students learn in both history and the sciences identifies the development of an understanding and use of procedural knowledge as of crucial importance in developing historical or scientific understanding. There is also evidence that students with good procedural knowledge have a better retention of substantive knowledge. A geography curriculum for Australian schools should therefore have a strong emphasis on procedural knowledge—on geographical questions and ways of understanding and explaining, on concepts, and on methods and skills.

The curriculum should also allow for inquiry-based methods of teaching, as the most effective methods for teaching procedural knowledge. A comprehensive review of UK schools concluded that the most effective geography departments were those which emphasised the inquiry method, fieldwork and group work, and addressed relevant and topical issues. ‘This implies a less formal teaching approach in the classroom with flexibility rather than rigid adherence to a content-driven programme’ (HMI, 2005b). In the primary years, the UK review also linked fieldwork to the development of geographical understanding and skills. However, it reported that ‘too often pupils are insufficiently challenged or stimulated by the tasks set ... Pupils have poorly developed enquiry skills because of over-directed tasks or a lack of opportunity to investigate geographical issues’ (HMI, 2005a). Inquiry-based methods and fieldwork are widely and successfully used in geography teaching in Australia and were supported by many teachers in the Project’s survey, as recorded in the Background Report.

Research also suggests that the development of procedural knowledge should be complemented by three other strands of learning (National Research Council, 2007:36-41). One strand is the learning of substantive knowledge, because this enables students to ask appropriate questions and interpret the answers, as well as providing them, in geography, with an essential knowledge of their world. Within substantive knowledge there should be an emphasis on the principles, processes and factors that help to understand and explain phenomena, so that students can link the ‘facts’ together in explanatory frameworks. Another strand is the opportunity for students to apply their knowledge and skills to issues

which engage them, as research shows that this facilitates learning. A third strand is the opportunity to discuss their ideas and findings with other students and the teacher, and to learn how to see other viewpoints, ask questions, engage in constructive debate, and adopt a critical stance.

An important and contentious issue is the place of values and attitudes in geographical education. This has been a matter of some debate in both geographical education and the media. For example, an Editorial in *The Australian* on 4 October 2006 claimed that ‘... in geography classrooms around Australia the subject has become little more than a stalking horse for hard-green ideology.’ Standish (2004:89), commenting on the geography curriculum in the UK as a geographical education academic, writes:

...the only value that matters is knowledge. Other values, such as concern for the environment, empathy, a sense of social justice, and respect for diversity, are about moralising and have no place in a curriculum with the goal of intellectual and personal development of the individual.

The role of teachers, he states, is to teach students ‘the facts and theories about the world they live in’, and leave students to construct their own values and attitudes. Lidstone (2003) also cautions against the inculcation of specific attitudes and values, but strongly supports teaching about potentially contentious issues. The problem for teachers is that issues such as land degradation, water management, environmental sustainability, the management of large city growth, and global inequality all involve different opinions about what is the problem and how it should be addressed, and are therefore the subject of debate and disagreement, often along ideological divisions. Avoiding discussion of these issues, which are regularly reported in the media, will leave students dissatisfied. Other educators argue that values and attitudes cannot and should not be divorced from many of the topics and issues that are studied in both primary and secondary school geography (Catling, 2003a; Fien, 1996; Gilbert and Hoeppe, 2004; Huckle, 2002; Kriewaldt, 2003; Wood, 2005). It should also be noted that the National Curriculum Board has stated that one of the aims of the national curriculum is to develop ‘... a commitment to sustainable patterns of living’ (National Curriculum Board, 2009:13), which means that teachers must engage with a topic which some Australians will regard as ideological. An additional consideration is that the research on the functioning of the brain reviewed by Martin (2006a), as summarised in the Appendix, suggests that for effective learning it is important to engage students both emotionally and intellectually.

All the writers referred to above agree that students should learn about issues on which people’s attitudes differ, but some disagree on how far teachers should go in promoting particular values and attitudes. Fien (2003), for example, differentiates between *values*, which he defines as enduring beliefs about our principles and goals, and *attitudes*, which are beliefs about what should happen in a particular situation and which are derived from our values. The role of the teacher, he suggests, should be to promote particular values, but not specific attitudes towards specific situations. Some of the other educators referred to above provide guidelines to help teachers determine an appropriate role. Teachers can help students to develop informed attitudes on geographical questions and issues through a combination of study, discussion and a critical analysis of different viewpoints, including their own (Kriewaldt, 2003). The role of the teacher should be to ensure that opinions are well informed by a sound understanding of the causes of a problem, and that different viewpoints are considered and debated. Students should also learn to evaluate issues against the three criteria of environmental sustainability, economic costs and benefits, and

social equity, frequently used in public life. One way to improve their ability to make these types of evaluation is to teach them decision-making skills, as advocated by Arvati et al. (2004) in relation to environmental issues.

Students should also be helped to recognise that their world view is not necessarily one that is universally shared. As Greig, Pike and Selby (1987:46) write:

Everyone interprets the world from within a particular framework of perception and thought. Personal perspectives are shaped by such factors as age, class, creed, culture, ethnicity, gender, geographical context, ideology, language, nationality and race. There are difficulties and dangers inherent in using one's own perspective as a yardstick by which to judge the values and behaviour of others.

In a very recent book Standish (2009) also argues that much teaching about global issues in geography imposes Western values on non-Western societies by failing to view these issues from the perspective of these societies. The ability to understand why other people, whether in the student's own society or in other societies, see issues differently is an important skill, and part of the development of geographical empathy and geographical imagination.

The Appendix to this Paper has a more detailed review of research on learning and pedagogy in geography, some of which is also included in the Background Report. On the basis of this review, the Steering Committee believes that the geography curriculum should:

- be structured to enable a progression of learning that matches student cognitive capabilities, while allowing teachers to cater for students of different abilities
- take seriously the arguments about a child-centred primary school curriculum
- not underestimate the capabilities of primary school children
- not confine early primary school geography to local and nearby places, but build on children's curiosity and encourage them to explore the whole world
- emphasise learning how to find out
- complement the present well-developed teaching of concepts, methods and skills with a greater emphasis on geographical questions, perspectives and approaches, and on the development of geographical thinking and understanding
- be structured to build an increasingly comprehensive and sophisticated understanding of how phenomena can be understood and explained
- focus on depth of understanding rather than breadth of content
- enable teachers to use inquiry-based and problem-solving methods of teaching and learning
- reinforce classroom learning through a wide variety of local area studies and fieldwork
- include learning experiences that would stimulate activity across all sections of the brain, which is best done through a mixture of critical and creative thinking
- include activities which engage students emotionally as well as intellectually
- incorporate the development of thinking skills, including thinking about thinking
- integrate the learning of ICT skills into the study of geography
- be suited to the context in which students live and work
- enable students to recognise the value of their own experience of places, and of their own everyday geographical thinking
- provide opportunities for the application of student knowledge and skills to issues that interest and concern them

- provide knowledge, skills and frameworks for students to explore and reflect on the world in which they live, and with which to develop their own values and attitudes towards geographical issues
- enable students to recognise that their world view is not necessarily shared by others
- embrace the current view of pedagogy as an integrated approach involving geography teachers, learners, classrooms, the 'field' and spatial technologies in sustaining learning communities.

5. PROCEDURAL KNOWLEDGE IN GEOGRAPHY

Procedural knowledge was defined earlier as knowledge of the perspectives, questions, methods and skills that geographers use to gain new substantive knowledge, and of the concepts they use to organise and make sense of that knowledge. The components of procedural knowledge in geography are described below. In schools a common sequence is to ask 'what', 'where', 'why', 'so what' and 'what if'.

The typical stages of a geographical inquiry are:

- selecting the object of study
- data collection
- data analysis
- understanding and explaining
- evaluating
- applying geographical understanding
- presenting.

Selecting the object of study

Geographical inquiry starts with identifying some place, phenomenon, pattern, process or issue to study. In school education students should have the opportunity to consider how these choices are made. What is geographically 'significant' about something that makes it worth studying? Catling and Taylor have explored the concept of 'geographical significance', and have suggested some criteria for deciding on significance (Catling and Taylor, 2006a, 2006b; Taylor and Catling, 2006). These include:

- Does this place, phenomenon or issue have personal resonance or meaning?
- Is it important to others?
- What effects does it have on people's lives and activities?
- What effects does it have on other places, phenomena or issues?
- Is it of regional, national or international interest and importance?
- What does it tell us about geographical processes and explanations?
- What does it tell us about geography?

They argue that the learning of students in both primary and secondary schools will benefit from them thinking about the significance of what they are studying, while teachers will find this concept useful when planning their teaching.

Data collection

This stage involves the collection of information about the object of study. In the classroom this will be from books, DVDs, television, the web, maps, photos, satellite images and resource packs. As schooling progresses information can also be gained from primary and secondary sources such as field observation, interviews and the Census. Fieldwork is a particularly important component of geographical inquiry, in which information can be directly obtained through observation, measurement, monitoring or interviews. These and other skills used by geographers are extensively described in the Background Report, Matthews and Herbert (2008), and Kleeman (2008). This stage answers the 'what' and 'where' questions.

The stage also includes teaching students how to evaluate the resource materials they use for their likely accuracy and balance. Catling (2006a), for example, believes that primary school children should learn to be critically selective of the resources they use and the ways these represent the world, and certainly primary school children in Australia are already being taught how to evaluate and be critical of the material they find on the web. With older students this can be extended to include a deeper examination of how we know 'what', which involves a critical approach to sources, the evaluation of evidence, an awareness of different ways of knowing, and an understanding of the contestability of knowledge. Students in Years 11 and 12, and probably earlier, should be introduced to the main philosophies of thought in geography. While academic geographers can identify up to 11 different philosophies in geographical research (Aiken and Valentine, 2006), for schools these can perhaps be reduced to four broad approaches: positivist/empiricist; behavioural and humanist; structuralist and political economy; and cultural/social constructivist (Hubbard et al., 2002). These ask different questions, provide different answers, and lead to different solutions or to no solutions at all. Each of these approaches is represented in one or more of the questions in the subsection below on 'Understanding and explaining'. An additional approach that might be appropriate for upper secondary students is critical realism, with its emphasis on the interaction of causal processes and local conditions. Students can be introduced to each of these broad philosophies of explanation, and their strengths and weaknesses, through a study of concrete examples. Some may argue that a study of cultural/social constructivist ways of thinking is inappropriate in the school curriculum, as being too subjective and insufficiently scientific, but their value is illustrated in the papers in Waitt, Head and Gill (2006).

Data analysis

The information collected can be analysed in a search for patterns, regularities and associations using a variety of quantitative and qualitative methods, including cartographic analysis and GIS techniques.

Understanding and explaining

Understanding and explaining 'why' involves asking questions. The ones listed below, adapted from Maude (2009), encompass the main questions that geographers ask when searching for an understanding and explanation of the phenomena that they study, which could be the characteristics of a place, a process, a problem or issue in a place, or the spatial distribution of phenomena across places. The significance of these questions is that they guide students to examine phenomena and issues from a domain-specific geographical viewpoint. The questions also represent, in a simplified form, the major paradigms or schools that have developed in contemporary geography, such as the earth science, human-environment, spatial, structural, political economy, political ecology, behavioural, humanistic, cultural and historical approaches to geographical understanding. They demonstrate the continuity and dynamic development of geographical ideas. The use of paradigms to structure a geography curriculum was first advocated by Biddle (1976), a prominent Australian geographical educator.

1. To what extent can the object of study be explained by its location, such as the effect of relative location on the economy, or of absolute location on climate? This is the 'where' question, used as an explanation rather than simply as a fact.
2. To what extent can the object of study be explained by its interrelationships with other phenomena *in the same place*? This method has several long-established traditions:

- study of the relationships between the components of the biophysical environment, such as the effects of rainfall on vegetation or soils, and the processes that are involved in these relationships
- study of the influence of the biophysical environment on human life, such as the effects of environmental resources on economic activity
- study of human alteration of the biophysical environment
- study of the relationships between the human characteristics of a place, such as the effects of economic conditions on population mobility, or of culture on economic activity, or of high levels of unemployment on the life opportunities of children—this approach may emphasise the differences between people of different class, race, gender or culture
- investigating the influence of specific variables, such as rainfall or culture or policy, through a comparison of one place with others that differ in one or more key characteristics, or have developed different responses to similar problems.

