

Roles of sectors in mass higher education: a study of effects of sectors on student transfer and national innovation

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Certificate

I certify that I am the sole author and that the substance of this thesis has not already been submitted for any degree and is not being currently submitted for any other degree.

I certify that to the best of my knowledge that any help received in preparing this thesis and all sources used have been acknowledged in this thesis.

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Preface

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Abstract

This thesis seeks answers to the questions: why divide higher education into sectors, are they meeting their current goals and are they likely to meet emerging goals? Higher education was segmented into sectors in many countries to handle a mass expansion of participation. Access to lower level and lower cost tiers was made reasonably broad, while the funding needed for higher level and higher cost tiers was contained by limiting access to them. Student transfer is central to assessing the performance of segmented systems such as these if students are not to be trapped in the lower cost and lower level tiers.

The thesis compares the rates of admission of students transferring from non baccalaureate granting institutions to baccalaureate granting institutions in Australia, Scotland and three US states. While the jurisdictions chosen for study are similar in many ways, they differ in the extent to which they have tended to specify general or specialised roles for their institutions and sectors. The thesis therefore seeks to investigate one aspect of the dynamic operation of comprehensive and specialised tertiary education systems by the rates of student transfer between parts of the systems.

The thesis finds that the rates of upward student transfer are affected less by the formal segmentation of systems into general or specialised sectors than by informal differences between institutions and groups of institutions. Transfer student admission rates are probably influenced by several factors, but the thesis hypothesises that the strength of transfer policies and practices is more important than official institutional designations. The thesis also considers briefly reverse transfer in Canada, New Zealand and the US, and investigates it rather more extensively in Australia. The thesis finds that the extent and perhaps also the significance of reverse transfer in Australia has been overstated. However, the thesis agrees with many writers that the metaphors of both upward and reverse transfer are too simplistic in positing a linear progression from one program, institution or sector to another.

The thesis notes that while sectors were initially segmented by orientation (vocational or general education) and student intake (selective or open entry), it is now common to distinguish sectors by research role. The thesis therefore also considers the transfer of research findings to the community and to business in particular. The thesis finds that as with student transfer, the transfer of research is complex and non linear: indeed, it is probably more accurate to refer to the production and exchange of knowledge than the transfer of research. The thesis posits speculatively a role for non baccalaureate granting institutions in reproducing or exchanging knowledge and stimulating innovation. It therefore argues that simple linear hierarchies within higher education and its relations to society may not be best suited to knowledge production and exchange and thus may not best support national innovation. Further, just as special measures are necessary to promote the transfer of students between sectors, special measures may be necessary to transfer knowledge across sectoral boundaries. The thesis concludes by noting its limitations and therefore possible lines of further inquiry.

1 Introduction

Why have sectors? This study considers why most systems of higher education are divided into sectors, whether they meet their current goals, and whether the current division of higher education into sectors may be adapted to meet emerging goals or whether some other arrangement may be preferable. In some countries this question originates, and in other countries it is intensified, by the transition from elite to mass higher education. This is the transition from providing higher education for a small elite, typically around 5% of the group that provides most higher education students, to providing higher education for more than 15% of the relevant age group (Trow 1974, p 63). While countries that have made this transition have done so at different times, it 'is essentially a post-World War II phenomenon' (Smith 1993, p 24). Thus in many European countries higher education participation for the relevant age group increased from about 4% or 5% just after World War II to between 10% and 15% in 1970 (Trow 1974, p 58), and the participation rate for 20 to 24 year olds in the industrialised countries increased from 6% in 1950 to 25% in 1985 (Smith 1993, p 24 citing Ramirez & Riddle 1991, p 96).

In many countries this transition has been achieved by developing 'alternative educational structures, in most cases more practically or vocationally-oriented than universities' (Esnault & Skilbeck 1993, p 5; Gibbons *et al* 1994, p 73), often building on institutions that had been established for other purposes. In some countries the new needs of society were met by establishing sharply differentiated programs, institutions, sectors and systems. These are the 'tracked' systems of continental Europe. Performance in these countries is optimised when there is a good match of students, sectors and society's needs. The main future challenge of these closely integrated systems is to change to meet new and not necessarily consistent needs.

In other countries the new sector was given the role of accommodating many but not all of society's diverse needs. The sectors were established with different emphases and orientations, but this is within a comprehensive framework. This is the pattern in many Anglophone countries – Canada, New Zealand, the UK and the US. Performance in these countries is optimised when there is good opportunity for students to transfer between the sectors, studying in the sector most suited to their capacity and need at any time. The main future challenge of these systems with to some extent merged and overlapping sectors is to maintain each sector's distinctiveness in the face of institutions' 'mission creep'.

This thesis concentrates on higher education systems of the second type. The study investigates student transfer in detail since it is central to these systems' operation. Both upward transfer from the non baccalaureate granting sector to the baccalaureate granting sector and 'reverse transfer' are studied. First, the study compares the rates of admission of students transferring from non baccalaureate granting institutions to different types of baccalaureate granting institutions. Transfer student admission rates are compared in Australia, Scotland and in three US states. While the jurisdictions chosen for study are similar in many ways, they differ in the extent to which they have segmented their tertiary education systems. The method is developed and the results are put in context in chapter 7, but briefly, the study found that the group of eight highly selective Australian universities admitted a far lower proportion of transfers from the non baccalaureate granting sector than comparable institutions in California, Colorado and Texas. The findings are summarised in table 1.1.

The study found that the highly selective baccalaureate granting institutions in Australia admitted only 2% of their students commencing bachelor degrees on the basis of a qualification from a non baccalaureate granting institution. In contrast the moderately selective institutions admitted 8% of their students on the basis of a qualification from a non baccalaureate granting institution. Thus, the moderately selective Australian institutions admitted four times as many students from non baccalaureate granting institutions than highly selective institutions, giving a ratio of transfer student admission rates at highly and moderately selective institutions of 1:4. The corresponding ratios in the US states studied are 1:2.

TABLE 1.1: STUDENTS TRANSFERRING FROM NON BACCALAUREATE PROGRAMS TO PUBLIC BACCALAUREATE GRANTING INSTITUTIONS, AUSTRALIA, SCOTLAND AND THREE US STATES, BY SELECTIVITY OF RECEIVING INSTITUTION

Jurisdiction	Highly selective institutions	Moderately selective institutions	Ratio of highly selective to moderately selective
Australia	2%	8%	1:4
California	6.5%	13%	1:2
Colorado	3%	6%	1:2
Texas	15%	26%	1:1.7
Scotland	5%	24%	1:5

This finding is particularly striking when one notes that the difference in transfer student admission rates is lower in California, which formally segments its highly selective and not so selective higher education sectors, than in Australia which has a formally unified national system of higher education. It is, furthermore, consistent with Gallacher's (2003, p 12) finding for the formally undifferentiated university sector in Scotland which is also shown in table 1.1.

The thesis hypothesises that the rates of upward student transfer are affected less by the formal segmentation of systems into sectors than by informal differences between institutions and groups of institutions. Transfer student admission rates are probably influenced by several factors, but the hypothesis is that the strength of transfer policies and practices is more important than official structural designations. Many US States, including the ones in this study, have legislated strong transfer provisions. In contrast, no Australian Government has a policy on student transfer beyond a general statement of encouragement. Like Australia, Scotland has not formally segmented its universities. While the Scottish Government seems more concerned with supporting student transfer than Australian governments, this concern is relatively recent and has not yet moved much beyond commissioning the studies cited in chapter 7.

The thesis also investigates ‘reverse transfer’, the transfer of students from baccalaureate-granting to non baccalaureate granting sectors. The relative size of upward and reverse transfer depends on the concept or measure of transfer used. Measures of reverse transfer are considered in Canada, New Zealand and the US, and several Australian measures are considered. The national Australian enrolment and survey data report that reverse transfer is about 40% of all transfers, that is, it is rather less than upward transfer. Taking into account all the methodological limitations discussed, the fairest conclusion is that in Australia reverse transfer is from 50% less to 50% more than upward transfer depending on the concept and measure of transfer used. Thus many Australian writers have overstated the size and perhaps also the significance of reverse transfer. Many writers agree, however, that the metaphors of both upward and reverse transfer are too simplistic in positing a linear progression from one program, institution or sector to another. Institutional studies show that significant numbers of students study in multiple programs, institutions or sectors, sometimes concurrently, and usually not following a ‘pathway’ defined by institutions.

While the transfer of students has long been recognised as important to the operation of higher education systems of the type investigated in this study, more recently writers have started considering higher education’s effectiveness in transferring the findings of research. Unlike student transfer, there is very little direct data on research transfer, so this issue is considered indirectly by investigating higher education’s contribution to national innovation. The case is considered for Australia only, although it is informed by some of the international literature and by studies of the UK. Again, the thesis finds that as with student transfer, innovation processes are complex and non linear. As is argued in chapter 8 on innovation, it is probably more accurate to refer to the production and exchange of knowledge than the transfer of research. It therefore seems that simple linear hierarchies within higher education may not be best suited to knowledge production and exchange and thus may not best support national innovation. The substantive part of the thesis concludes by considering alternative more sophisticated structures to maximise higher education’s contribution to knowledge production and exchange and to innovation.