3. To what extent can the object of study be explained by its interrelationships with phenomena and events *in other places*, such as the effects of air pollutant transfer on vegetation and human health, of drought or political instability on migration, of markets on regional economies, or of unequal relationships of power?

4. To what extent can the object of study be explained by the interaction of regional or national processes of socioeconomic change, such as structural economic change, industrialisation, urbanisation or ageing, with local environmental, economic, social and political conditions? This and the next two questions introduce the role of scale, an important component of geographical inquiry as investigating phenomena at different scales can uncover different explanations.

5. To what extent can the object of study be explained by the interaction of regional, national or supranational political-economic factors, such as land tenure arrangements, ideologies, international trade relations, types of economic development or unequal power relations, with local environmental, economic, social and political conditions? This and the next question also involve a study of how people in places adapt to, accommodate or resist these influences.

6. To what extent can the object of study be explained by the interaction of global processes, such as climate change, technological development and globalisation, with local environmental, economic, social and political conditions?

7. To what extent can the object of study be explained by the spatial distribution across places of individual phenomena, such as rainfall or manufacturing? For example, spatial regularities, such as the distribution of rural settlements, can be used to explain the characteristics of individual places by their position within a spatial pattern. Similarly, the mapping of spatial variations in slope, soil drainage and vegetation may reveal the interrelationships between these phenomena.

8. To what extent can the object of study be explained by individual, group or organisational geographical behaviour, such as decisions to locate an enterprise, or develop a mine, or regulate the use of the biophysical environment, or redevelop an urban area, or move to a new place, or shop in a different location? How are these decisions and choices constrained by the context in which they are made? If there are different opinions on an issue, how are

these differences resolved? This and the next question are about how people make, and contest, places.

9. To what extent can the object of study be understood by the different ways that it is perceived, defined, constructed or represented by different people? This could include comparisons of the perceptions and representations of women and men, Indigenous peoples and immigrants, farmers and environmentalists, developers and residents, children and adults, and people in developed and developing countries. How are opposing views resolved? Do some groups have the power to ensure that their view is dominant, and what are the consequences of this?

10. To what extent can the object of study be explained by the way it has developed over time? In physical geography the time span for these studies can be the length of geological time but mostly covers the Quaternary Period, while in human geography the time span may be only a decade, or as far back as there are historical and archaeological records.

In looking for answers through these questions students learn to evaluate evidence, identify cause and effect relationships, understand the structure of the environmental, social, economic and political processes that link phenomena, and construct models and explanatory frameworks. Through the variety of questions they learn how to look beyond the immediate causes of a problem to more fundamental explanations (Hutchinson, 2005). For example, in explaining land degradation the search for causes could start with the immediate biophysical processes that produce degradation, and then examine the underlying causes such as lack of knowledge, attitudes, cost-price pressures, government policies, and international trade and aid policies.

Students should also learn how to integrate the answers to these questions. An influential review of geography in the United States argued that:

Places are natural laboratories for the study of complex relationships among processes and phenomena. Geography has a long tradition of attempting to understand how different processes and phenomena interact in regions and localities, including an understanding of how these interactions give places their distinctive character (Rediscovering Geography Committee, 1997:30).

Respondents to the Project's survey also emphasised the importance of integration in their teaching of geography. The ability to integrate or synthesise is valued by employers, and the geography curriculum should be explicitly designed to develop this skill.

Evaluating

The next stage of geographical inquiry involves asking the 'so what' question. Does what is observed or identified matter? What makes something a 'problem' that should be addressed? This question can be asked in several ways.

1. Is 'place' important in people's lives and identities?
2. Where place-based problems like land degradation or regional poverty are identified, do they matter, and if so why and to whom?
3. What are the environmental, economic, social and political consequences of spatial distributions across places and spatial inequalities between places? For example, what are

the consequences of Australia's spatial distribution of rainfall? What are the implications of national and global spatial inequalities in economic and social welfare, or of regional inequalities in service provision? What are the effects on the national economy of regional differences in rates of economic growth?

An integral part of this aspect of geographical inquiry is for students to reflect on their attitudes towards particular issues, such as environmental sustainability, spatial inequality, and diversity.

Applying geographical understanding

The knowledge and understanding gained through geographical inquiry can be applied to current issues in several ways. One is to examine how a place is changing, and how the changes identified could be best managed, an exercise that includes evaluating the objectives of this management. A second is to apply geographical understanding and skills to a range of place-based, environmental, spatial or locational issues, such as land degradation, environmental management, urban planning, the location of facilities, regional disadvantage and poverty, and housing. These are not just technical matters, but can also be approached from the perspective of how different groups frame issues in different ways, and how these differences influence the way problems are addressed. A third is to apply geographical knowledge to an examination of alternative futures, such as by constructing and evaluating scenarios of the future for a range of geographical topics, and determining how a preferred outcome could be achieved (Hicks, 2007; Hicks and Holden, 2007). Students' assessment of alternative scenarios or policies could be based on the three criteria of environmental sustainability, economic benefits and costs, and social equity.

It is important that students get many opportunities to apply their growing geographical knowledge to examining problems, as some of the research reviewed in the Appendix shows that this contributes to effective learning and deeper understanding. This is geography's equivalent to the problem-solving exercises in mathematics or physics, and also helps students to develop their skills in critical thinking, logical argument, the use of evidence and decision-making. This stage answers the 'what if' question.

Presenting

This stage involves the presentation of the outcomes of study in a wide variety of forms. In geography graphical and cartographic forms of presentation are particularly well developed. Geography students may also present their conclusions as reports, oral presentations, posters, websites, or letters to the editor.

Concepts

The concepts used to order, investigate and understand phenomena are another aspect of procedural knowledge in geography. Based on the Project's survey, the Background Report groups responses to the question on the concepts to include, into the following categories:

- natural environment (e.g. ecosystems, environmental health)
- spatial (e.g. location, relative location, spatial association)
- process-based (e.g. globalisation, desertification)
- society-based (e.g. poverty, technology)
- human environment (e.g. population, density)
- temporal (e.g. change, futures).

The Background Report also shows how concepts can be grouped into the four traditions or approaches of geography identified by Pattison (1964): the spatial tradition, the area studies tradition, the human-environment tradition, and the earth science tradition. The Report notes that some respondents to the question on concepts provided lists of topics rather than of concepts, suggesting some confusion over the meaning of a concept which will need to be addressed in a national curriculum.

Following Taylor (2008:54), this Paper focuses mainly on what she calls ‘second order concepts’, those which ‘... can be used to organise geographical content and ... mobilised to ask geographical questions across the whole range of geography content, physical and human.’ These are distinguished from ‘substantive’ concepts like ‘climate’, which apply to specific areas of geography. The criterion for selection in the list in Table 1 is that the concept must relate to the questions outlined above, because the Steering Committee believes that concepts should be taught as a way of framing questions, interpreting answers

Table 1: Key concepts in geography

Major concept	Related concepts
behaviour	decision-making; structure and agency; power
cause and effect	explanation; evidence; hypothesis; model; theory; ways of knowing
culture	social, economic and political organisation; values and attitudes
diversity	difference; uniqueness
environment	biophysical environment; built environment; perceptual environment; nature; environmental resource; ecosystem service; environmental resilience; environmental opportunity and constraint; human-environment relations; sustainability
interaction	movement; flow; connection; link; interrelationship; interdependence; system; cycle; regional multiplier
location	absolute location; relative location; proximity and distance; real and perceived distance; centrality and remoteness; time-space convergence/compression
order	classification; generalisation; pattern; association; similarity
perception	representation; construction; geographical empathy; geographical imagination ^a
place	region; landscape
processes	biophysical processes; socioeconomic processes
scale	
space	absolute space; relational space; material space; representation of space; lived space; spatial distribution; network; clustering and dispersion; agglomeration; spatial inequality; uneven development; regional comparative advantage
time	change; continuity; prediction; projection; scenario; trend

a. Geographical imagination is the ability to imagine other places, and geographical empathy is the ability to understand why people in other places think and behave the way they do.

and organising facts, and not on their own. Taylor (2007), for example, shows how inquiry questions and organising concepts can be linked, by listing from two to five questions under each of the four concepts of interaction, diversity, perception and representation. Teachers should also note Leat's concept of bridging, in which a concept or reasoning pattern used in one context is applied to other issues and questions as a way of showing students how to tackle unfamiliar problems (Leat, 2002a).

Conclusion

To 'think geographically' is to use these methods, questions and concepts to gain substantive geographical knowledge. Students who can 'think geographically' will have:

- a knowledge of ways of collecting and analysing information
- an understanding of how and why places change
- an ability to identify and explain the opportunities that environments provide, and the constraints they set, for economic activity and population settlement
- an appreciation of the significance of location
- an ability to evaluate evidence, identify cause and effect relationships, and construct explanatory frameworks
- a knowledge of the different ways that the characteristics of places, and the differences and similarities between places, can be understood and explained
- an understanding of the concepts that geographers use to order knowledge, frame questions and interpret answers
- an ability to integrate explanations
- an understanding of the significance of scale in explanation
- an ability to think spatially and to identify and explain spatial patterns
- an ability to use spatial analysis to answer questions
- an awareness of place and its significance in people's lives
- an ability to use their knowledge to analyse issues and develop and evaluate possible solutions
- an ability to construct and evaluate scenarios of alternative futures
- informed attitudes and values towards places, environments and human well-being.

6. A STRUCTURE FOR THE GEOGRAPHY CURRICULUM

On the basis of the research on learning and teaching in geography and related disciplines, a geography curriculum for Australian schools should be structured to enable a progression of learning; have an emphasis on geographical questions, perspectives, approaches and methods (i.e. on procedural knowledge); focus on depth of understanding rather than breadth of content; provide scope for inquiry-based and problem-solving methods of teaching and learning; and enable students to reflect on what they are learning and develop their own considered values and attitudes.

The Project's Background Report states that there is strong support for a curriculum that is shaped by:

- a study of specific content based on organising (second order) concepts that are distinctive to geography
- content that provides:
 - for a study of both physical and human geography
 - flexibility to study core and optional topics in geography
 - an engaging and intellectually challenging study
 - opportunities for depth of study
- progression of each student's geographical learning appropriate to their level of schooling
- an inquiry-based approach that investigates key questions about geographical topics at a range of scales
- the application of geographical skills including those using ICT
- the opportunity to link study with the personal world of students
- the development of students' prior knowledge and skills in a way that avoids repetition
- the selection of content that demonstrates relevance and clear links to students' future lives including their employment opportunities
- the development of positive attitudes and values to the environment, sustainability and cultural diversity
- students' understandings gained through fieldwork.

Respondents to the survey, as recorded in the Background Report, also wanted:

- sequential learning and building on prior learning
- inclusion of thinking and practical skills
- integration of concepts, knowledge and skills
- a minimum time allocation for geography.

This and the next section of the Paper discuss some of the issues that need to be considered in meeting the above requirements.

A. Ensuring progression

The main contributor to the literature on progression in geographical education is Bennetts (2002, 2005a, 2005b, 2008). After reviewing the literature on educational progression in

general, he selects the following dimensions of progression in geography: ‘... distance from experience; complexity; abstraction; precision; degree of connectivity and of structure; breadth of context; association with cognitive skills; and association with affective elements’. Each of these is explained below, with quotations from Bennetts (2005a).

Distance from experience is about the extent to which students are familiar, whether directly or indirectly, with examples of what is being studied.

Complexity is about the number of elements, variables and links that are involved.

Abstraction relates to concepts, generalisations, models or theories.

Precision ‘... is perhaps most closely associated with techniques of measurement ... but it is also applicable to the use of language and to clarity of thinking.’

Connectivity

... refers to students’ growing knowledge and understanding of the links and relationships between the elements that they study, and between the ideas that they develop and apply. ... [A]n advance in understanding is likely to involve a denser and richer network of links and relationships than that previously held, and consequently a greater capacity to raise relevant questions and suggest fruitful lines of enquiry. Such networks are also characterised by their deeper *structures*, which provide more coherent overviews and help students to organise their ideas more effectively which, in turn, explains the greater use of conceptual models and theories in advanced learning.

Broadening involves

... *broadening the context* in which explanations are placed. For example, an initial explanation of the occurrence of rainfall might focus on the local conditions, at a particular place and time, responsible for the uplift of humid air which leads to condensation and precipitation—a relief barrier in the path of water bearing winds, convectional activity, or a weather front. Progression could involve a widening of the context of explanation to take account of the synoptic weather patterns in which such events take place; or even be extended to the global atmospheric system which provides the context for the synoptic pattern. Similarly, explanation of the spatial pattern of a specific human activity might progress from identifying the essential requirements of the activity, and the current advantages of particular locations, to considering relevant historical factors and how various broad systems—economic, social, cultural, political, technological or whatever—contribute to the maintenance of, or changes to, that spatial pattern.

Cognitive skills. ‘Progression in understanding is often linked closely to the development and use of cognitive skills which support creative, analytical and evaluative thinking.’

Association with affective elements

... is especially evident when people’s responses to geographical features and situations are influenced by their attitudes and values, which in turn are likely to be influenced by their personal and social experiences. Enquiries into environmental, social and political issues may require students and teachers to reflect on their own attitudes and values, as well as gain an appreciation and understanding of those of other people. Some concepts which are important in human geography, such as human welfare, development, resource, environmental quality, conservation and sustainability, are clearly value-laden. But interpretations of, and reaction to,

many other processes and features, such as planning, green belts, pollution, migration, multi-ethnic communities and transnational companies, are also influenced by attitudes and values. Understanding views that are different from one's own, and reflecting on one's own attitudes and values, are intellectually demanding, and form a significant, although still poorly understood, dimension of progression.

A different aspect of progression, and one also noted by Bennetts, is sequence—building on previous knowledge. For example, sequence could be achieved through a more advanced teaching of some aspect of physical geography by building on the students' previous studies of the same topic, or by teaching about communities after students have studied population composition and mobility, both of which influence the structure of communities.

Following Bennetts, the curriculum could therefore incorporate the following dimensions of progression.

1. Sequence. Some topics depend on prior knowledge, so should follow the topics that teach that knowledge.
2. Distance from experience. Topics on which students have no direct or indirect experience should be taught later in the curriculum.
3. Complexity. More complex topics should be taught later in the curriculum.
4. Abstraction. The curriculum should have a progression from concepts like association to generalisation, cause and effect, model and theory.
5. Connectivity. Topics could be designed to progressively integrate more areas of geography, so that students investigate a growing number of links between phenomena.
6. Broadening. This can be achieved by progressively adding new ways of understanding and explaining, and their associated concepts.
7. Association with affective elements. While students at all stages should be dealing with values and attitudes, the issues that they study could become progressively more contested.

The Background Report presents two ways of describing progression in geography that should be considered in the development of the national curriculum. One is adapted from the Geographical Association (2008) and relates to the focus of the curriculum at each stage:

Years 1-3: establishes the foundations for enthusing student's learning about the world around them, predominantly using their personal, family and local experiences as the starting points for geography

Years 4-6: moves on to wider local, regional, national and overseas contexts to introduce some aspects of physical, human and environmental geography and an understanding of what a geographer does

Years 7-8: builds on the content, methods and skills of geography and ensures that students are inspired and enthused by the subject and its relevance to their current and future lives

Years 9-10: engages students in inquiry into significant geographical issues that emphasises the contribution and value of geography to students and enables them to understand and

participate as young Australian citizens in the world around them

Years 11-12: provides opportunities to undertake substantive critical analysis and scholarship through sufficient depth and breadth of geographical study for students to have access to important ideas and approaches in the subject.

The other describes a progression of cognitive activities:

1. learning to observe, compare, classify and describe phenomena
2. learning how to see relationships between phenomena, and to suggest explanations
3. learning how to make generalisations about phenomena, and to suggest explanations
4. learning how to explain phenomena by using [geographical] methods of inquiry and concepts ...
5. learning how to evaluate phenomena, using the criteria of environmental quality and sustainability, economic outcomes, and social equity
6. learning how to analyse a problem, propose an answer, and evaluate it.

B. Determining a structure for the curriculum

The Background Paper has an extensive discussion of ways of organising a geography curriculum, with examples from several jurisdictions in Australia and a selection of overseas countries. It also presents some alternative models for the organisation of the curriculum. These models were evaluated by participants in every state and territory in Australia, and the outcomes are summarised in the Background Report. Participants overwhelmingly preferred either a structure based on the UK's Key Stages 1-3 1999 curriculum, or one they developed themselves. The UK Key Stages 1-3 1999 curriculum is based on a specification of:

1. *Knowledge, skills and understanding*: geographical inquiry, geographical skills, knowledge and understanding of places, knowledge and understanding of patterns and processes, knowledge and understanding of environmental change and sustainable development.

2. *Breadth of study*: the places, countries and themes through which to teach knowledge, skills and understanding.

There was support in the consultation forums for a structure that included progression in skills development, a view that geographical inquiry could be combined with geographical skills, a view that assessment should be included, and differing opinions on how to incorporate attitudes and values. There was also some support for a structure that started with the focus of the curriculum at each stage, as in a model adapted from the National Curriculum Board's (2008b) science framing paper. Otherwise there were wide differences in approach, but common elements included the identification of geographical knowledge and understanding, concepts, and skills. However, there was no support for a model based on a progression of ways of understanding and explaining. This presents the Steering Committee with a dilemma, because the Committee believes that the curriculum *must* be based on a progression of procedural knowledge, for the reasons discussed earlier in this Paper and in the Appendix, and that procedural knowledge involves ways of understanding and explaining as well as concepts and skills. Existing curriculum models include the asking of geographical questions such as 'why' and 'where' and 'what is it like', but do not identify the different approaches that geographers use to find answers to these questions, and it is these approaches that identify the geographical way of thinking.

The Steering Committee has taken careful note of the views recorded in the Background Report in developing its own curriculum structure, shown in Table 2. This is based on an adaptation of the UK Key Stages model, with the addition of elements from other models. It is based on two principles. First, the curriculum should be structured so that at each stage there is a match between the cognitive capabilities of students and their interests and awareness of the world, and the focus of the curriculum. The second column in the table outlines the focus of the curriculum at each stage, based on assumptions about these capabilities and interests. The second principle is that the structure should be driven by the progressive development of procedural knowledge, through the addition of new ways of understanding and explaining in geographical inquiry, as shown in the third column of the table (based on the questions on pp. 22-24). These are complemented by the related concepts in the fourth column and the skills and methods in the fifth column. The sixth column provides examples of topics that might be appropriate to each stage. These topics should be chosen both to teach substantive geographical knowledge about the world, and to develop students' understanding of procedural geographical knowledge. The table does not include assessment, which the Steering Committee has not attempted to develop, but the Committee does wish to stress that the assessment methods chosen must support the emphasis on procedural knowledge. In putting forward the model in Table 2 the Committee recognises that other models may be equally valid.

Concepts have not been allocated to particular stages. They would be introduced progressively by teachers, so that simple elements of 'location' or 'culture' could be taught in early primary school but more advanced elements at a later stage. Similarly, skills and methods would be introduced by teachers at appropriate stages, depending on their complexity, and reinforced by further use in new contexts at later stages. Each stage of the curriculum would continue to use and develop the concepts, skills and ways of explaining of the previous stage(s).

All stages would have additional components on literacy and numeracy, thinking skills, and values and attitudes. The Oxfam (2006) publication *Education for Global Citizenship* gives useful guidance on developing values and attitudes suited to different age groups.

In applying this model, teachers and students would incorporate further components, such as translating the ways of explaining into a series of questions to be investigated. In early primary school the questions that students ask will be fairly simple, such as:

- Where is this place?
- What is it like (i.e. what are its characteristics and how can they be described)?
- How does this place differ from other places?
- How is it similar to other places?
- How is this place linked with other places?
- How am I linked with people and environments in other places?
- How and why is this place changing?
- What are the effects of these changes?
- Where are things located in this place? (developing the concepts of order and pattern)
- How do I use this place?
- How do I feel about this place?

Table 2: A possible structure for a national geography curriculum

Years	Curriculum focus	Geographical inquiry/Ways of understanding and explaining Students should learn how to:	Relevant major concepts	Skills and methods	Knowledge and understanding (these are examples only) Students gain substantive geographical knowledge and understanding, and learn about geographical inquiry and skills, through:
Years K-2	Responding to and developing the child's curiosity about and knowledge of places	ask and answer basic geographical questions	<i>Concepts will be introduced progressively and revisited at higher levels of complexity.</i> behaviour; cause and effect; culture; diversity; environment; interaction; location; order; perception; place; processes; scale; space; time	A progression of skills and methods to be developed for each stage	a study of the local place and of other places throughout the world of which the child has direct or indirect experience
Years 3-6	Responding to and developing the child's curiosity about and knowledge of places Identifying and investigating associations within places Studying the location of phenomena	ask more questions, and answer them, by examining: a. the influence of location b. the relationships between phenomena in the same place c. a comparison of places			a. study of a larger number and variety of places and countries, and of the connections between the local and other places and countries b. studies of where things are located c. studies of thematic topics such as weather and climate; local ecosystems; and settlements
Years 7-8	Understanding the role of the environment in human life Investigating spatial distributions (patterns) Exploring the role of 'place' in the student's life and identity	ask more questions, and answer them, by examining: a. the relationships between phenomena in different places b. human geographical behaviour c. perceptions of the environment and its resources d. spatial distributions			a. studies of types of places, such as coastal or mining places b. studies of thematic topics such as Australian and world biomes; environmental resources; natural hazards; Australian and world population; the geographical effects of technological change
Years 9-10	Examining the environmental, economic, social and political consequences of spatial distributions Applying geographical knowledge and understanding to issues Advanced study of the local place Topics that relate to the interests of young adolescents	ask more questions, and answer them, by examining: a. regional and national processes of demographic, social and economic change b. regional, national and supranational political-economic factors c. global processes			a. advanced study of the local place b. further studies of types of places c. studies of thematic topics such as land degradation; local and regional economies; sport; crime; a geography of the Internet; spatial inequalities in economic and social well-being in Australia; urbanisation
Years 11-12	Topics that develop the stages' ways of understanding and explaining Understanding different ways of knowing and explaining Construction and evaluation of alternative futures In-depth study of topics Independent investigation	ask more questions, and answer them, by examining: a. how phenomena have developed over time b. the different ways phenomena are constructed or represented by different people or groups			a. formal study of geography's ways of knowing and explaining b. further studies of types of places c. studies of thematic topics such as environmental issues; globalisation and localism; global economic and social inequalities; geographical change and geographical futures

By the end of secondary school, on the other hand, students will be familiar with a broad range of ways of understanding and explaining places, phenomena and issues, and will be able to ask a wider and deeper set of questions.

The key feature of this structure is that it is driven by procedural knowledge, not content, and that each stage focuses on the progressive development of this procedural knowledge in complexity, abstraction, connectivity and broadening. This allows teachers to match the level of procedural knowledge to the abilities of individual students, while all students in the class study the same or similar content. Such a structure follows the advice of David Lambert, the Chief Executive of the Geographical Association in the UK and a leading geography educator, who writes:

Thus, school geography—living geography—is not concerned with delivering slabs of content as an end in itself ..., but with inducting young people into geographical enquiry and how to ‘think geographically’ (Lambert, 2009:5).

C. Ensuring continuity

Continuity in the geography curriculum can be maintained in two ways. One is through the core definition of geography and its overall aim of understanding places. The other is through the repeated use of an expanding set of geographical questions (as outlined in Section 5) and associated ways of understanding and explaining (as contained in the structure in Table 2). By at least the end of Year 8 students should be clear about the distinctiveness of geography as a discipline, and be able to use its ways of gaining knowledge to investigate their world.