Main steps in the study

The rest of this chapter outlines the main steps in the thesis that follows. The thesis is divided into four steps which ‘to some extent overlap and are interdependent’ (King 1967, p 59). The first step is to state the issue to be investigated (Bereday 1964), and this was done at the outset. The thesis considers why most systems of higher education are divided into sectors, whether they meet their current goals, and whether the current division of higher education into sectors may be adapted to meet emerging goals or whether some other arrangement may be preferable. In short, the issue is: why have sectors? The thesis compares tertiary education systems in different jurisdictions so the second step is to ensure that like is being compared with like (Nadel 1951). Third, the thesis classifies the phenomena observed (Anderson 1961) and in the fourth step it generalises from the data (Kandel 1933). A discussion and conclusion draws the main findings together.

Method: comparing education systems (chapter 2)

Comparisons of education systems are not simple (Sadler 1964 [1900]) and there are competing methods (Kandel 1933). The study derives a method from Comte’s (1975) [1842] observation by experiment, Durkheim’s (1938) indirect experiment and Mill’s (1925) method of agreement as elaborated by Noah & Eckstein (1969). This is the most similar systems design or the method of concomitant variation as described by Przeworski & Teune (1970, p 33). This method selects for comparison systems that are similar but which nevertheless have different characteristics. Differences in systems’ operation or outcomes are ascribed to one or more of their different characteristics. Since similar systems are chosen for comparison there are rather fewer different characteristics that may be identified with the systems’ different operation.

Second step: identify identity (chapter 3)

One of the most common segmentations of tertiary education is into a baccalaureate granting or loosely ‘university’ sector, and what is called in this thesis vocational education. While there is broad agreement on the nature of higher education there is no uniform understanding of vocational education (Cantor 1989b). So in chapter 3 the thesis seeks to found vocational education’s nature on a distinctive epistemology or purpose (Aristotle; Newman 1959 [1853]), on a distinctive level (Plato) or on pragmatic grounds. The thesis finds that no single characteristic consistently identifies vocational education but that a compound definition is possible. The thesis uses the four general characteristics reviewed – epistemological, teleological, hierarchical and pragmatic – to pose a new compound description of vocational education which it argues is adequate to identify the ‘family resemblance’ (Wittgenstein 1968) of vocational education and its cognates. The chapter concludes by mapping this compound definition of vocational education to UNESCO’s international standard classification of education.

Jurisdictions chosen for comparison (chapters 4 and 5)

Since the most similar systems design (Przeworski & Teune 1970) has been adopted for the thesis it compares in chapter 4 the structuring of tertiary education in Australia with tertiary education systems that are similar, but which nevertheless have different characteristics which will be the key points compared. The comparators are wealthy Anglo countries: Canada, the UK and the US. The table below gives an idea of the relative scale of the vocational education and university sectors in each country. The first row in the table is Australia which has a very high share of total tertiary enrolments in vocational education (65%), largely because of its very high proportion of part time vocational education students. In the next row is the UK which has a lesser proportion but still a majority of enrolments in further education programs (56%). Third is the US which has a minority of enrolments in two-year colleges (39%), and finally Canada has the lowest proportion of community college enrolments (37%), largely because of its extraordinarily low proportion of part time enrolments in community colleges. As is elaborated in the next section, Australian vocational education and training, UK further

education, US two-year college education and Canadian community college education may all be classified as tertiary type B education. This is distinguished from baccalaureate-level programs offered by universities in Australia, Canada and the UK and by four-year colleges and universities in the US.

TABLE 1.2: PROPORTION OF TERTIARY EDUCATION ENROLMENTS BY TERTIARY TYPE AND STUDY LOAD IN AUSTRALIA, CANADA, THE UK AND THE US.

	Tertiary type B (vocational)			Tertiary type A (higher ed)			ALL
	Part time	Full time	Total	Part time	Full time	Total	
Australia	59%	6%	65%	12%	22%	35%	100%
UK	37%	20%	56%	14%	27%	44%	100%
U.S.	24%	14%	39%	17%	44%	61%	100%
Canada	7%	31%	37%	19%	44%	63%	100%

Arrangements in each US State are summarised in an appendix which demonstrates that while there are patterns in higher education provision and participation, it is not possible to generalise from a few US States to a US ‘system’ of tertiary education. Any detailed study of tertiary education in the US must therefore be of the States because of the very considerable variations between them. Which States are chosen for detailed study therefore shapes the study and its findings.

A US State was not chosen if its population was less than three million since this was too small to be similar to the other jurisdictions studied and therefore not a useful comparator for the most similar systems design used in the study. A State was also excluded if it did not report on its web site a good range of data, particularly on student transfer. New York was excluded partly for this reason, and partly because its arrangements are too complicated to be readily understood and too specific to its own circumstances to be readily applicable to other jurisdictions. These negative criteria biased the selection of States to those with a big public sector and a strong coordinating authority. In this they are similar to the non US jurisdictions considered in the thesis and indeed to many other US States. But there are several important US States which have interesting higher education arrangements which do not share these characteristics.

California was chosen because it is well known and now is almost archetypal of a particular arrangement of higher education: a strongly segmented system. Colorado was chosen because it is the home State of one of the author's supervisors, who is able to correct an outsider's learned knowledge with lived experience. Texas was chosen because its population is about the same size as Australia's and because it has a geography similar to much of Australia's. Arrangements in these US States are described in greater detail in chapter 5. The thesis makes no claim to represent the US, but rather to make some informative comparisons with Australia.

Third step: analyse and classify (chapter 6)

A description of the arrangements in each jurisdiction selected for detailed study discloses a variety of arrangements and terminologies which are analysed and classified in chapter 6. 'Tertiary education' is defined from Skilbeck, Wagner, & Esnault's (1998) report for the OECD on *Redefining tertiary education*. The thesis adopts the distinction in UNESCO's (1997) international standard classification of education revised in 1997 (ISCED-97) between tertiary type A programs which are 'theoretically based/research preparatory (history, philosophy, mathematics, etc.) or giving access to professions with high skills requirements (e.g. medicine, dentistry, architecture, etc.)' and tertiary type B programs 'which are practical/technical/ occupationally specific' (UNESCO 1997, para 84).

Conveniently, but not necessarily fortuitously in view of the conscious decision to choose for study systems that are most similar, the distinction between tertiary type A and B programs coincides with several differences that emerged from the detailed study of jurisdictions. So chapter 6 is able to align UNESCO's typology with the level of awards, duration of programs, status of institutions and selectivity of student admissions of the vocational education and university sectors in Australia, the UK and the US.

Transfer (chapters 7 and 8)

This chapter has already anticipated the thesis' investigation of student transfer reported in chapter 7. Student transfer is considered important by both the advocates of segmented systems (Clark 1983, p 51) and advocates of unitary systems (Furth 1973, p 24). Student transfer is also an important aspect of the relations and interactions between sectors and institutions and thus allows the thesis to investigate the operation of tertiary education systems as dynamic environments rather than as static structures (Spicker 1996, p 68). Research transfer or more precisely the production and exchange of knowledge is also important to the operation of tertiary education as a system, but is more important for its contribution to national innovation and development. This is reported and the argument is developed in chapter 8.

The thesis notes that while sectors were initially segmented by orientation (vocational or general education) and student intake (selective or open entry), it is now common to distinguish sectors by research role. The thesis therefore also considers the transfer of research findings to the community and to business in particular. The thesis finds that as with student transfer, the transfer of research is complex and non linear: indeed, it is probably more accurate to refer to the production and exchange of knowledge than the transfer of research. While this finding is now common if not orthodox, it leads the thesis to suggest more speculatively a role for non baccalaureate granting institutions in (re)producing or exchanging knowledge and stimulating innovation. However, many countries do not support such a role for non baccalaureate granting institutions, thus possibly inhibiting knowledge exchange and production. So while the segmentation of a higher education system into sectors does not necessarily inhibit the transfer of students or the exchange and production of knowledge, special measures are necessary to promote the transfer of students and knowledge across sectoral boundaries. The thesis concludes by noting its limitations and therefore possible lines of further inquiry.

Fourth step: generalise (chapter 9)

The differences in transfer student admission rates between different types of tertiary A institutions suggest that Skilbeck and colleagues (1998, p 104) are right in arguing that structures aren't so important as the relationships between the organisations that form them. Nonetheless, as Geiger (1992, p 1031) points out, while structures don't determine outcomes, different structures require different mechanisms to achieve similar outcomes. The findings of the thesis are used to consider six options for structuring the relations between sectors in Australia: segregation, duplication, integration, systematise cross-sectoral enrolments, establish an intermediate sector, and 'masterly inactivity'. The thesis concludes by noting its limitations and therefore possible lines of further inquiry.

2 Comparing education systems

Burton Clark argued that the important features of one system of tertiary education can be illuminated by comparing it with other systems.

To define what is basic requires that we move among nations and confront their common and varied structures and procedures. To group descriptive facts about countries in other than a mere list requires an ordering framework. Cross-national comparison is particularly advantageous in uncovering the unique features and unconscious assumptions that possess our vision when we study only a single country, generally our own.

(Clark 1983, p 2)

Morgan (2000, pp 226-7) quoting Heidenheimer and colleagues (1990) suggested that the design of domestic policies benefits from conducting systematic international comparisons. Comparisons can reveal hidden assumptions about a country. The different approaches of countries with similar problems is a type of national experiment of the policies available to a country – Durkheim's (1938 [1895], p 125) indirect experiment, as shall be demonstrated later in this chapter. Comparisons can also begin to separate the effects of specific circumstances from the general effects of a policy.