D. Time allocation

To ensure that students are able to develop a deep understanding of geography’s procedural and substantive knowledge, there needs to be a minimum time allocation for the subject. This was an issue raised by many respondents to the Project’s survey and in the consultation meetings—that geography should have a time allocation commensurate with science and history. The Steering Committee does not believe it is in a position to specify the hours required in different Years, although there are some suggestions in the Background Report. The Committee sees this specification as the role of ACARA, which will balance competing demands on the whole school curriculum.

7. SUBSTANTIVE KNOWLEDGE IN GEOGRAPHY: SELECTING CONTENT

Building on the definition of geography as the study of places, and the concept of places existing at a range of scales, substantive knowledge in geography is about the characteristics of places and the factors, relationships, processes, models and theories that explain these characteristics. This includes knowledge about continents, countries, regions, cities and localities throughout the world. This is often what the public and community leaders expect students to learn from geography, and indeed students can't make much sense of the world if they don't know where places are and what they are like. However, place studies have the disadvantage that they can be excessively descriptive and have limited explanatory value. Since the 1800s they have been complemented by systematic geography, which studies how and why individual phenomena like vegetation, climate or population are distributed across places as spatial patterns. These systematic studies form the content of much of school geography at present, and have focused mainly on the biophysical environment, rural and urban settlement, economic activity, population and community. Yet while most of geography's ability to understand and explain the characteristics of places has come through systematic studies, this approach can give students little idea of the connections between phenomena within places or across space.

Place studies and systematic studies are not the only ways of organising curriculum content in geography. Another approach to content is through the study of types of places, such as coastal places, cold places, dry places, hot and wet places, mountain places, awesome or extreme environments, cities, religious centres, retailing and commercial centres within cities, and suburbs. This brings together many systematic areas of geography in a holistic approach to understanding (Wood, 2007), and the Background Report provides an example of a unit on Harsh Environments. This approach also enables students to compare places which are similar in some key characteristic but different in others, and to explore the explanatory potential of comparative analysis. This is similar to the comparative study of revolutions or empires in history. A related approach is through integrated studies of thematic topics or issues such as natural hazards, deforestation, land degradation, rivers and aquatic environments, poverty, disease, development, housing, religion, Indigenous peoples and urban planning. Another possibility is a topic based on a geographical study of an issue currently in the media, which provides scope for students to explore 'the geography behind the news'. For this, the curriculum needs the flexibility to allow for spontaneity.

Yet another approach to the content of geography is through the study of the processes that produce the characteristics of places. These could be processes like weathering, erosion and sedimentation, or climate change, or migration, or urbanisation, or change in transportation and communication technologies, to name only a few.

These different ways of identifying substantive knowledge in geography are complementary, and the curriculum should be a blend of all of them. Place studies are likely to predominate in the earlier years of education, and systematic and process studies in the later years, in line with the cognitive capabilities of students.

A. Selecting content

The Steering Committee does not attempt to recommend what content should be specified in a national curriculum. The studies listed in Table 2 are examples, not recommendations.

There is an extensive discussion of views on content in the Background Report, and the choice is a matter for ACARA, and the groups with which it will consult in developing this curriculum. Here the Steering Committee sets out some thoughts on how this content could be selected.

1. Content should be selected so that it matches and develops the curriculum focus and ways of explaining of each stage, and avoids repetition.

2. Content should be structured to encourage the integration of physical and human geography, with material from both sub-disciplines included in as many of the topics as possible. For example, a study on cities could include consideration of the distinctive biophysical environment of cities and the problems and opportunities that this presents for urban living, urban planning and environmental sustainability, while a topic on the environment could include an exploration of different human perceptions and constructions of the environment. To increase this integration there could be an emphasis on studying the biophysical environment as a resource base. This is one way that geography differentiates itself from environmental science, by evaluating the resources that environments provide for economic activity and human life. Students should learn at least as much about soil productivity, scenic quality, the attractiveness of climates, ecosystem services, and the sources and variability of water resources as they learn about soil-forming processes, landforms, climate classifications, ecosystems and the hydrological cycle. They should also understand both the opportunities that environments provide, and the constraints that they set, for economic activity and population growth (Maude, 2009).

3. There should be opportunities to study the local area at all stages. In primary school the study of the local place provides opportunities to build on children's own knowledge and experience, and to engage with their own world in innovative ways (Barratt Hacking, Scott and Barratt, 2007). In secondary school the syllabus should include a study of the local environment, population and economy, and of the local issues that students will soon have some responsibility for as citizens. Local study also provides the opportunity for fieldwork, probably the most effective and popular form of learning in geography, and for the study of the role of place in the lives of students.

4. The curriculum should provide opportunities to learn about the most significant geographical features and issues of Australia and the world. What these should be will be a matter for some debate. As noted earlier, geography's strengths are in the study of issues that involve the biophysical environment, human-environment relations, spatial distributions, spatial interactions, and the management of local and regional places. Below are some examples of issues ranging from the local to the national and the global. These use Australian examples at local and national scales, but overseas issues would also be studied at these scales.

- biophysical environment
 - local environmental resources and their perception and use
 - the distinctiveness of Australian environments
 - world deforestation
- water resources
 - local water resources and their perception and use
 - Australia's imbalance between population distribution and water resources
 - global water shortages and their consequences

- economy
 - the structure and functioning of the local economy
 - regional differences in economic structure and well-being in Australia, and the implications of these differences for individuals, communities and governments
 - why countries vary in their levels of income and human well-being, and the significance of these differences
- population
 - the components and consequences of local population change
 - the movement of Australians between places, the causes of these movements, and their demographic, economic and social effects
 - international population mobility: types, causes and consequences
- governance
 - how is the local area governed?
 - should the governance of Australian space be more centralised or more regionalised?
 - world geopolitical hotspots: conflicts over resources, ethnicity, ideologies and borders

The importance of choosing topics that can be studied *geographically* is illustrated by this comment from a survey respondent, as recorded in the Background Report:

Topic-based Geography is one the key reasons why the subject has declined in recent years—the subject becomes a social-issues ‘catch all’ subject which allows non-specialists to teach everything and anything and leaves students with no sense of what Geography is really about.

5. Another way of selecting content is to identify the issues that adult Australians say concern them, and that can be studied geographically, in order to prepare students for adult life. These include community and neighbourhood; the environment; the economy; employment; globalisation; immigration; income inequality and poverty in Australia; housing; and the impact of information and communication technologies on people’s lives. This selection is based on the current concerns of adult Australians, as identified by the social researcher Hugh Mackay (Mackay, 2008) and respondents’ choice of ‘the most important problem facing Australia’, from a 2008 Roy Morgan survey (Roy Morgan International, 2008). In particular, there should be a place for the study of local and regional economies and how they function. While many current syllabuses include the economic issues of developing countries, most devote little or no time to a study of the economy of Australian localities and regions, although economic issues are central concerns of households, communities and governments. Students completing geography at high school should be able to understand how their local economy functions and how and why it is changing. They should learn something about how the jobs they will be looking for in the near future are created and lost in particular places. They should also understand the economic conditions and issues in different parts of Australia, because these are central to informed citizenship (Maude, 2009).

6. Content should reflect the contemporary world that students experience or are aware of. As Kirchner (2000:11) writes, ‘Pupils must be able to recognise their world in the lessons.’ This means the inclusion of topics like services, the dominant economic sector in the Australian economy, or the knowledge economy or the information economy, rather than the historical focus on agriculture and manufacturing. The curriculum could also include topics that might particularly appeal to adolescents, such as sport, tourism, popular culture, food, fashion, retailing and consumption, crime, and the geography of the Internet. During

the years geography is compulsory it is important that teachers have the option to select some topics that might engage students who, for whatever reason, do not have much interest in the subject, or in learning at all. All of these topics can be used effectively to develop procedural knowledge in geography. All of them have been successfully taught in the UK, and some of them in Australia to judge from responses to the survey. The Background Report also points out that students are increasingly interacting with and gaining an understanding of less tangible spaces through their use of social networking via the Internet. This type of space contrasts markedly with material spaces such as home and school. This enables geography students to include less tangible places within their realm, and this needs to be taken into account in the choice and design of topics.

Furthermore, the curriculum at all stages should provide opportunities for teachers to engage with young people's lives and their own geographies, to use the experiences of young people to make them active agents in their own learning, and to 'challenge and excite them with content that might be beyond their immediate horizon' (Geographical Association, 2009:15). This may be particularly appropriate in primary school, where the learning of geography can be based on the child's own world of everyday experience, and children can be involved in investigating their personal geographies. Catling (2003a and 2003b) has some detailed suggestions on how to relate the content of primary school geography to the student's world that should be considered in the preparation of the national curriculum.

7. Placed-based studies, especially of the Asia-Pacific region, could be included, to support ACARA's focus on this part of the world.

8. An Indigenous perspective can be incorporated into the curriculum by including this perspective in all appropriate topics, so that topics on the management of the environment, or regional economies, or urbanisation, for example, would all have an Indigenous component.

9. Finally, any compulsory content must be relevant to schools throughout Australia. For example, cities should not be a compulsory study, as some non-metropolitan students may have no experience of a large city while metropolitan students have considerable knowledge on which to draw. On the other hand, a study of settlement, ranging from rural settlement through small towns and regional centres to large cities, is relevant to all students, as they all have experience of a part of the pattern. Similarly, climate is relevant to all parts of Australia, but coasts are not. Perhaps paradoxically, a geography curriculum must in some ways be geographically neutral.

B. Providing choice, avoiding repetition and ensuring consistency

One reason for the development of a national curriculum is to bring greater consistency across educational systems in what students study at each stage, partly to reduce the problems that students experience when they move between systems. Another aim is to reduce the risk of repetition, a problem identified by some respondents to the Project's survey. Both of these aims will require a degree of compulsion in the curriculum that will restrict choice and, if not managed carefully, limit the ability of schools and teachers to provide for the varying interests and capabilities of their students.

Choice can be provided in several ways. One is to allow for optional topics in each year, and given the variety of schools and students it may be advisable to provide teachers with the option to select some topics that best suit their situation. The curriculum would therefore contain some compulsory topics and a set of optional topics from which teachers could choose. Choice could be extended to teachers developing their own topics, subject to an approval process as already exists in some jurisdictions. A second is to design topics so that there is scope within them to study different examples of the same phenomena or principles. This is already a feature of many existing syllabuses, and seems essential if teachers and students across Australia are to be able to build on their own knowledge, resources and interests.

C. Selecting places to study

In studying whatever content is selected, students should apply their growing knowledge and skills to an understanding of a variety of places. These should include a student's own place, and other places around the world with which the student's own place is connected through environmental processes, population movements, trade and investment, tourism, cultural influences and political relationships, or which illustrate particular aspects of geography. This means that the places selected will vary from school to school, and can be chosen by teachers, subject to some guidelines. They should also include a balanced selection of examples from Australia, the Asia-Pacific region and elsewhere around the world, for the aim of the syllabus is to teach students about the world, and not just Australia. Again the choice could be left to teachers, who should be able to build on their own experience, and on links the school may be able to develop with schools in other parts of Australia and other countries. Places should also be selected so that they are studied at a range of scales—local, regional, national and global.

In teaching about selected places it will be important to avoid the two 'place study traps' identified by Johnston. These are:

... to cover the required places as a unique catalogue of facts and information (the singularity trap) or to see places only as examples for thematic work (the generalisation trap). ... It may be a very real danger, for instance, that Japan is studied only as an example of economic success, that Brazil is merely the background for rain-forest studies, and that Bangladesh is seen as the example of a Third World country coping with flood hazard (Rawling, 1996:261).

D. Managing overlaps with other subjects

Some of the characteristics and issues of places that are studied in geography, like climate or water resources, are shared with other subjects, so there is potential for overlap. However, geography differentiates itself from other subjects through its variety of questions and its search for an integrated and holistic understanding. For example, in teaching about climate change in Australia, which is also included in the science curriculum, a geography teacher could not only ensure that students understand the science underlying the process, but examine how different places in Australia will be affected in different ways by climate change, and the potential influence of these differences on the location of agriculture and population, and on cities like Perth, Adelaide and Melbourne. Senior students could also examine why people have different opinions on climate change and policies to manage it. In studying bushfires students can examine the role of landforms, climate, weather, vegetation, changes to traditional Aboriginal burning practices, rural settlement, the housing decisions of people, communications and territorial governance, all systematic elements of geography.

Geography therefore takes a different approach to the understanding of phenomena which it may share with other subjects. This holistic and integrative approach was frequently mentioned by teachers in the Project's survey, as recorded in the Background Report.

In the primary years, potential overlaps should also be seen as complementary. For example, teachers could take elements from the geography curriculum and from the mathematics curriculum when planning a unit using mapping skills. There will be many instances in primary schools where teachers will find that it provides a better learning environment for their students to combine parts of the geography curriculum with parts of other curricula, for example, poetry from the English curriculum with climate, or an insect study from the science curriculum with a study of land use adjoining a local creek. In England, which has a much stronger tradition than Australia of geography in the primary years, there are many excellent articles exploring these links, for instance the special issues of *Primary Geographer* on language (no. 32 1998), numeracy (no. 34 1998), creativity (no. 50 2003), global education (no. 62 2008) and technology (no. 67 2008).

8. OBJECTIVES OF A GEOGRAPHICAL EDUCATION

The objectives listed here have been largely drawn from the Background Report. By the end of Year 10 geography students should:

- have reached a high standard of literacy, numeracy and graphicacy
- be knowledgeable about and interested in the world, from their own place up to the global level
- value learning about geographical ideas and issues
- be confident about their ability to find new geographical knowledge
- be aware of the possibilities of individual and group action to make positive changes concerning places, people and environments
- be informed about some of the main local, national and global issues studied by geographers
- have developed their own informed set of values and attitudes about places, people and environments, and an understanding of what this means for personal action
- understand why people have different viewpoints on geographical issues
- have an understanding of and empathy for other people, both in their own place and in other places.

They should have a deep understanding of geography as a discipline, and have demonstrated this through a mastery of:

- the process of geographical inquiry
- geography's integrated approach and holistic view
- ways of describing and explaining the characteristics of places, differences between places, and the spatial distribution of phenomena
- critical thinking skills
- methods of collecting, analysing and presenting geographical information, including the use of digital technologies
- the application of these skills and methods to analyse contemporary issues and develop and evaluate possible responses to them
- the identification of possible, probable and preferred futures.

They should have a knowledge and understanding of a variety of places and countries, including:

- the biophysical, demographic, economic and social characteristics of their own place, and how and why these are changing
- the key geographical issues of their place, and how their community is adapting to and taking action on these issues
- the role of places in their own and other peoples' lives, and in personal and national identity
- the characteristics of other places in Australia, in the Asia-Pacific region, and in selected other countries
- the major features of the geography of Australia and of selected other countries, and the processes that are changing that geography

- the similarities and differences between selected places, and the ways these can be explained through geographical thinking
- some of the main geographical issues in Australia and in other countries, and how these issues can be viewed from a variety of perspectives and be resolved in a variety of ways
- the nature of the connections between places in Australia, in the Asia-Pacific region and throughout the world.

They should have a knowledge and understanding of Australian and world environments, including:

- Australian environments and their resources
- perception and use of these environments and resources
- major biophysical systems of the Earth
- ecosystems and their dynamics
- biophysical processes
- the impacts of human activities on the environment
- the concept of environmental sustainability.

They should have a knowledge and understanding of the demographic, economic, social and cultural differences between places, including:

- the world distribution of population, economies and cultures
- the spatial structure of the global economy
- the major demographic, economic, social and cultural processes that connect places.

They should have a knowledge and understanding of major geographical perspectives, including:

- the influence of location and distance
- the concept of place
- diversity and similarity
- the role of the environment in human life
- the consequences of spatial distributions
- the interdependence of places
- the significance of scale in geographical understanding
- continuity and change.

9. IMPLEMENTING A NATIONAL GEOGRAPHY CURRICULUM

In developing the national geography curriculum there should be a premise that teachers are capable of devising relevant, rigorous, dynamic and engaging geography with their students when guided by a clear idea of the subject's worth, and with curriculum structures providing context and flexibility for content choice. Such a premise lies at the heart of the idea of 'curriculum making' that empowers teachers to balance the three sources of energy in the classroom:

- the teacher's own practical skills and expertise
- the interests and needs of the students
- what the dynamic, changing subject discipline has to offer (Geographical Association, 2009:27).

As discussed by the Geographical Association in the United Kingdom, the role of geography teachers as *curriculum makers* and not simply as *curriculum takers* is at the core of such a premise. It follows that it is imperative that major curriculum change be accompanied by appropriate and significant professional learning.

For the geography teacher the development of a contextually relevant and engaging curriculum with currency is an interesting professional challenge. The task is made more complex by the dynamic nature of geography, the plethora of resources and topics available and the fact that the general public has difficulty in understanding the nature of modern geography. This heightens the need for professional learning to have currency, and for teachers to have conversations with industry, geographers, other teachers, community members, families and the students themselves to explain the subject. Geography is a discipline which deals with information, data, ideas, events and issues in local, national and global communities. As a result the spontaneity of geography to respond to current events and commentary is critical if the subject is to remain relevant and engaging for young people. Hence professional learning must also be regular, consultative and dynamic, responding to the latest issues, information and technologies. Subject associations such as AGTA and the geographical societies are well placed to facilitate such critical conversations and showcase the latest technology, information and ideas relevant to the study of geography.

The range of settings in which the professional learning for teaching geography should take place are:

Pre-service professional learning

Adequate training is required that is specifically directed to supporting the teaching of geography as a distinct subject. University teacher education departments need to be fully aware of the implications of geography being part of the national curriculum and to develop programs that address these. It is likely that special attention will need to be given to the training of primary school teachers who may have had very little exposure to the key areas of geography's knowledge, concepts and skills. Of critical importance is that pre-service education reflects the state of technology used by geographers in the community. In particular, new teachers need to be competent in the range of spatial technologies used widely in the community and increasingly seen as the tools of the modern geographer.

Professional learning for teachers

Professional learning is a life-long journey and geography teachers should be encouraged to maintain a strong interest in the subject and to share this with others. To deliver a 21st century geography curriculum professional learning should involve:

- principals and faculty heads encouraging and supporting teachers in their role as curriculum makers
- primary school teachers being supported in their understanding of geographical knowledge, concepts and skills
- support/hub groups being established and serviced by jurisdictions to support the implementation of geography in primary schools
- supporting national geographical organisations (e.g. AGTA and IAG) to provide opportunities for geography teachers to broaden their knowledge, enthusiasm and expertise beyond a local context through such avenues as national conferences, exchanges between different systems and jurisdictions, and study tours
- State and Territory education departments and curriculum and assessment authorities providing appropriate structures, activities and resources to ensure that teachers are well prepared to teach geography within their system
- geography subject associations in each state playing an important role in supporting local, regional and statewide groups
- appropriate resourcing by jurisdictions in terms of finance and personnel to support such initiatives—providing teachers with time release from teaching to enable them to attend professional learning activities and developing advisory structures to deliver professional learning
- the latest technology to disseminate geographical resources, ideas, information and exemplars to teachers
- the use of web 2.0 capabilities to develop support structures for teachers, which may be informal (e.g. discussion forums) or formal programs (e.g. accredited training) appropriate to support teachers in isolated schools or remote localities
- summer school programs within tertiary institutions (run by geography departments and/or teaching practice departments) providing a means whereby teachers can extend their understanding in geography with the possibility of gaining formal recognition or accreditation
- mentoring programs by leading geography teachers
- training programs provided by specialist organisations (e.g. government and non-government) or companies (e.g. GIS software providers)
- scholarships and/or fellowships.

For the national geography curriculum to be successful it is imperative that a national strategic implementation plan be developed in collaboration with geographical associations and jurisdictions to provide a range of options for teachers to access professional learning. Only with a teaching force geographically skilled, and engaged with approaches commensurate with the objectives of geographical education as outlined in this paper, is it likely that the national geography curriculum will be successfully implemented to meet the needs of young people in the 21st century.

The most significant challenge facing the discipline now and into the future is the number of teachers with sufficient geographical knowledge and skills to deliver the new curriculum in primary and secondary schools.

9. CONCLUSION

The Towards a National Geography Curriculum Project Steering Committee has endeavoured to create a document, based on research and wide consultation, which sets out the overarching principles and preferred directions for a national geography curriculum, that geography teachers, academic geographers, and community geographers can agree upon in principle.

This Paper has argued, first, that a national geography curriculum should be based on an understanding of how students learn geography, of how geographical knowledge is actively constructed, and of the most effective methods of teaching the subject. It should therefore have an emphasis on geographical questions, perspectives, approaches, methods and concepts (i.e. on procedural knowledge), and employ an inquiry-based and problem-solving approach that investigates key questions about geographical topics at a range of scales and in a diversity of places. Content should be chosen to illustrate the concepts and ways of explaining that are distinctive to geography. It should be structured to enable a progression of learning that builds on previous study, and teaches students an expanding range of geographical skills, methods and ways of explaining, in a way that avoids repetition. Fieldwork should be an essential component of student learning, because of its demonstrated enhancement of student understanding. Affective learning should be integrated with the study of substantive topics, as this has also been shown to enhance learning.

Second, the curriculum should be engaging and intellectually challenging. It should develop student curiosity and creativity, focus on depth of understanding rather than breadth of content, and provides opportunities to study a wide range of geographical topics, including optional topics chosen to suit student interests and teacher expertise.

Third, the curriculum should provide students with the opportunity to link study with their personal world, with content that relates to their present and future lives, including their employment opportunities. It should enable them to reflect on what they are learning and to develop their own considered values and attitudes towards the environment, sustainable ways of living, social equity, cultural diversity, and the future.

Fourth, the curriculum should develop the general skills and capabilities of students. It should teach thinking and problem-solving skills, and provide opportunities for students to improve their literacy and numeracy, their ability to communicate in a wide variety of ways, and a range of practical skills including those involving ICT.

Fifth, the curriculum should address key government initiatives and policies, including recognition of Indigenous perspectives, civics and citizenship, and studies of Asia. Above all, it should prepare students to become geographically literate citizens, and demonstrate the value of a geographical education and geographical understanding to the wider public

Finally, the curriculum should be delivered by competent, enthusiastic and qualified geography teachers at all levels who have the opportunity to continually improve their knowledge and skills. While the new curriculum will contain much that is familiar to teachers, it will also require them to learn some new content and some new ways of thinking. Effective implementation of the curriculum will require appropriate government

funding to enable teachers to properly prepare to teach it, and to support their professional learning over the succeeding years.

This Paper has not been developed to be an end in itself but rather as a contribution to ACARA's development of their consultation process and initial advice on geography to the education community in Australia. We understand that the development of any discipline in the national curriculum needs to be dynamic and provide the opportunity for robust debate between the key stakeholders. We hope the work undertaken by the geographical community via the Towards a National Geography Curriculum Project enhances and supports the process of developing a creative, relevant, engaging, innovative and state of the art geographical education for young Australians in the 21st century.

APPENDIX: THE IMPLICATIONS OF RESEARCH ON LEARNING AND PEDAGOGY FOR THE GEOGRAPHY CURRICULUM

The curriculum should be based on an understanding of how students learn geography, of how geographical knowledge is actively constructed (Balderstone, 2000:114), and of the most effective methods of teaching the subject. There is much written on teaching styles and strategies in geography classrooms and there is an emerging body of practitioner-based research. However, there is less research on the cognitive abilities of children studying geography that relates to curriculum development, or on how they gain geographical understanding, than in some other subjects. Consequently this report turns first to the research literature on learning in history and the sciences, which overlap geography from different directions.