This chapter develops the method that will be used to make these comparisons. Several methods are available, unfortunately none without problems and limitations. As Mitter (1992, p 1788) observes, 'the content and scope of comparative education are controversial, and the debate about them mirrors different philosophies of the subject'. One problem is that comparative education does not refer to a distinctive subject matter but to a method, the 'comparative method', and that different techniques are included in the method.

‘Comparative education’ as a term of art

To say that the tertiary education sectors are more deeply divided in Australia than those in Colorado and England is to make a comparative statement in undoubtedly two, and arguably three senses. First, as Levy (1970, p100) wrote in an article whose title ‘Scientific analysis is a subset of comparative analysis’ neatly expresses its thesis, ‘any generalised statement involving variables implies a comparison’. And Goedegebuure & van Vught (1994, p 1) echo Levy in saying that ‘Making comparisons among entities and units is one of the crucial aspects of scientific analysis’. This a generalisation of Farrell’s (1979, p 1) observation that ‘there can be no generalising scientific study of education which is not the comparative study of education’ and indeed of Durkheim’s (1938 [1895], p 139) view that ‘Comparative sociology is not a particular branch of sociology; it is sociology itself, in so far as it ceases to be purely descriptive and aspires to account for facts’.

Thus, the simpler proposition ‘The water is deep’, clearly embeds a comparison disclosed by its grammatical form as a comparative adjective. Consider secondly the statement ‘The book is red’. Again, ‘red’ could be understood as the absolute form of the adjective whose comparative and superlative forms are redder and reddest. But the statement ‘The book is red’ could also be understood to mean that it is not blue, green or any other colour in the spectrum. Turning now from adjectives to nouns, consider a scientific instrument that identifies a specimen by comparing the specimen with all the types in its database. If the instrument finds a match it identifies its specimen as the matched type. One epistemology says that all propositions are comparative in this sense. On this theory the statement ‘The object is a book’ means that the object is not a ball or a computer or any other object and that this is determined by comparing the object with all object types until a match is found. So ‘The object is a book’ is really an elliptical way of saying that ‘The object matches the ideal type of the book’ or on another ontology, ‘The object has enough resemblances with the class of books to be considered a member of that class’. This theory therefore posits that all statements of this type are taxonomies, and that all classifications are made by comparison (Froese 1982, pp 305, 310).

These understandings of comparisons go beyond the purposes of this study, which are served by a third, narrower sense of comparative education expressed in another context but neatly by Wiora (1975, p 1): ‘All musical research contains comparisons, but comparative musical research elevates comparison to the essential purpose of the research’. Rust stated the position more fully.

In some respects the term ‘comparative education’ has been unfortunate, because most knowledge is comparative in nature. That is, anyone inspecting two or more educational entities or events in order to discover how and why they are alike and different might claim to be engaged in comparative analysis of education. However, scholars in the field of comparative education generally see their work in a more restricted sense. Most comparative educators would likely feel comfortable with the notion that comparative education deals mainly with the analysis of educational systems and problems in two or more national contexts.

(Rust 2001, p iii)

‘In short, comparative education is a political geography of schools’ (Bereday 1964, p ix). This may be an acceptable statement of part of comparative education, but it is too narrow to be acceptable as a statement of the whole discipline. Furthermore, it implies that comparative education is a single method, whereas as shall be explored below, many methods are used in self-described studies of comparative education.

History as well as geography?

It is not only possible to compare different places at the same time, but also the same place at different times; that is, comparative education may be an historical as well as a geographic study. Thus Hans defined comparative education as the study of historical development.

Comparative education is based on history and should be dealt with functionally, which is another way of saying historically.

What I mean by functionalism in comparative education is the comparison of functions of educational institutions as they were historically evolved in each country.

(Hans 1964, p 94)

This is perhaps ambiguous. Hans may have been arguing for the comparative study of different institutions' historical development rather than comparing the same institution at different stages of its historical development. Seidenfaden (1972, pp 31-2) argued more specifically for the importance of historical studies in comparative education since he claimed that it is not possible to understand and describe the present structure of the educational systems of countries without looking at their development.

But this is rather narrow and has not been followed by other comparativists. McKinney & Tiryakian (1970, p 10) argued that 'There are two aspects to this comparative method: (1) comparison of different coexisting states and (2) comparison of consecutive states'. This neat statement is nonetheless limited. McKinney & Tiryakian tacitly adopted the developmental approach of some of the early comparative educationalists such as Hans. McKinney & Tiryakian also needlessly confine history to the study of consecutive states as if geography studied only contiguous states. History as readily and almost as frequently studies periods separated in time. Anderson (1961, p 6) stated the position more generally: comparative study correlates across the boundaries of societies – whether these societies are in different centuries in one area or are spatially distinct societies and sub-societies.

Spolton (1968, p 109) also notes that comparisons may be made over time as well as space. But while he accepts that historical studies are legitimately comparative, he uses 'comparative education' more narrowly to refer specifically to geographic studies: 'comparative education does over space what historical study does over time. Put in this way the analogy with geography and history becomes an obvious one to make. To some extent history suggest development while geography suggests a static picture.'

Comparing education in different periods can be illuminating. The next chapter compares different uses of the terms 'vocational education' and 'technical education' at different times to demonstrate their different meanings, and elsewhere the thesis notes different educational arrangements at previous times to argue that the present arrangement is contingent, notwithstanding its entrenchment.

But historical comparisons are not used as a core method in this study for two, rather prosaic reasons. First, there are methodological problems with comparing educational arrangements at different times. Changed arrangements are almost always accompanied by changed data collection and reporting arrangements, and often by changes to the bodies responsible for collecting system data. Those responsible for implementing such changes are preoccupied with things other than the interests of policy analysts and so rarely ensure that data is comparable between eras.

But even were the continuity of data preserved, or if it could be reconstructed, problems would remain with comparing educational arrangements between eras. The binary divide in Australian higher education was dismantled to achieve ‘a new era of growth and opportunity’ in higher education (Dawkins 1988), or to change from an elite to a mass system of higher education as would be said now. The premise of such a change is that the demands and needs of students in previous eras are not comparable with current or emerging needs. That a previous arrangement adequately met the needs of a previous era says little about its capacity to meet the different needs of the present. The chapter now starts considering what method will be used in the thesis.

Experiment by analogy

In his *The rules of sociological method* first published in 1895 Durkheim sought to establish a comparative method for identifying the cause of social phenomena. Lacking controlled experiments, the social researcher uses comparisons to construct as indirect experiment, as Durkheim put it.

We have only one way to demonstrate that a given phenomenon is the cause of another, viz, to compare the cases in which they are simultaneously present or absent, to see if the variations they present in these different combinations of circumstances indicate that one depends on the other. When they can be artificially produced at the will of the observer, the method is that of experiment, properly so called. When, on the contrary, the production of facts is not within our control and we can only bring them together in the way that they have been spontaneously been produced, the method employed is that of indirect experiment, or the comparative method.

We have seen that sociological explanation consists exclusively in establishing relations of causality, that it is a matter of connecting a phenomenon to its cause, or rather a cause to its effects. Since, moreover, social phenomena evidently escape the control of the experimenter, the comparative method is the only one suited to sociology.

(Durkheim 1938 [1895], p 125)

As Anderson (1961, p 5) subsequently said more simply ‘The comparative method is one of the numerous imperfect substitutes for experimentation’. Durkheim’s method is derivable from Comte’s statement of the positivist philosophical method, first published in 1842. Comte notes that observation by comparison involves identifying ‘analogous cases’, thus foreshadowing the problem of establishing equivalence discussed later.

The means of exploration are three: direct observation, observation by experiment, and observation by comparison. In the first case, we look at the phenomenon before our eyes; in the second, we see how it is modified by artificial circumstances to which we have subjected it; and in the third, we contemplate a series of analogous cases, in which the phenomenon is more and more simplified.

(Comte (1975) [1842], p 132)

The comparative sociological method was first elaborated systematically by Mill in his *System of logic*, first published in 1843. The starting point for Mill’s method is a social phenomenon, say, suicide. Mill says there are two methods for identifying the causes of the phenomenon from circumstances that precede it. One method is to compare societies in which there are high rates of suicide and see what they have in common. Mill calls this method the method of agreement. His method of difference is to compare societies with high suicide rates with those with low suicide rates to see what differences between them may cause their different suicide rates. These two methods may also be used to identify the consequences of the phenomenon, the circumstances that follow the phenomenon which are ‘really connected by an invariable law’.

The simplest and most obvious modes of singling out from among the circumstances which precede or follow a phenomenon those with which it is really connected by an invariable law are two in number. One, is by comparing together different instances in which the phenomenon occurs. The other is, by comparing instances in which

the phenomenon does occur, with instances in other respects similar in which it does not. These two methods may be respectively denominated the Method of Agreement and the Method of Difference.

(Mill 1925 [1843], chap VIII, sec 1, p 253)

Mill's method of agreement has more recently been redescribed as the method of concomitant variation. Comparison is still considered a substitute for controlled experimentation which is internalised as the research paradigm. Both points were made succinctly by Altbach, Arnove & Kelly (1982, p 4): 'comparison substitutes for experimentation. Comparison permits certain controls to be introduced; it enables researchers to find instances where different variables are present or absent and in varying amounts – a process of analysis known as concomitant variation. Although experimental design is not possible, different quasi-experimental designs are'.