A. Research on learning

An understanding of the research on learning in history and science requires an understanding of the structure of subject knowledge. VanSledright and Limón (2006:547) divide historical knowledge into substantive and procedural knowledge, and further divide substantive knowledge into two categories. First-order substantive knowledge is ‘knowledge of the substance of the past that come[s] from who, what, where, when, and how questions.’ Second-order substantive knowledge consists of the ‘... concepts and ideas that investigators impose on the past in the practice of interpreting and making sense of it.’ Procedural knowledge, on the other hand, is ‘knowledge of how to research and interpret the past.’ Substantive knowledge is commonly described as ‘content’, while procedural knowledge is about ‘how to do geography’ and how to ‘think geographically’. The National Curriculum Board’s framing paper for history (National Curriculum Board, 2008a), however, places concepts in procedural knowledge, a location which also seems to make sense for geography because a major role of a concept is to help frame questions and interpret answers. This Paper therefore divides geographical knowledge into substantive and procedural knowledge. *Substantive knowledge* is knowledge of the content of geography, and of the factors, processes and principles that help in understanding this content. *Procedural knowledge* is knowledge of the perspectives, questions, methods and skills that geographers use to gain new substantive knowledge, of the ways of knowing that they use to interpret that knowledge, and of the concepts they use to organise and make sense of that knowledge.

The significance of this classification of knowledge is that research into how primary and secondary school students learn in both history and the sciences identifies the development of an understanding and use of procedural knowledge as of crucial importance in developing historical or scientific understanding (National Research Council, 2002 and 2007; Taylor and Young, 2003). For example, VanSledright and Limón (2006:548), referring to their categories of knowledge, write: ‘... for learners to develop deep understandings of first-order ideas [i.e. content knowledge], the study of second-order concepts, thinking capabilities, and domain-specific procedural knowledge appears to be required.’ Some of the evidence for this comes from the experience of the Schools Council History Project in the UK. The same view is reported in the National Curriculum Board’s (2008b) science framing paper. In a recent evaluation of science learning in United Kingdom schools a report by science inspectors concluded that the main factor in the schools with the highest or most rapidly improved science learning was their commitment to science inquiry. In these schools students were

given the opportunity to pose questions and design and carry out investigations for themselves. There is also evidence that students with good procedural knowledge have a better retention of substantive knowledge. A similar review of English schools by geography inspectors linked the inquiry method to successful geography teaching (HMI, 2005a and 2005b).

A geography curriculum for Australian schools should therefore have a strong emphasis on procedural knowledge—on geographical questions and ways of understanding and explaining, on concepts, and on methods and skills. It should also allow for inquiry-based methods of teaching, as the most effective methods for teaching this knowledge. These are widely and successfully used in geography teaching in Australia, and were supported by many teachers in the Project’s survey, as recorded in the Background Report. Miles and Ward (2008) describe the approach used in Victoria.

Research also suggests that the development of procedural knowledge should be complemented by three other strands of learning (National Research Council, 2007:36-41). One strand is the learning of substantive knowledge, because this enables students to ask appropriate questions and interpret the answers, as well as providing them, in geography, with an essential knowledge of their world. Within substantive knowledge there should be an emphasis on the principles, processes and factors that help to understand and explain phenomena, so that students can link the ‘facts’ together in explanatory frameworks. Another strand is the opportunity for students to apply their knowledge and skills to issues which engage them, as research shows that this facilitates learning. A third strand is the opportunity to discuss their ideas and findings with other students and the teacher, and to learn how to see other viewpoints, ask questions, engage in constructive debate, and adopt a critical stance. The value of collaborative talk between children in helping them to develop understanding in upper primary geography has been researched by Lyle (1997), Mercer, Wegerif and Dawes (1999) and Thurston (2006), and is supported in secondary school geography by Leat (1998).

The Background Report adapts an idea from the National Curriculum Board’s science framing paper to show how the elements described above can be grouped into three areas:

Geographical understanding: Understanding of geographic concepts and explanations enables people to explain and predict natural and human phenomena and to apply that knowledge and understanding to new situations and events. These concepts and explanations are drawn from physical and human geography.

Geographical inquiry skills: Geographical inquiry consists of posing questions, data collection, analysis, presentation and communicating findings. Geographical inquiry is concerned with evaluating competing claims about issues from different groups and individuals. It also recognises that geographic issues change as new or different circumstances arise.

Geography and society: Geography relates to society through its investigation of social and ethical issues. Societal challenges and socio-political priorities influence the direction and development of geographic inquiry. This element highlights the need for informed, evidence-based decision making about current and future social and environmental issues. It acknowledges that in making decisions about these issues their practices, moral, ethical and social implications should be considered.

Another issue concerns the cognitive abilities of students. Leat, a British geography education academic, suggests that children’s ability to engage in formal operational thinking

is limited until the ages 11 to 14, and often even later. Such students have difficulty with tasks that ask them to 'evaluate', 'analyse' or 'explain', or to comprehend complex concepts, or to cope with more than two variables at a time (Lambert and Balderstone, 2000:195-207; Leat, 2002a). His view is supported by research on science education which shows that the majority of children have not progressed beyond a stage of concrete operational thinking in early secondary school (Endler and Bond, 2008). On the other hand, Taylor and Young (2003) state that research into education in history provides good evidence that eight-year-olds are capable of conceptual thinking, arguing a position, and engaging in historical problem-solving. Adolescents can use more advanced concepts, locate and interrogate sources, and collect evidence to construct explanations. Similarly, the US National Research Council's report on science education in Grades K-8 states that cognitive developmental research shows that primary school children can think in abstract as opposed to concrete terms, and are able to make sense of their world in terms of explanatory understanding and the construction of intuitive theories (National Research Council, 2007:56). Their report also points to the great variation in when the thinking of children matures, and is critical of Piaget-based stages of cognitive development. Newton and Newton (2006) state that there is ample evidence that primary school children can grasp causal reasoning. Scoffham (2004:15), introducing a handbook on primary school geography, contends that '... the skills and competencies of young children appear to have been consistently underestimated' by researchers and teachers. Catling, in a wide-ranging review of research on young children, supports this view when he states that young children of the age of five '... bring greater awareness, understanding and skill potential to their formal schooling than is recognised' (Catling, 2006b:62; see also Palmer and Birch, 2004:12-19).

What all these sources agree on is that the intervention of teachers is essential to the development of children's cognitive abilities. Leat, for example, argues that the cognitive ability of students can be accelerated, and has developed a Thinking Through Geography program for teachers in the UK (Leat, 1998 and 2002b), a program which has also been tested in the Netherlands (Van der Schee, Leat and Vankan, 2006). His approach is adapted from the Cognitive Acceleration in Science Education (CASE) project started in the UK in 1981, which has been the subject of a small trial in Australia (Endler and Bond, 2001). A number of studies have shown that the CASE methods produce an improvement in measures of cognitive development and school examination results. Leat (2002b:117) concludes that his approach '... is more likely to equip pupils to handle complex information and relationships, tackle challenging tasks and transfer learning to new contexts. It is also more likely to keep them interested.' He also writes that:

Instead of trying to produce a curriculum that most students can cope with, there is a strong case for building a curriculum that changes the learner, so that they become effective learners and have access to a demanding curriculum (Leat, 1998:157).

The use of other methods of developing thinking skills is reported by Ashworth (2002), Tonizzo and staff (2003) and Fogarty (2006), all practising teachers in Australia, while Ward (2004) provides a practical example from the UK. There was strong support in the Project's survey, as recorded in the Background Report, for a curriculum that is engaging and intellectually challenging.

Leat (2002a) also points to the importance of metacognition, an awareness of one's own thinking, in the ability of students to direct and enhance their learning. The US National

Research Council's (2002:122) study of learning and understanding in high school science and mathematics found that:

To be effective problem solvers and learners, students need to determine what they already know and what else they need to know in any given situation. They must consider both factual knowledge about the task, their goals, and their abilities and strategic knowledge about how and when to use a specific procedure to solve the problem at hand. In other words, to be effective problem solvers, students must be *metacognitive*. Empirical studies show that students who are metacognitively aware perform better than those who are not.

Kriewaldt (2006), an Australian geographical education academic, argues that metacognition should be systematically developed in the geography curriculum, and explores strategies that teachers can use to achieve this goal through more active and constructivist classroom learning processes. Concept mapping, a thinking strategy recommended by Leat and Chandler (1996), can help in this, and the US National Research Council's (2007:123) report on science and mathematics learning states that it can provide '... powerful metacognitive insights'. Roberts (2007), in her outline of the process of geographical inquiry, includes a stage on 'reflecting on learning', which involves reflecting on what has been learnt and how it has been learnt, and which also gets students thinking metacognitively.

Most of the studies of cognitive development in geography are about how people comprehend maps, and about the teaching and learning of map skills (VanSledright and Limón, 2006). Some examine how a sequence of map work can be developed to match the stages of children's cognitive ability (Downs and Liben, 1991; Downs, Liben and Dagg, 1988; Kleeman and Hutchinson, 2005; Liben and Downs, 1994). The beginning of spatial reasoning starts very early, and research reviewed by Boardman (1990), Kerkman et al. (2003) and Scoffham (2004) shows that three- to five-year-olds can draw and use simple maps. Much of this literature has been brought together recently by Wiegand (2006). He argues that while there is ample evidence for the early engagement of children with maps, the mastery of map skills takes time, with many adults still unable to use maps to find their way or for other practical purposes, and he cautions against assuming that map learning is unproblematic. He calls for a rethinking of the mapping skills that are taught, for the development of an integrated curriculum in mapping and GIScience, and for the teaching of these skills from the beginning of schooling through a carefully planned progression of learning activities. His book should inform those developing the details of a national geography curriculum. As an example of an appropriate teaching strategy Catling (1998), in a study of nine- and ten-year-old children in a London school, showed how a program of local area studies combined with the teaching of map skills improved students' knowledge of their area and its spatial layout, and their ability to represent the area in their own maps. On the issue of gender differences in mapping abilities, Boardman (1990) and Wiegand (2006) review the evidence that suggests that these differences increase with age, until by adolescence boys demonstrate significantly better map skills than girls. This difference may be because boys have generally greater freedom to explore their local area than girls, which in turn means that schools should provide more opportunities for girls to practice map skills in their local environment. The Steering Committee also notes that learning about maps is not only about learning technical skills, but can include understanding how maps are social constructions that can portray the world in distorted and selected ways (Hallisey, 2005; Winter, 2007; Wright, 2009).

Children's ability to understand and interpret aerial photographs, which are widely used in the teaching of geography, has also been the subject of cognitive research. Some have

argued, following Piaget, that children of young primary age are incapable of working with aerial photographs, but other researchers have found that even infants and pre-school children can interpret them correctly, especially if they show an area with which the child is familiar and at a large scale, while young primary children can use aerial photographs to answer questions about areas with which they are not familiar (Plester, Blades and Spencer, 2003; Spencer, 1998). Ground-level photographs seem to present more problems, and Mackintosh (1998) argues that children need to be taught how to read and interpret these through a progression of studies. She also cautions about the choice of photographs, which can reinforce stereotypes about other places.

While reviews of research on geographical education regularly comment on the limited amount of research, except in relation to maps and photos, there is a surprising body of work, much of it on primary school geography and some of it in the literature on environmental education. Much of this research has been in the UK, and has been summarised for teachers by Scoffham (1998), and incorporated into books for primary school teachers by Martin (2006a) and Palmer and Birch (2004). One area of research has been into young children's awareness of and interest in places. Research reported by Scoffham (2004), and the responses of teachers to the Project's survey, shows that young children are curious about and interested in distant places, and not just their local area. This supports the Steering Committee's belief that early primary school geography should not be confined to local and nearby places, but should build on children's curiosity and encourage them to explore the whole world. In fact Wiegand (1992) records that studies have concluded that primary school students prefer studies of other countries over their own and that over time this preference declines. However, as noted in the Background Report, Wildy and Smith (2007:9) conclude that:

A summary of key research into students' geographical knowledge concludes that students start to acquire knowledge about their own country by the age of five. Knowledge of other countries starts to be acquired at a slightly later age, with a significant increase in such knowledge at about eight years of age.

Research also supports that the organisation of students' large scale geographical knowledge is related to their general cognitive capabilities, and the overall developmental process appears to be one in which information about salient places is first acquired on an item by item basis, followed by the subsequent integration of this information into a more coherent mental map as further information is acquired and as the child's cognitive capacities develop.