The method had been previously elaborated Przeworski & Teune (1970). Mill's, Durkheim's and Compté's 'circumstances' are for Przeworski & Teune (1970, p 32) 'experimental' variables. The method of concomitant variation minimises the number of differences or variables between jurisdictions being compared. This reduces the number of factors that may be identified as causes of the differences observed between countries, making it easier to isolate the influence of particular factors (Skolnick & Jones 1992, p 122).

Przeworski & Teune (1970) also restated Mill's method of agreement in modern statistical terms. Przeworski & Teune (1970, p 33) say that common characteristics of systems are conceived of as 'controlled for', whereas differences between systems are viewed as explanatory variables. The aim is to maximise the number of common characteristics and minimise the number of differences. This allows Przeworski & Teune (1970, p 34) to state precisely what is at least a limitation of the method, but which may be considered a flaw. Even very similar systems have several variables which are plausible causes of the phenomenon of interest, and the method has no way of identifying which of the variables is the cause.

One possible solution to this difficulty is to study systems that are so simple that only one variable is plausibly the cause of the phenomenon of interest. Thus economists build models that are simple enough to be described mathematically. But while mathematics may adequately describe the model, it is less clear that the simplified model adequately describes society. This approach, therefore, sacrifices the explanatory power of the model for the explanatory power of mathematics.

An alternative compromise is chosen in this thesis, of seeking to describe systems comprehensively but being left with too many variables as plausible causes of the phenomenon it is seeking to explain. This makes the study's conclusions rather more speculative than may be preferred, but there doesn't seem to be a better resolution of the difficulty. But even were it possible to overcome this difficulty it would not be possible to posit something more than constant conjunction, to conclude that the phenomenon was caused by the variable.

'The ghost in the machine'¹

Mill may perhaps have been inferring some connection between corresponding elements of phenomena by arguing that it is necessary to have a 'dynamical' view of phenomena. Such a connection would justify elevating an observation to a 'law of correspondence'.

It is necessary to combine the statistical view of social phenomena with the dynamical, considering not only the progressive changes of the different elements, but the contemporaneous condition of each, and thus obtain empirically the law of correspondence not only between the simultaneous states, but between the simultaneous changes, of those elements.

(Mill 1925 [1843], chap X, sec 7, p 604)

¹ Ryle (1975, pp 15-6) used 'the dogma of the Ghost in the Machine' to refer 'with deliberate abusiveness' to the Cartesian dualism of the physical body animated by the spiritual mind, but the expression seems apt also in this context.

In places in his *System of logic* Mill arguably treated his ‘law of correspondence’ as if it were a law of causation, but nowhere did he say explicitly that corresponding elements aren’t logically independent. No such scruple was held by Durkheim who posited a relationship between corresponding phenomena.

But the case is quite different with the method of concomitant variations or correlation. For this method to be reliable, it is not necessary that all the variables differing from those which we are comparing shall have been strictly excluded. The mere parallelism of the series of values presented by the two phenomena, provided that it has been established in a sufficient number and variety of cases, is proof that a relationship exists between them. Its validity is due to the fact that the concomitant variations display the causal relationship not by coincidence, as the preceding ones do, but intrinsically. It does not simply show us two facts which accompany or exclude one another externally, so that there is no direct proof that they are united by an internal bond; on the contrary, it shows them as mutually influencing each other in a continuous manner, at least as far as their quality is concerned. This interaction, in itself, suffices to demonstrate that they are not foreign to each other.

The manner in which a phenomenon develops, expresses its nature. For two developments to correspond to each other, there must also be a correspondence in the natures manifested by them. Constant concomitance is, then, a law in itself, whatever may be the condition of the phenomena excluded from the comparison.

(Durkheim 1938 [1895], pp 130-1)

Even if he were writing metaphorically, Durkheim at least posited a ‘bond’ between facts. Such a bond supports Durkheim’s strong claim that conclusions are completed proofs.

We shall first investigate, by the aid of deduction, how one of the two terms has produced the other; then we shall try to verify the result of this deduction with the aid of experiments, ie, new comparisons. If the deduction is possible and if the verification succeeds, we can regard the proof as completed. If, on the contrary, we are aware of no direct bond between these facts, especially if the hypothesis of such a bond contradicts laws already demonstrated, we shall begin to look for a third phenomenon on which the other two depend equally or which have served as an intermediary between them.

(Durkheim 1938 [1895], p 132)

The early education comparativists were even less cautious in positing causation. Sadler refers to a 'spiritual force' that supports education systems.

Therefore, if we propose to study foreign systems of education, we must not keep our eyes on the brick and mortar institutions, nor on the teachers and pupils only, but we must also go outside into the streets and into the homes of the people, and try to find out what is the intangible, impalpable, spiritual force which, in the case of any successful system of education, is in reality upholding the school system and accounting for its practical efficiency.

(Sadler 1964 [1900], p 309)

Kandel wrote in similar terms but went even further to posit 'intangible, impalpable spiritual and cultural forces which underlie an educational system'. He identified these as the causes of the systems studied.

The chief value of a comparative approach to such problems lies in an analysis of the causes which have produced them, in a comparison of the differences between the various systems and the reasons underlying them, and, finally, in a study of the solutions attempted. In other words, the comparative approach demands first an appreciation of the intangible, impalpable spiritual and cultural forces which underlie an educational system; the factors and forces outside the school matter even more than what goes on inside it. Hence the comparative study of education must be founded on an analysis of the social and political ideals which the school reflects, for the school epitomises these for transmission and for progress. In order to understand, appreciate, and evaluate the real meaning of the educational system of a nation, it is essential to know something of its history and traditions, of the forces and attitudes governing its social organisation, of the political and economic conditions that determine its development.

(Kandel 1933, p xix)

This raises the problem of induction, leaving one open to the fallacy of constant conjunction identified by Hume. This is the fallacious belief that the constant conjunction of events establishes a causal relationship between them, or more generally, that one may infer universal statements from individual observations (Popper 1972 [1934], p 27).

Let men be once fully persuaded of these two principles, *that there is nothing in any object, considered in itself, which can afford us a reason for drawing a conclusion beyond it; and, that even after the observation of the frequent or constant conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have had experience; . . .*

(Hume 1964 [1738], book 1, part III, section XII, p 139. Emphasis in original.)

One may correctly observe that a cock crows every day before the sun rises, but one would be wrong to infer that the cock causes the sun to rise. Even the fact that every swan seen by a European before 1770 was white would not have supported the general statement that all swans are white. One may grant the desirability, perhaps even the necessity of knowing something of a system's history and economic, social and political context to support a comparative study without conceding that one may find in this the 'forces' that 'determine' its development. Ryan states forcefully the difficulty in drawing too strong a conclusion from comparative studies.

The second difficulty facing the analytical use of comparative research can be illustrated in terms of multivariate statistical inference, with each country as a separate observation and each attribute a quantitative variable . . . A small number of observations – usually two – is selected for the study of a relationship between two variables. . . . With only two observations on three or more potentially influential variables, positive 'degrees of freedom' are absent and it is impossible to establish the associations involved.

Several responses seek to reduce such difficulties. The first increases the number of observations relative to the number of variables. The usual way of doing so is to bring other countries into consideration. . . .

The second response takes the opposite tack: it selects countries so as to reduce the number of control variables required. If the countries in question are highly similar in other relevant attributes, then any observed relationship is less likely to be caused or distorted by uncontrolled influences. . . .

The final response develops Rose's advice to use time as well as space for comparative research. If the variables of interest have changed over time in the two countries while other factors have remained constant, then 'taking first differences' – comparing changes over time in the two countries – will remove the influence of factors other than the ones in hand. They are controlled by using the fact that they have not changed.

Again, results remain tentative. Even if the existence and direction of a relationship can be established, its strength is less readily assessed. Other influences are usually not measured, in which case there is no assurance that they have remained constant. Moreover, if the various influences interact . . . considering changes over time will provide an at best partial guide to the underlying relationship.

Finally, even were an association well determined, issues of causality would remain.

(Ryan 1991, pp 13-16)

Ryan also seems to be suggesting that if contemporaneous comparison alone can't establish causation, Mill's 'dynamical' view of social phenomena might suggest that history could be used to identify the cause, to explain the reason or even more weakly to describe the evolution of different arrangements. Froese (1960, p 268) expresses this as a combination of vertical and horizontal perspectives: what the history of education seeks to discover in vertical development, 'comparative education tries to obtain from a horizontal (ie contemporary) conspectus; that is an idea of the development and differentiation of the modern educational structure'.

Noah & Eckstein (1969, pp 104-5) agree that the method of agreement is the essence of comparative studies. They propose multiple comparisons of similar situations, eventually isolating the factor that is associated with the phenomenon of interest. The investigator may then develop a hypothesis which may be used to predict future situations or elements missing from observations of present situations. They (Noah & Eckstein 1969, p 104) state that this method of 'controlled investigation' is used extensively in some of the natural sciences, such as astronomy.

Noah & Eckstein are thus using Popper's (1972 [1934], p 40) concept of a falsifiable proposition. But Noah & Eckstein limit the circumstances in which a proposition may be tested. There are of course two variables, place and time. A proposition may be tested by observing whether it holds for the same place at a future time – prediction, but it may also be tested by investigating whether it held for the same place at a previous time, a sort of retrospective prediction.

This thesis follows Noah & Eckstein (1969) and ultimately Popper (1972 [1934]) in that the most that will be claimed is that the evidence adduced disproves some propositions and allows but does not necessarily establish others. Freeland (2000, p 6) calls studies which examine relationships between variables and seek causal explanations 'explanatory'. Freeland (2000, p 6) says a second form of comparative study is descriptive, which describe critical aspects of educational systems practices and outcomes. He says that both types of analyses can provide valuable insights into the nature of national economic and social systems. This thesis is therefore also is heavily descriptive.

Four steps will be followed, adopting a mostly orthodox method for comparative studies. The first step is to state the issue to be investigated (Bereday 1964). The second step is to ensure that like is being compared with like (Nadel 1951). Third, the thesis classifies the phenomena observed (Anderson 1961) and in the fourth step it generalises from the data (Kandel 1933).

First step: state an issue

Most comparative studies start by stating an issue to be investigated. Thus Trethewey states Bereday's method thus.

In step form, [Bereday's] comparative methodology thus becomes:

- (1) select a topic, issue or problem,
- (2) collect and collate educational data relevant to the topic in selected countries,
- (3) interpret the data, applying such disciplines as are relevant to an understanding of it in social context,
- (4) juxtapose the interpreted data in order to reveal possible bases for comparison,
- (5) develop hypotheses,
- (6) test hypotheses by comparative analysis of the interpreted data,
- (7) draw conclusions.

(Trethewey 1976, pp 74-5)

This is an obvious first step and has been followed in this thesis. Thus the introduction says that the thesis is investigating why most systems of higher education are divided into sectors, whether they meet their current goals, and whether the current division of higher education into sectors may be adapted to meet emerging goals or whether some other arrangement may be preferable. In brief, why have sectors? But Bereday's method is linear. Having stated an issue Bereday proceeds to the other steps, returning to the issue only to draw conclusions. Another founder of the discipline, Edmund King (1967) describes a more iterative approach. King (1967, p 58) starts by conceptualising an appropriate theme of inquiry. This soon brings King to institutions and thence to institutionalise his study. He then observes that the same kind of institution or function might produce different results in different circumstances, and thus are operationalised differently. King (1967, p 59) concludes that the three aspects of comparative inquiry – conceptual, institutional, and operational – to some extent overlap and are interdependent. King's more iterative approach is followed in this thesis.

Second step: identify identity

An obvious requirement is to ensure that like is being compared with like. Nadel (1951) derives the requirement from first principles. He says that the method of co-variations presupposes preliminary hypothesis or suspicion about the kind of correlation likely to prove relevant. The method also implies according to Nadel (1951, p 224) 'the general postulate that social situations are not made up of random items, but of facts which hang together by some meaningful nexus or intrinsic fitness'. Thirdly, 'the study of co-variations is bound up with judgements on the identity and difference of social facts . . . more specifically, with judgements on similarity and partial identity, the very concept of variations implying a sameness of facts which yet permits some measure of difference' (Nadel 1951, p 224, cited in Anderson 1961, p 7).

Przeworski & Teune (1970, pp 33-4) state the requirement of equivalence in linguistic terms. They argue that phenomena are comparable if they can be expressed in a standard language. The same point is made by Hantrais & Mangen. They observe further that a standard language is required because it establishes conceptual

equivalence (Hantrais & Mangen 1996, pp 5, 7). Soydan argues the same point, although somewhat differently that this raises the meaning of social reality. He (Soydan 1996, p120) argues that social reality has a specific meaning and relevance for human beings who are members of the same social reality. He therefore claims that this is an ontological question.

Ontology is the study of being or more generally the investigation of the nature of reality (Audi 2002, p 563). Soydan is therefore correct if social reality is constructed by its members. An alternative view is that the problem is not of the nature of reality but of the nature of knowledge. So Glover (1996, p29) suggests the problem is not really ontological but epistemological, the study of the nature of knowledge and justification.

As will be elaborated in some detail in the next chapter, the problem of equivalence is particularly acute in the study of vocational education and training. Bliss & Garbett (1990, p 190) observe that the concept of technical education is not always, and not necessarily, to be interpreted in the same way in the context of other systems. Indeed, they argue, in some ways it is necessary to challenge the very notion of technical education as a clearly definable sector. 'Problems of interpreting data, of learning lessons from abroad, are thus not simply technical, statistical ones, but take us to central definitional problems about what are to count as legitimate usages of terms such as 'education' and 'technical education'. The notion of 'education' is one that has been much debated, but even the apparently more precise notion of 'technical education' is by no means transparent in meaning' (Bliss & Garbett 1990, p 190).

Cantor (1989) and Watson (1994, p 94) also warned of the particular difficulty in comparative studies of technical education: is like being compared with like? The thesis argues later that terminological ambiguity not only causes problems of equivalence in comparative studies, but is also a special problem of identity for vocational education and training. Rainbird (1996, p117) argues that terms such as 'skill', 'qualification' and 'apprenticeship' derive from distinctive historical traditions and do not necessarily have equivalents from one country to another. For Rainbird the problem of equivalence is a problem of understanding the conceptual language of different social and intellectual traditions.

Goedegebuure & van Vught (1994, pp 11-12) restate the problem, but helpfully propose an admittedly partial solution. This is to reduce the risk of mistranslating concepts by comparing countries that are similar. This thesis seeks a balance between similarity and difference in selecting jurisdictions to compare with Australia, but leans heavily towards the similarity proposed by Goedegebuure & van Vught to minimise the problems with the incommensurability of concepts and data noted above.

Third step: classify

The third step followed in the thesis is to classify the phenomena observed. Anderson (1961, p 7) says that three sorts of correlations are used to compare educational systems in depth, for both qualitative and quantitative data. The first step is to identify patterns of relationships among various aspects of educational systems. The second step is to develop a typology of educational systems, which is a way of summarising vast quantities of data that have already received a preliminary ordering in the first step. Anderson's third step is to display the relationships between various educational characteristics and associated sociological, economic, or other non-educational features.

The classification of data is also an analytical tool, a way of building a simplified but explanatory model of reality as Spolton (1968) suggests. Spolton (1968, p 114) raises the issue referred to earlier, of the tension between the explanatory power of models and the loss of accuracy that they necessarily entail. Koehl interestingly relates this step, which remains such a large part of the relatively young method of comparative education, to the early development of other disciplines. According to Koehl (1977), comparative education is still developing its analogue of the life science's taxonomy and chemistry's periodic table. Koehl (1977, p 177) says that 'some of the crucial theoretical problems facing contemporary comparative education, particularly those of classification, terminology, and morphology, were confronted by the practitioners of these early sciences and have analogies if not exact parallels in the taxonomic manuals of chemistry, geology, and biology of the not too distant past'.

Fourth step: generalise

Finally, generalisation is an obvious goal of comparative studies. Trethewey (1976) describes Kandel's method thus.

Expressed as a sequence of steps for the comparativist, these suggest *description* leading successively to *explanation*, to *comparative analysis* and, finally, to the *identification of patterns, trends or principles* of education.

* * *

Elaborating the sequence of steps already inferred, Kandel's method can now be presented in the following way:

- (i) *description* of the answers given in theory and practice to one or more of the problems common to all countries. . . .
- (ii) *explanation or interpretation* in terms of an analysis of the causes that have produced them.
- (iii) *comparative analysis* involving 'comparison of the differences between the various systems and the reasons underlying them.'
- (iv) 'disengage *certain principles or tendencies* and . . . build up a philosophy of education on a basis of observed practice . . .

(Trethewey 1976, p 57-8; emphases in the original)

Holmes (1981) expounds a positivist method. His generalisations are thus provable universal laws.

The essential features of this method are (1) the collection of data using objective observation, (2) the careful classification of data, (3) the search for explanation by ascribing to each event an antecedent cause or causes, (4) the formulation of tentative hypotheses, (5) the collection of further confirming evidence and finally (6) the statement of universal laws whose validity can be provided.

(Holmes 1981, p 39)

This thesis is more descriptive than positivist, seeking to clarify what Raivola (1985, p 369) observes is the considerable semantic fuzziness in the field. Raivola (1985, p 363) notes that comparisons can also lead to the construction of theories or generalisations.

A number of tools will be used

It may be possible to construct a single method for comparative education, and arguably Sadler (1900/1964, p 310) envisaged a single tool, a holistic appreciation of a system and its environment. Kandel (1933, p xi) eliminated a number of tools because of contemporary methodological limitations and was left with Sadler's contextual description-explanation. Hofmann & Malkova (1990, pp 122-3) argued that due to the complexity of comparing education the multiplicity of tools does not offer a choice but imposes a requirement. They propose studies of primary sources and statistical and literature analyses, with direct observation having a greater moral than methodological benefit. Paulston (2000, p 359) attempted a more comprehensive typology of tools. The several tools considered by Paulson are set out below in a simplified table.

TABLE 2.1: PAULSTON'S TYPES OF TOOLS IN COMPARATIVE EDUCATION

<i>Types of creative imagination</i>	<i>Textual products</i>
Narrative imagination	Chronicles and stories of educational customs and practices: histories of educational ideas.
Statistical imagination	Methodologies for the numerical representation of educational data and practices: measurement.
Scientific imagination	Positive models for representing educational functions and systems: iconic realism.
Analytical imagination	Causal explanations of social and economic relations and outcomes: theories.
Ethnographic imagination	Thick descriptions of cultural processes and world-making: transformations, appropriations and personal witnessing (<i>testimonio</i>).
Rhetorical imagination	Translations and deconstructions of literary texts and discursive practice: poetics.
Spatial imagination	Metaphorical mappings of diverse ways of seeing and nets of relationships: heterotopias of intellectual space.
Pictorial imagination	Visual displays and image-making: pictures.