What this suggests is that with very young children learning about distant places should be guided by their awareness of and links with those places. Taylor has briefly reviewed studies of children's understandings of distant places, and suggests that it is possible to draw the following conclusions:

- that children's understandings of place are complex—they may change according to context and may draw on stereotypes as well as more nuanced views;
- ideas of place are bound up with the child's formation of their own, and others', identities;
- that children actively engage with others to construct their understandings of place. The scope of this engagement, and importance attached to sources, may vary with age; and
- such engagement may be within formal contexts (schooling) or informal contexts (the influence of the media, particularly popular culture, is likely to be important) (Taylor, 2006:446).

Research in New South Wales primary schools on the views of children on the countries they knew also found that children's knowledge of places can be distorted and stereotyped:

... children retained a very Anglocentric view of the world despite many years of concerted efforts in Australian education systems to promote a more regional perspective. Their responses also indicated that they were strongly influenced by media representations of countries in the world and tended to stereotype places and people as a result of these. Many of these children obviously felt afraid of many parts of the world (Reynolds, 2004:52).

Scoffham (2004) reports similar findings from the UK, and argues that these stereotypes need to be challenged at an early age before they become entrenched and difficult to modify. Harrington (1998) writes that for this reason it is important that children be taught about distant places and countries in a positive way from the beginning of schooling (see also Martin, 2006a; Picton, 2008; Wiegand, 1992).

Some research has been undertaken into children's understanding of geographical vocabulary (Mackintosh, 1999; Ward, 1998). This shows that primary children can be confused about the meaning of the terms that they use, and that practical experience and visual illustration are needed to improve the precision of their vocabulary. Similarly, research on primary school children's knowledge of environmental issues shows a considerable degree of awareness, but some inaccurate ideas that teachers need to counter (Chambers, 1998). Palmer, in a study of four-year-old children in England and California, found that they were active thinkers about environmental issues, and had a real sense of care and concern for their world. 'In short, they possess the knowledge, ideas and values which formal education can build upon in a sound and progressive way' (Palmer, 1998:33). In an Australian study of six- and seven-year-old children Keliher also found that they had a well formulated perception of nature and of some environmental issues, and suggests that the similarity in the perceptions of nature and the environment between these children and young adolescents in another study might mean that '... these perceptions develop early in life and may not change significantly without intervention' (Keliher, 1997:241). Further studies of students' environmental views are summarised in the Background Report (p. 34).

A final area of cognitive research has been into children's understanding of nested hierarchies, in which smaller places are located inside larger places, such as towns being located within states which in turn are located within Australia. Studies show that even older primary school children can have difficulty with this fundamental geographical concept, but also that learning can be accelerated by systematic teaching (Harwood, 1998).

B. Research on pedagogy

Watkins and Mortimore (1999:3) define pedagogy as 'any conscious activity by one person designed to enhance learning in another'. Gerber and Williams (2002:307) identified the main pedagogical research areas of geographical educators to include:

... different approaches to learning and teaching; teaching styles; children's development of geographical and pedagogical skills; the development by teachers and students of the basic forms of communication including literacy, numeracy, graphicacy and oracy; children's development of basic geographical concepts; and the development of values through geographical education, especially social and environmental values.

Robertson (1996:54), an Australian geographical educator, maintains that good teaching is built on the quality of the relationship developed between students and their teacher, to the extent that the constructivist approach to teaching relies on knowledge gained of student meanings.

Pedagogy has several dimensions. **First**, it focuses on individual teacher's approaches and learning styles. Roberts (1995) found that the introduction, in 1988, of the UK Geography National Curriculum document at Key Stage 3 (for pupils aged 11-14) was met by a vastly different set of approaches in three different comprehensive schools. The research showed that what emerged as important was the way the heads of geography departments viewed the curriculum. In one school, the emphasis was on 'basic knowledge' and 'basic skills', and on 'teaching' and 'input'. In another, the syllabus was presented as a framework of ideas and skills, and these included written and oral communication, graphicacy, numeracy and study skills. Students were encouraged to form their own opinions. The pedagogies could be seen as fitting into the 'framed category' (Roberts, 1996) where teachers controlled the topic and the tasks but allowed students scope for working out their own interpretations within the teacher's frame. In a third school, geographical knowledge was constructed by the students from their own inquiries, not constrained within subject boundaries but related to general concepts. The teacher's role had shifted away from being a source of knowledge or a provider of resources to that of a negotiator, with the pedagogies framed in a negotiated dimension (Roberts, 1996).

Empirical research into individual teacher's approaches and learning styles has included Kent's random stratified sample of 191 A Level geography teachers in 1987, where the most common form of teaching resembled the transmission-reception model (Kent, 2006; Balderstone, 2000:120). Gerber (2001), an Australian geography educator, conducted research into teaching methods used in geographical education in 32 countries which suggested that the transmission-reception model was still dominant. Lecturing, map reading and individual work was common but group work had also emerged as a strong component of learning. Using games/simulations, conducting experiments, map making and mental mapping were far less common pedagogical vehicles.

Andrew-Evans' (2006) practitioner-based research into improving the performance of her Year 11 geography class involved introducing and refining styles and strategies that best suited the students. These preferred learning styles were identified using an outside consultant's factor analysis of their Year 9 Cognitive Ability Test results. The preferred learning styles identified were auditory/text learners, visual/verbal learners, visual learners and kinaesthetic learners. The majority of the students were identified as visual/verbal learners. Students were seated with peers with similar learning styles. Andrew-Evans concentrated on teaching-learning approaches that purported to improve these students' self expression through discussion, and used visual imagery and structured writing activities. She reported that there were significant improvements in students' test scores and the class was more engaged in their geography classes. Ward (2003) is also concerned with individual differences within the one classroom, and provides advice for geography teachers on how to address this problem through the application of Gardner's Multiple Intelligences theory.

A plethora of teaching approaches and learning styles is available for geography teachers and learners. A support document from the New South Wales Department of Education and Training (n.d.) lists some fifty teaching strategies and practices for teachers of Human Society and its Environment in Years K-6. Literate, numerate and graphic forms of

communication have long been used in geography classrooms (Slater, 1982). Slater conducted a research project in the UK that asked geography teachers to identify the strategies that they would use to apply the theories implicit in an initiative called Language across the Curriculum. She concluded that ‘... the range and wealth of ideas for putting Language across the Curriculum into action is impressive’ (Slater, 1989:18).

Teaching literacy through geography has a strong presence in Australian schools. Examples include a note-taking outline—the biophysical features of Sydney Harbour—developed by the Metropolitan East Disadvantaged School’s Program (Write it Right, 1996:84), and the Department of Education’s *Teaching Literacy in Geography in Year 7* (Department of Education and Training NSW, 1999). Owen’s (2001) practitioner-based research looked at developing students’ literacy skills in UK schools through Key Stage 3 geography (aged 11-14). The research involved developing a scheme of work using Bloom’s ‘Mastery Learning’ approach, teaching the unit using ‘normal’ teaching methods and then through enrichment or support work. Analysis of the students’ work by an English teacher indicated that 86 per cent of the students had produced work of a higher standard than expected from their literacy skills.

Davidson, Stevens and William’s (1988) research into developing numeracy through geography addressed the most widespread mathematical difficulties that Key Stage 3 students encountered in their geography lessons. Post-graduate geography teaching students were surveyed in an attempt to identify the reasons why students fail to make progress in understanding geographical concepts that rely on numerical data. They reported that geography students lacked confidence when mathematics emphasised producing right and wrong answers, thus engendering an enhanced belief in cumulative failure. There were perceptual problems whereby mathematical concepts were seen as separate entities with little application to real life practices. There were difficulties experienced when the conventions, symbols and ‘grammar’ of mathematics were expressed in different terms in geography lessons. Problems of progression and fluency were identified whereby students in geography classrooms were expected to have achieved fluency and competence. Mathematics concepts and skills are taught progressively according to their level of difficulty and these may be dissonant with geography teachers’ expectations. Geographical data are often expressed in very large or small numbers, but a significant number of geography students experience difficulty with numbers below 1 and over 1000, and are perplexed by zero and negative numbers, by relative and absolute change and by the use of scales.

Research into graphicacy through geography has a long record. Graphicacy refers to a visual-spatial ‘intelligence’, and maps, diagrams, photographs, remotely-sensed images and other spatial documents are the tools of graphicacy as well as the basis of geography. In 1966 Balchin and Coleman proposed that graphicacy, a new term, be added to the existing basic skills of literacy, articulacy and numeracy, and later argued that, because of its teaching of graphicacy, geography should rank with English and mathematics as foundational school subjects (Balchin, 1972). Boardman (1983:167-172) provides tables containing graphicacy skills that may normally be attained by students at the ages of 7, 9, 11, 13, 16 and 19 years respectively. He maintains that the lists are based on research evidence, the experience of classroom geography teachers and the requirements of public examinations, but they may be a little too reliant on Piaget’s concepts of stage-based development referred to earlier. Gerber (1985) has provided advice on the design elements of graphics for effective learning; Cox (1988) examined metacognition in relation to map reading skills; Kwan (1999) looked at the kinds of maps that pre-teenage students encountered and the meanings they conveyed; and Hallisey (2005) has advocated graphicacy in the context of cartographic visualisation and

GIS. Mackintosh has examined graphicacy in the context of four case studies prepared for UK primary school students. She advocates constructivist teaching approaches to assist students moving from a familiar view of the world, the horizontal, to the perspective of most maps, the vertical. Mackintosh explains that this is ‘... a huge conceptual leap; too big for most young pupils to readily understand’ (Mackintosh, 2008:5), but it is one that they can be taught to make through a carefully sequenced progression.

A **second** dimension of pedagogy focuses on context, including organisational and managerial aspects of a teacher’s day-to-day life. Research into accomplished geography teaching standards has attempted to articulate this classroom ‘activity system’ (Kriewaldt, 2009; Mulcahy, 2009). Mulcahy explains that a central component of the Australian project entitled *Strengthening standards of teaching through linking standards and teacher learning: The development of professional standards for teaching school geography* is to unearth what constitutes ‘accomplished’ geography teaching by documenting what geography teachers who are deemed accomplished, *do*. Data are being sourced from teachers and students via video recordings of accomplished teaching.

In an effort to ‘capture’ the specificities of practice, including the flow of teacher action and embodied judgement, the approach adopted uses technically complex methods for video recording classrooms and supplementing the video records with post-lesson video-stimulated interviews with students and the teacher (Mulcahy, 2009).

Preliminary results see teachers engaged in standards setting, articulating the norms or rules that are used in school geography for determining levels of achievement in the subject. Mulcahy sees these norms as heterogeneous, as according to her they involve an *entanglement* of behavioural, cognitive and ethical elements (Mulcahy, 2009).

A **third** dimension of pedagogy focuses on a move away from transmission-reception models of learning to a view of effective learning involving an understanding of metacognition (Kriewaldt, 2006), a view reinforced by teachers’ increased awareness of constructivist views of learning (Bednarz, 2003; Davidson, 2002; Leat 2002b; Roberts, 2003). Geography teachers have long been engaged in concept development based on work on cognition (Donnelly, 1978). Donnelly developed lesson plans based on Gagne’s work in what she termed cumulative learning models and a ‘questioning curriculum’ model based on Bruner. In fact, the work of Ausubel, Bruner and Gagne has long informed an inquiry focus in geography classrooms (Naish, Rawling and Hart, 2002:64) as evidenced in the US High School Geography project of the 1960s (Stoltman, 2006), the Victorian Secondary Geography Education Project of the 1970s (GTAV, 1977) and a host of UK initiatives that fostered inquiry learning in geography classrooms (Kent, 2006:62-66; Roberts, 2003:16-22). A related aspect of constructivist teaching is the idea of starting with students’ existing understanding of a concept or phenomenon, and working to correct misconceptions. Reinfried (2006) reports on an experiment in teaching about groundwater with teacher education students, using a mental model building approach compared with a control group taught in a traditional lecture-style. After the intervention the first group revealed significantly fewer misconceptions than the second group. This is an approach recommended by the US National Research Council (2007) in its report on science teaching in schools.

Martin, in her book on teaching primary school geography, briefly reviews research into the functioning of the brain. She argues that this understanding of how the brain works has three broad implications for teaching and learning in geography:

- Connections need to be made between new learning and what the child already knows. Linking learning with the real, outside world can make learning more personal and meaningful.
- Learning experiences need to stimulate activity across all sections of the brain. This is best done through a mixture of critical and creative thinking.
- Brain research has shown how important it is to engage the children emotionally as well as intellectually (Martin, 2006a:145).