Source: after Paulston (2000, p 359) table II.

This discussion has distinguished between comparative education's method and the tool(s) used to implement a method. It has sought to construct a single method – at least for the purposes of this thesis – but has foreshadowed the use of multiple tools. Those who define a discipline by its method and reduce method to a tool of observation or analysis conclude that comparative education is a pluralist undertaking. Thus Kelly (1992, p 21) argues that the field of comparative education has no centre, rather it is an amalgam of multidisciplinary studies, informed by a number of different theoretical frameworks. Likewise Watson (1996) argued that there is no single method of comparative education but several – historical, descriptive, evaluative and ethnographic. He (Watson 1996, p 381) argued that the choice of method is pragmatic, that it depends upon the area being studied, the information being sought and the questions being asked. Broadfoot (2000) casts this as a virtue. According to Broadfoot (2000, p 369) comparative education is a multi disciplinary (although she calls it meta-disciplinary) undertaking that involves sociology, politics, economics, geography, cultural studies, anthropology and history.

Comparable data

Goedegebuure & van Vught (1994, p 18) quote Oyen in suggesting that one of the central research strategies, although not much discussed, seems to be the preference given to available data and methodological tools, and this is certainly true for this thesis. The thesis follows Glover (1996, p 28) in using secondary analysis – a method for exploiting primary data gathered for other purposes to explore a different research issue. Student transfer was chosen because of the ready availability of this data in many jurisdictions. A jurisdiction was not included in the study if data on student transfer weren't readily available. But even available data isn't useful if it can't be compared sensibly. As Hantrais & Mangen (1996, p 8) observe, the investigator must make the best of often crude cross-sectional analyses. Conveniently, Anderson (1961, p 17) provides a defence: perfect data will never be available, and in the mean time there are pressing issues to investigate.

3 Identify identity

The second step in the comparative method outlined in chapter 2 is to establish the equivalence, or more precisely the comparability of the entities being compared. This is a particular problem in comparing tertiary education systems because one of the key parts or functions of tertiary education, which for convenience the thesis will refer to as ‘vocational education’, ‘is beset by definitional problems’ as Middleton & Demsky wrote (1989, p 3). Most of this chapter therefore discusses previous attempts to define ‘vocational education’ and its cognates, and this section concludes by proposing a general compound definition of ‘vocational education’. The chapter concludes by mapping this compound definition of vocational education to UNESCO’s international standard classification of education.

Defining ‘vocational education’ and its cognates¹.

The previous chapter noted the difficulties Cantor that (1989b, p ix), Bliss & Garbett (1990, p 190), Watson (1994, p 94) and Rainbird (1996, p117) had in defining vocational education. Cantor (1992, p 1240) reiterated the problem three years later, adding that terminology also varies over time. That is, terms are not only used inconsistently from place to place at the same time, but inconsistently in the same place at different times. Murray-Smith (1965, p 170) made the same point earlier, observing that ‘The “received” definitions of technical education change radically from one era to another . . .’. The problem is longstanding. Over a century ago T H Huxley (1877) lamented that ‘it passes the wit of man, so far as I know, to give a legal definition of technical education’. In 1959 Henninger (1959, p 115) reported that his ‘survey has

¹ An earlier and much briefer version of this chapter was published as MOODIE, GAVIN (2002) ‘Identifying vocational education and training’ *Journal of Vocational Education and Training*, volume 54, number 2, pp 251-267. I thank one of the journal’s anonymous reviewers for their generous suggestions to improve the paper.

shown a tremendous spread and considerable carelessness or capriciousness in the use of the term ‘technical institute’ by various schools and related groups . . .’ Bennett (1937, p 275) observed that ‘technical education’ has been applied to general science subjects, to trade teaching, to higher instruction in science and engineering and to commercial and management studies.

As will be explored in some detail later in this chapter, vocational education is often contrasted with general education, but this does not assist comparisons since “‘vocational’ and “general” education . . . can mean different things in different countries, depending on the traditions that have formed in the education system’ (Lachenmann 1988, p 26). Indeed, Skilbeck and colleagues (1994, p 3) argue that inconsistent use affects not only ‘vocational education’ but also its cognates ‘education’, ‘vocational’, ‘training’, ‘skill’, ‘competence’, ‘working life’ and so on.

Establishing equivalence

Raivola (1985, pp 367-8) posited three ways of establishing equivalence: correlative equivalence, functional equivalence and genetic equivalence. These are considered in turn.

Correlative equivalence

One of the key markers of vocational education in many countries including Australia has been apprenticeships, and this is useful in identifying correlative equivalence of vocational education in the countries that have apprenticeships. But as Smith & Keating (2003, p 11) observe, apprenticeships have essentially been attached to regulated industrial relations arrangements and some countries do not have the industrial regulations needed to support apprenticeships. So as will be observed in the review of North America, there are almost no apprenticeships in the US and there are few and patchy in Canada. Is there therefore no ‘vocational education’ in the US? That seems unlikely, particularly since even though education is constitutionally a State responsibility in the US as it is in Australia, the US federal government has fostered vocational education since the Smith-Hughes Act of 1917 which allocated federal funds for vocational education in high schools (Mobley & Barlow 1965, p 186; Campbell

1974, p 106; Gordon 1999, p 174). The thesis finds that there is no simple correlative equivalence of vocational education in any of the jurisdictions it examines: their equivalence, and the basis for comparisons, will have to be founded on a more complex understanding.

Functional equivalence

Comparing tertiary education systems is fruitful because their different functions are served differently in different systems. Thus the functions served by apprenticeships in Australia and the UK are served differently in Canada. Ashton, Maguire & Sung (1991, pp 237-8) observe that the apprenticeship system does not exist in all Canadian provinces and is fragmentary in its coverage of occupations in the provinces where it does exist. In the absence of strong institutional supports for an occupational labour market, employers satisfy their need for skilled labour by establishing their own internal labour markets. So new employees enter the lower levels of the organisation, where they may be given an opportunity to move up to more highly skilled jobs.

Educational functions are not even necessarily served by an education sector. Hall & Soskice (2001, p 30) argue that education and training systems complement their host economies. They posit two types of economies, coordinated market economies exemplified by Germany which have a sufficiently stable labour market to encourage enterprises and employees to invest heavily in vocationally specific skills, and liberal market economies such as the US which are characterised by highly fluid labour markets. In liberal market economies vocational education is normally provided by institutions offering formal education that concentrate on general skills because companies are loath to invest in apprenticeships imparting industry-specific skills where they have no guarantees that other firms will not poach their apprentices without investing in training themselves. Workers facing short job tenures and fluid labour markets also prefer general vocational education since career success depends on acquiring the general skills that can be used in many different firms. Hall & Soskice (2001, p 30) argue that high levels of general education lower the cost of additional training. So companies in liberal market economies do a substantial amount of in-house

training, although rarely in the form of the intensive apprenticeships used to develop company-specific or industry-specific skills in coordinated market economies.

The substitution of functions is likely to be particularly prevalent at the intersection of sectors, such as in applied education and, indeed, in applied research. So while establishing functional equivalence is often instructive, it is not sufficiently consistent between different types of economies to found a definition of vocational education.

Genetic equivalence

This analysis starts with Raivola's third way of establishing equivalence, genetic equivalence, by which he means membership of the same conceptual class. The section analyses several attempts to define 'vocational education' and its cognates, classifying them into four types: epistemological, teleological, hierarchical and pragmatic. None of these attempts is found to be satisfactory so those types are used to pose a new compound description of 'vocational education' which the section argues is adequate to identify the 'family resemblance' (Wittgenstein 1968) of vocational education and its cognates.

Epistemological

The most fundamental foundation of vocational education's identity is as the development of a distinctive way of knowing; some writers make associated claims for vocational education and training's distinctive way of learning; and some consider it a field of knowledge. These are considered in turn.

Ways of knowing

In *Nichomachean Ethics* Aristotle distinguished 'five ways in which the soul arrives at truth' – pure science (episteme), art or applied science (techne), prudence or practical wisdom (phronesis), intelligence or intuition (nous) and wisdom (sophia). Wisdom or theoretical wisdom is knowledge of first principles and therefore is the most precise and perfect form of knowledge. Art or applied science is essentially a trained ability of

rationally producing, or in other translations, producing under the guidance of true reason. Similarly in the *Metaphysics* Aristotle says that theoretical kinds of knowledge are more of the nature of wisdom than the productive or practical kinds of knowledge because they deal with the first causes and the principles of things.

James (1995) notes that different levels of reflection correspond to Habermas' different knowledge-constitutive interests: technical reflection (know how and know what), practical reflection ('what ought I do?') and critical reflection (development of relational autonomy). Durkheim (1977 [1938]) relates the Medieval construction of the curriculum to a distinction between theory and practice –

First of all there were three disciplines, grammar, rhetoric and dialectic, which formed what was called the 'trivium'. . . . The quadrivium included geometry, arithmetic, astronomy and music.

These two cycles were not only distinguished by the number disciplines which they included. There was also a profound difference in the nature of the disciplines which were taught within the two cycles. The trivium was intended to instruct the mind about the mind itself, that is to say the laws which it obeys when it thinks and when it expresses itself, and the rules it ought to follow in order to think and express itself correctly. . . . The quadrivium, by contrast, consisted of a set of branches of learning related to things. Its role was to generate understanding of external realities and the laws which govern them, the laws of number, the laws of space, the laws concerning the stars, and those which govern sounds.

(Durkheim 1977 [1938], p 47)

Frijhoff expounds the historical significance of Aristotle's epistemology. He projects onto Aristotle a dualism between intellectual and manual skills and derives from this a binary system of tertiary education.

The Aristotelian distinction between intellectual and manual skills is to blame for the decision not to include technology, applied science, or manual training – such as that of surgeons, architects, farmers, or bookkeepers – in the university curriculum. After some teaching of technology in the sixteenth and seventeenth centuries, in particular at some Dutch (Leiden) and Italian universities, a binary system developed all over Europe. Technology and training for manual skills were confined to specialised schools at a nonuniversity level . . .

(Frijhoff 1992, pp 1255-6)

There are several variants and partial applications of such epistemological distinctions. One of the earliest descriptions of ‘technical instruction’ is as the training of the hand, which is contrasted with the education of the mind (Magnus 1888, p 26). While no one would propose such a crude Cartesian dualism now, many descriptions of vocational education tacitly propound other mind/body distinctions such as the distinction between knowing and doing and between theory and practice (Gonzci 1997). Holmes (1981, p 143) collapses Plato and Aristotle’s epistemology to a distinction between reason and experience.

Newman (1959 [1853], p 138) distinguished between liberal education which is general and mechanical education which is particular, a distinction adopted by others (Wilkinson 1970, p133, quoted in Hyland 1999, p 30). Ashby proposes a similar distinction between *Bildung* (education) and *Ausbildung* (training), or between *Allgemeinbildung* (general education) and *berufliche Bildung* (vocational education/training) as Jochimsen (1978) prefers. Pechar (2004b, footnote 7, p 71) notes that this distinction was institutionalised in Austria in the 1990s, with ‘training’ for vocations (*Ausbildung*) classified as secondary education and therefore the responsibility of the Education Ministry while ‘preparation’ for vocational activities (*Vorbildung*) was considered higher education and the responsibility of the Ministry for Science and Research. Ashby (1946, p 81) distinguished between a subject which leads to generalisation and a technique which presumably is specific; and H S Williams argues that technical education is practical, in contrast to university education which is by implication (more) theoretical (1963, p 92) or academic. At other times Williams rests the distinctiveness of technical education on its applied nature in contrast to university education which is by implication more ‘pure’ (1965, p 71).

At its most general this is a distinction between the abstract thought said to characterise general education and the concrete action thought to characterise vocational education (Gonzci 1997, p 84). This is reflected in UNESCO’s (1997) international standard classification of education which distinguishes between general education which is mainly designed to lead participants to a deeper understanding of a subject or group of subjects and ‘vocational or technical education’ which is mainly designed to lead

participants to acquire the practical skills, know-how and understanding necessary for employment in a particular occupation or trade or class of occupations or trades. The international standard subdivides tertiary education programs into those that are primarily theoretically oriented and those that are primarily practically oriented. In a subsequent recommendation on the integration of general and technical and vocational education UNESCO (1986, p 334) maintained its definition of technical and vocational education as ‘ . . . the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life’.

Associated with this dualism is the connotation if not definition of vocational education as being concerned with training to do repetitive tasks in contrast with higher level education which is considered adaptive, generative and innovative. This in turn can be reduced to a distinction between skill and knowledge (Stevenson 1996; 1998a, p 134). Blunden (1995, p 5) and Stevenson (1995) note the modern association of general education with conceptual understanding or declarative knowledge and vocational education’s association with demonstrated knowledge or procedural knowledge, which they trace to Ryle’s (1975, p 28) distinction between knowing that and knowing how, between propositional knowledge and operational competence. Somewhat similar is Tight’s (1996) distinction between understanding and practical experience.

Shapin & Barnes (1976, cited in Skilbeck et al 1994, p 139) draw out this distinction in three sets of dichotomies which have long persisted in educational assumptions: ‘the *sensual* and *concrete* character of the thought of the lower orders against the *intellectual*, *verbal* and *abstract* qualities of the thinking of those above them’; ‘the *simplicity* of the thought of the lower orders and the *complexity* of that of their betters’; ‘the *active use* of knowledge and experience of the higher orders, contrasted with the *passive* and *automatic* way in which the lower ranks were assumed to react to experience’.

Some contemporary vocational education reformers found its epistemological distinctiveness in being based on competence. One arm of the definition of vocational and technical education in the US federal education code is that it should ‘include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills,

technical skills, and occupation-specific skills, of an individual' (Legal Information Institute, 2002). Carnegie (2000, p 25) propounds a similar definition, at least for Australia, asserting that a distinguishing feature of vocational education is the competency based 'learning/assessment focus'.

While different epistemologies may be accepted, these don't map to any familiar educational domain or sector such as vocational education or higher education. Scientific experimental technique and the surgeon's skill are clearly 'technical' as Huxley (1895) himself argued, but these have been part of higher education at least since the early 19th century. Conversely, vocational education is clearly concerned with general theoretical knowledge in accounting, electronics and information technology, to give just three examples. Stevenson argues further that the theoretical knowledge of the high status occupations – the professions – is routinised by experienced practitioners, thus collapsing the distinction between the types of knowledge ascribed to vocational education and higher education.

The differentiation between theoretical and practical knowledge is also based on the view that one set of occupations denoted professions (e.g. medicine, engineering, law and architecture) draws essentially on theory in pursuit of practice; while another set of occupations denoted vocations (e.g. the trades and office work) draws essentially upon highly routinised procedural knowledge in practice. This knowledge is often put down in such terms as personal, direct, experiential, tacit or implicit knowledge, to denote that it is 'unsophisticated' and 'trapped' in practice. However, there is now considerable research evidence that, with experience, so-called professionals also draw upon highly routinised procedural knowledge ('scripts') attached to templates for frequently encountered case types (Boshuizen et al, 1995; Bromme & Tillema, 1995; Custer et al 1999; Rambow & Bromme, 1995; von der Weth & Frankenberger, 1995). That is, professionals transform their theoretical knowledge into ('encapsulated') knowledge of proto-typical instances, and skills (scripts) for dealing with these instances. Clients or problems are seen in terms of types rather than underlying theoretical principles. Indeed the more experienced the professional, the more likely that contact will be lost with the initial discipline-based theoretical ideas taught to novices in the profession. Thus, the professional / vocational differentiation appears to have more to do with class considerations than with any essential differences in expert practice.

(Stevenson 2003)

Ways and place of learning

Carnegie's (2000, p 25) distinction is partly founded not only on ways of knowing but on ways of learning. This resonates with vocational education's historical identification with apprenticeships, where the learning-teaching method is said to be by observation, imitation and personal correction, rather than by application of general propositions delivered in classrooms and text books. This in turn is related to a distinction between general education's verbal or propositional knowledge and vocational education's non verbal or tacit knowledge (Stevenson 1998a, p 134). There has also been some attempt to found vocational education's distinctiveness on the place of learning. Summerfield & Evans (1990, p 5) observe that gradually during the 1980s vocational education shifted to learning in places of work.

While some vocational education may currently place more emphasis on a particular style or place of learning-teaching, this is surely highly contingent, and is in any case only weakly distinctive of vocational education. The physician's art of diagnosis and the lawyer's skill of advocacy are learned on the job at least partly by imitation, and indeed some doctoral programs seem to have similarities with apprenticeships.

As a field of knowledge

Leonard Cantor (1989a) distinguishes between 'general vocational education programmes, and occupational-specific programmes', the former including 'pre-vocational courses designed to introduce students to broad vocational areas, such as business and office education, home economics, and industrial arts', and general work and life skills. This describes vocational education not so much as a way of knowing as a broad field of knowledge comparable to social sciences, physical sciences and the humanities. Thompson (1973, p 10) claimed that vocational education has a diverse set of specialised knowledge and skills. Similarly Summerfield & Evans (1990, p 5) observe that in the early stages of the UK technical and vocational education initiative in the late 1970s and early 1980s technical and vocational education was understood to imply a specific curriculum content – 'technical' subjects like information technology, electronics and 'craft, design and technology', and 'vocational' ones like business

education, food technology, community care and horticulture. But these fields are clearly not distinctive of vocational education since they are shared with higher education. They are therefore not sufficient to found vocational education's identity.

Teleological

Many thinkers found vocational education's identity on the purpose it serves; three types are identified here.

Training for an extrinsic purpose compared with cultivation for intrinsic worth

In the *Metaphysics* Aristotle distinguishes philosophy, the knowledge of first principles and causes, which 'alone of the sciences is free since it alone is pursued for its own sake' from other activities which are pursued for extrinsic reasons. In *The Politics* Aristotle contrasted the training for extrinsic purposes suitable for artisans, slaves and women with the cultivation of the arts for their intrinsic worth appropriate for leisured, free men. Newman (1959 [1853], discourse v) expressed Aristotle's distinction as one between liberal or gentleman's knowledge and education and servile or mercantile education. Dewey (1916, pp 250-1, 260) observes that this association of liberal, intellectual education with the leisured class and practical education preparing for useful labour with the servile class leads to 'probably the most deep-seated antithesis which has shown itself in educational history' between culture and utility. It also leads to 'preparation for useful work [to] be looked down upon with contempt as an unworthy thing' (Dewey 1916, pp 250-1, 260). It informed the philosophy of civic humanism, which Cunningham & Hartley (2001, p 2) note was espoused by those like the Earl of Shaftesbury, writing in the early 1700s, who revived a classical distinction between 'liberal' arts which were free in the sense of civic freedom, and 'mechanical', 'useful' or even 'servile' artisanship. Cunningham & Hartley (2001, p 2) argue that Shaftesbury's aristocratic schema was firmly based on the idea that 'trade' – commercial activity including creative work – was 'servile' or even 'slavish', as in 'slavish imitation'.