A number of research projects have been conducted into geographical inquiry (Roberts, 2003). Rawling (2001) identified inquiry in the UK Geography National Curriculum in 1991, 1995 and 1999, and Roberts (1998) conducted research into how teachers in a range of schools were integrating inquiry questions and skills into geography schemes of work. Roberts found that interpretations of inquiry varied across schools: some associated it with fieldwork, some with student independence, some with quantitative enquiry, and some with qualitative (Roberts, 2003:16). So strong is the groundswell for inquiry learning in geography that Rawling (2004) reported that the examination for the then to be piloted geography GCSE in the UK aimed to give students materials 'to think with' rather than ask them to regurgitate information. Inquiry learning, however, does not imply a pure discovery method in which students receive no guidance from a teacher, but more a process of guided discovery (Mayer, 2004). Naish, Rawling and Hart (1987:212), commenting on a 16-19 geography curriculum project in the UK where inquiry-based learning was emphasised, write:

Careful planning was needed in order to ensure that basic concepts and theories were studied at an appropriate point in the enquiry; otherwise student understanding of the geographical context of an issue would be hindered.

Geographical education's engagement with theoretical concepts and models of learning also informs developments in progression (Bennetts, 2005b), curriculum development (Lambert, 2003), differentiation (Battersby, 2002), powerful pedagogical strategies (Leat and Higgins, 2002) and assessment (Smothers, 2002; Butt, Weeden and Wood, 2004).

Finally, a more current view of pedagogy sees a more complex and integrated model taking components from the first three areas discussed above, and seeing geography teachers, learners, classrooms, the 'field' and spatial technologies as creating and sustaining learning communities. These learning communities are made up of geographers (including students) who share a common purpose, collaborate bringing individual strengths, respect a variety of perspectives, and actively promote learning opportunities (Gerber, 2006).

Bliss (2009) reported on some of the research into geographical fieldwork. Citing the research of Fletcher and Dodds (2004), Fuller et al. (2003) and Scott et al. (2006), Bliss stressed the positive perceptions of fieldwork as an effective learning tool. Further, Bliss refers to Fink (1977) who suggested that fieldwork positively affected students' attitudes to study and that what they remembered was transferred into the workplace. Gerber (2000:197) suggests that '... fieldwork as one of life's experiences should not be underestimated as they can be transferred beyond school to the workplace such as observation and analytical skills.' Further support for fieldwork is presented in the Background Report (pp. 38-39). Foskett (1997:200) pleads:

With effective planning and management and a commitment to the educational and personal benefits to pupils of fieldwork, geography teachers can ensure that it remains as one of the most significant learning experiences that pupils have during their school career.

In relation to information and communication technologies (ICT) the British Educational Communications and Technology Agency (Becta, 2004:2) reported that ICT can have positive effects on the learning and teaching of geography in the following areas:

- Geographical Information Systems (GIS) simplify many geographical concepts and present large amounts of non-sequentially related data in simple and readily accessible formats, allowing pupils to concentrate on interpreting and analysing data (West, 1999)
- Using GIS software enhances spatial awareness and decision-making skills (Audet and Paris, 1997; Taylor [et al.], 2003; West, 1999)
- Using simulations and modelling tools can lead to enhanced understanding of geographical topics such as erosion and agriculture (Cox and Abbott, 2003)
- ICT enables higher level thinking skills, especially for pupils using GIS (West, 1999)
- Using digital photography in a classroom mapping activity helps develop recall, reflection and self- assessment skills (Storey, 2002)
- Interactive ICT such as email enables the exploration of a sense of place, through communicating with people as well as through pictorial features (Storey, 2002)
- Using emails alongside postcards to make comparisons of places helps pupils to gain a better appreciation of other cultures (Storey, 2002).

Clearly, the use of ICT has great potential in fostering learning communities in geography.

Communities of practice have supported some of the finest research into geographical education. In terms of ICT the blogs hosted by Australians McInerney (<http://spatialworlds.blogspot.com>) and Nicholas (<http://mindswonderings.blogspot.com>) initiate teachers into a wide range of pedagogies. The great curriculum projects such as the Association of American Geographers High School Geography Project (Stoltman, 2006:29) and the UK Geography 16-19 project (Kent, 2002:9) have been supported by communities of practice. Leat's graduate students from north-east England formed a strong community of practice in their championing of Thinking Through Geography (Slater, 2003:292) and their efforts stimulated a further learning community evidenced in the Thinking Through Geography hyperlinks at the Staffordshire Teachers of Geography Learning Net (<http://www.sln.org.uk/geography>).

Boardman's (2004) practitioner-based research had similar purposes, within a school context. It combined a Thinking Through Geography approach (Leat, 2002a) with a Community of Enquiry approach (Lake and Needham, 2000) aiming to spread the use of thinking skills across the school's Social and Environment Faculty. The project contributed to raising academic standards throughout the school, stimulated the geography teachers and students and produced an embryonic learning community within the faculty. Williams (2003) explains that practitioner-based research of this type is often ignored by policy makers. The Steering Committee recommends that the writers of the national geography curriculum examine this research because its intent is to improve professional practice.

Holloway and Valentine (2002:330) reported on a learning community comprised of primary school students and teachers in electronic exchange between the UK and New Zealand. They researched children's imaginative geographies—the ways in which children imagine other nations. In essence, they found that these imaginative geographies were fashioned by a complex mix of highly stereotypical understandings of difference, as well as assumptions of

similarities across boundaries. Mackintosh (1999:71) would appear to support a curriculum that must 'start where the children are at'. She also provides valuable insight into research findings concerning young children's learning about physical geography.

Lambrinos and Bibou (2006) researched students' ability to develop child-centred views of geography through the medium of 'a geography box'. Primary school aged children in Greece were asked to prepare and present a box filled with objects that relate to their conceptions of geography, hence a 'geography box'. The results included presentations of items that resembled their school-based geography experience: maps, atlases, globes and compasses but there were also stamps, foodstuffs, museum tickets, straws (representing the Earth's axis) and a leaf that resembled the shape of the Greek peninsula. The researchers were concerned that the teaching methods most frequently used in geography were a combination of the closed and framed dimensions (Roberts, 1996), with a marked preference for the former which is characterised by non-negotiable content tightly controlled by the teacher. In this 'Pupils don't have to think critically; instead, they are asked to memorise what they have studied or [been] told' (Lambrinos and Bibou, 2006:244).

An issue in primary school teaching is that the geography that is taught may not be recognised as geography by either students or teachers. As the Background Report notes, in primary as well the junior and middle years of secondary education in Australia, geography has been absorbed into humanities or SOSE frameworks, except in New South Wales. Wildy and Smith (2007:12) write:

There is much geography taught in the primary school classroom even if it is not called geography. If you teach skills, concepts and content that relate to local places and global places, distance and direction and identify and explain natural and human features of the landscape you are then teaching geography.

As a primary teacher it is important to identify those aspects of the curriculum that fall under the heading of geography and to facilitate the development of geographic skills, concepts and content over the primary years.

Martin (2008) found in her research that geographical paradigms as defined by the academic community meant little to non-specialist primary student teachers. Geographical paradigms developed by geographical educators (Biddle, 1976) may be equally opaque to teachers. Martin insists that to frame geography curriculum documents it is therefore necessary to develop a way of conceptualising geography that: (1) enables students to recognise the value of their everyday experiences and that they are already thinking geographically in their everyday lives, and (2) is suited to the context that the students are working in—that of the primary school—and this is a paradigm that Martin (2006b) refers to as 'everyday' or 'ethnogeography'. She refers to a number of geographical educators who note that while good subject knowledge is a factor in teacher effectiveness, the way in which the subject knowledge is known, understood and acted upon is more important (Barratt Hacking, 1996; Leat, 1996). As Martin explains, the beliefs held about a subject, the assumptions made about how it operates as a means of understanding the world, and the extent to which these are explicit, are important considerations.

Martin's views are similar to those of Catling, who has written extensively on child-centred teaching in primary school geography. After reviewing the geographical experience, knowledge and attitudes of young children, and a vast range of research on children's geographies, he argues that:

The clear implication here is to take seriously young children's geographical and environmental learning and needs in their earliest education. From age three to five in nursery environments, and on entering compulsory schooling at five years old, geographical learning should engage young children in encounters with places and the environment, exploration of the environment and places, enquiry and debate about places and the environment, a variety of place and environmentally-focused play experiences, the use of imagination in relation to places and the environment, and contributing to caring for the environment and places (Catling, 2006b:71).

He goes on to list a variety of learning experiences that should be provided for young children, and emphasises that children should understand that what they are learning through these experiences is geography. A similar approach in primary school geography is advocated by Hutchinson (2007), but based on North American research and experience rather than British. We believe that teachers should be empowered to explore the 'diversity in young people's lives in order to place youth on the geographical map and demonstrate youth's relevance to a range of geographical debates' (Skelton and Valentine, 1998).

In their book on geography teaching, Morgan and Lambert (2005) argue that teachers are encouraged to consider teaching as a technical rather than as an intellectual activity and do not engage in critical and challenging discussions about *what* they are teaching and *why* they are teaching it. This is a crucial component of pedagogy. Brooks (2006) argues that teachers can reflect on and learn alternative perspectives from the students they teach. Morgan (2001) argues that teachers should reflect upon the idea that the 'geographical imaginations' of the students they teach are increasingly shaped outside the geography classroom. Kirman (2003) argues for a 'transformative' geography that envisages K-12 geography students practising the discipline of geography for the well-being of people and the environment in order to improve the world. Morgan (2000, 2001 and 2002) would go further and urge geography teachers to engage with more contemporary paradigms such as cultural studies, critical media literacy and postmodern epistemologies. Thompson and Clay (2008) advocate critical literacy that finds space for gender and feminist perspectives in geography classrooms. Huckle, similarly, argues that teachers should engage in a (far more political) critical school geography that has 'the potential to develop young people's 'place' in the world and so help form their identity' (Huckle, 1997:241). Identity forming and values and attitudes are also examined by Hicks and Bord where they point to an emphasis on teaching global issues as a 'cognitive affair' (Hicks and Bord, 2001:423), at the expense of exploring an existential dimension where students are empowered to question their values, life-purposes, faith and ways of living. Nagel (2005:77) advances a case for an environmentally 'educated person' where the ideology of environmentalism should be examined in the classroom, rather than the learning community being involved in environmental activism.

C. Conclusion

A geography curriculum based on the ideas outlined above should:

- be structured to enable a progression of learning that matches student cognitive capabilities, while allowing teachers to cater for students of different abilities
- take seriously the arguments about a child-centred primary school curriculum
- not underestimate the capabilities of primary school children
- not confine early primary school geography to local and nearby places, but build on children's curiosity and encourage them to explore the whole world
- emphasise learning how to find out

- complement the present well-developed teaching of concepts, methods and skills with a greater emphasis on geographical questions, perspectives and approaches, and on the development of geographical thinking and understanding
- be structured to build an increasingly comprehensive and sophisticated understanding of how phenomena can be understood and explained
- focus on depth of understanding rather than breadth of content
- enable teachers to use inquiry-based and problem-solving methods of teaching and learning
- reinforce classroom learning through a wide variety of local area studies and fieldwork
- include learning experiences that would stimulate activity across all sections of the brain, which is best done through a mixture of critical and creative thinking
- include activities which engage students emotionally as well as intellectually
- incorporate the development of thinking skills, including thinking about thinking
- integrate the learning of ICT skills into the study of geography
- be suited to the context in which students live and work
- enable students to recognise the value of their own experience of places, and of their own everyday geographical thinking
- provide opportunities for the application of student knowledge and skills to issues that interest and concern them
- provide knowledge, skills and frameworks for students to explore and reflect on the world in which they live, and with which to develop their own values and attitudes towards geographical issues
- enable students to recognise that their world view is not necessarily shared by others
- embrace the current view of pedagogy as an integrated approach involving geography teachers, learners, classrooms, the 'field' and spatial technologies in sustaining learning communities.

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