Brubacher (1978, p 74) observed that ‘Nowhere, perhaps, do the aristocratic proclivities of liberal education betray themselves more than in its attitude toward vocational education’. Hyland (1999, pp 32-3) argues that the system of vocational education established in the UK in the early 20th century ‘was completely dominated by class interests and divisions, and could not escape the power relationships and educational connotations linked to such divisions’.

It has also informed some modern conceptions of vocational education (Hyland 1999, p 27). Thus, B Williams (1970) argued that the ‘inner logic’ of university and advanced education provides a ‘functional differentiation’ between them, between university education’s intrinsic value and vocational education’s instrumental value (quoted in Hermann et al 1976, p 16). Feinberg (1983) claims that the aim of vocational education is to transmit exploitable knowledge to participate in the market, whereas general education is to create a democratic society. Mitter (1988) recounts the establishment of secondary schools during the time when child labour laws were imperfectly enforced to draw a distinction between education as a preparation for work and education as a protection from work. Stevenson (1997, pp 6-7) notes differences in the valuing of knowledge, which interestingly he constructs more completely than the normal dualism: academic valuing of the production of new knowledge, general education’s valuing of the development of the whole person for life, vocational education’s valuing of competences for work, and some parts of adult education’s valuing of critical thinking leading to empowerment.

As Dewey pointed out (1916, p 346), Aristotle’s distinction between training for an extrinsic purpose and education for intrinsic worth is a special application of a more general distinction between means and ends. While this distinction between training and education has an attractive neatness, it is not an adequate characterisation of vocational education. For in vocational education as much as in higher education there is a continuum between studies taught and learned for instrumental purposes and those pursued for intrinsic interest. Furthermore, in both sectors a study that may be of mainly intrinsic interest to some scholars has more instrumental value to others: studies aren’t one or the other for all scholars. Nonetheless, the distinction between means and ends has spawned cognate characterisations of vocational education.

Training for work; education for life

Huxley (1895, pp 405, 437) defined technical education as the teaching of handicrafts or trades. The US federal government adopted this understanding of vocational education as education for work. Palmer (1990, p 22) notes that the US federal Vocational Education Act and its subsequent amendments, along with community college enabling legislation in many States, tie community college occupational studies to labour force development for jobs that require more than the high school diploma but less than the baccalaureate. From the US federal government's first direct funding of vocational education, the Smith-Hughes Act of 1917, vocational education was defined as education 'less than college grade' 'to fit for useful employment' (quoted in Thompson 1973, p 107). A similar definition was used in the George-Dean Act of 1936 and the George-Barden Act of 1946 (Thompson 1973, p 107). The *Vocational Education Act* of 1963 retained the vocational purpose in the definition of vocational education but redefined the level to be 'semi-skilled or skilled' and excluded training for employment 'generally considered professional or as requiring a baccalaureate or higher degree' (quoted in Thompson 1973, p 109). See also Good 1959, p 603 (quoted in Thompson 1973, p 111); Mobley & Barlow 1965, p 200; Henninger 1959, p 8 footnote 4.

This view is current. Skilbeck and colleagues (1994, p 3) wrote recently that "“vocational” refers to those educational functions and processes which purport to prepare and equip individuals and groups for working life whether or not in the form of paid employment' and a similar definition had been proposed by Conant (1959, p 123, quoted in Campbell 1974, p 113), Harris (1960, p 1555, quoted in Campbell 1974, p 111), Barlow (1965, p 6, quoted in Campbell 1974, p 114), Hammonds & Lamar (1968, p 24, quoted in Thompson 1973, p 114), Thompson (1973, p 216), Bliss & Garbett (1990, p 191) and Smith and Keating (2003, p 3). But training for work includes much of higher education, as Ashby observes –

Notice that this distinction cuts across some familiar boundaries. It puts into the same category the education provided by the faculty of medicine at Cambridge and by the department of catering at Colchester Technical College; and it puts into the same category Oxford Greats and Workers' Education Association courses on archaeology.

(Ashby 1974, p 135)

Notwithstanding the ahistorical claims that universities' modern vocationalism is a betrayal of their supposed essentially non-utilitarian virtues (Symes 1999), from their foundation in the Middle Ages universities were largely vocational schools training for the church, medicine and the law (Cobban 1975, p 165). Universities of the Italian Renaissance, or *Rinascimento* as it was known in Italy its country of origin, were renowned for their teaching of law and medicine which typically comprised at least 75% of the university (Grendler 2002). Partridge (1968, pp 127-130) remarked upon Australian universities being 'overwhelmingly utilitarian and vocational' which he argued was true throughout almost the whole of their history. Universities have expanded the occupations for which they train until the present time, as Dearing (1997) observed. Vocational orientation was assumed to be a pervasive feature of higher education by the editor and many of the contributors to a recent special issue of *Journal of Vocational Education and Training* on vocational qualifications in higher education (Roodhouse 2000).

Thus in a review of World Bank investment in vocational education and training Middleton & Demsky (1989, p 6) identified as one of 'seven institutional modes for vocationally specific education and training' (p 4) university vocational education and training includes programs such as engineering, medicine, pharmacology, and business administration that prepare individuals for specific occupations at a professional level.

So simple vocationalism is not sufficient to found technical education's distinctiveness, as Kangan (1974, pp 5-6) observed in the report that established the framework and rationale for Australia's vocational education sector. Some writers, like the US federal legislature, seek to escape this difficulty by restricting vocational education to 'below college grade' (Good 1959, p 603, quoted in Campbell 1974, p 111) explicitly or implicitly, or with more consistency and frankness restrict vocational education to the middle and lower occupational levels. This is considered later.

Training for work directed by others, education for self-directed work

Aristotle's distinction is also a distinction between training for slaves and artisans whose work is directed by others and education for free or self-directing men. This has been characterised as a distinction between training for paid employment and education for gentlemen of leisure (Wilkinson 1970, quoted in Hyland 1999) but such a distinction would not be seriously entertained in modern times.

More common has been a distinction between vocational education for paid employment and higher education for the professions. This might have had some value when there were fewer occupations claiming the status of profession and most professionals practised on their own account. But even then it had some uncomfortable anomalies. Insurance underwriting is a venerable, highly skilled occupation in which brokers have long practised on their own account – we recall Shakespeare's Shylock and the 'names' of Lloyds of London – but insurance was very much 'trade' rather than a profession. And most of the practitioners of the profession whose training led to the formation of many venerable universities north of the Alps – the clergy – were and remain employees of large bureaucracies, not independent practitioners.

These days most lawyers, engineers and many doctors are employees and so can't claim the autonomy of independent practice. Neither can they claim special status from their exercise of independent judgement – carpenters, personal care attendants and bus drivers, for example, all exercise considerable independent judgement in their work. But arguably the practitioners of the higher status occupations have more independence in the direction of their work than lower status workers. This distinction, then, collapses into a distinction of occupational level, which has informed many accounts of the distinctive character of vocational education.

Hierarchical

Three types of hierarchical classification are identified: occupational level, educational level and cognitive level. They are considered in turn.

Occupational level

Plato expounds the view in *The Republic* that each person has different aptitudes which should be developed for the job to which they are best suited. Jobs in turn are commonly classified by level, and vocational education is also commonly defined by derivation from the occupational level of its graduates (Moorhouse 1960, p 176; Murray-Smith 1965, p 170; Hermann et al 1976, p 187; Haslegrave 1969, p 3). This has also been related to class (Hyde 1983, p 121; Anderson 1998, p 1; Young 1993; Stevenson 2003) and Cotgrove (1958, p 17) observes that ‘Throughout the 19th century educational provision and policy were closely related to the class structure.’ Further, Cotgrove (1958, p 66) observes the influence of class views on education in the controversy about the place of advanced and university studies in polytechnics. Polytechnics were intended for the poorer classes. The curriculum should, therefore, be limited mainly to elementary and trade classes, and university studies which would attract the middle classes should be excluded.

Cotgrove (1958, p 193 fn 1) quotes Banks (1955, p 214) who argues that educational institutions import the prestige from the range of occupations for which they normally prepare. Burton Clark (1960, p 169) suggested that this in turn determined the relative esteem or status of vocational education institutions. Institutions which prepare students for high status occupations enjoy high status by transference, whereas vocational education institutions prepare students for lower status vocations and thus are ascribed less esteem.

Two decades later Clark (1983, p 63) expressed firmer views on the relationship between educational level, institutional prestige and occupational level. He (Clark 1983, p 64) goes on to observe that lower level institutions are likely to be ranked more sharply if their graduates are unable to transfer to higher level institutions. This is but a part of the operation of whole educational system which is, argues Bourdieu (1988 [1984], p 313, n 3) ‘one of the means of preservation or transformation of the structure of class relations through the mediation of the maintenance or change in the number and status of the holders of positions in this structure’.

H S Williams was director of Western Australia technical education in the 1960s and he became the first Director of the Western Australia Institute of Technology which evolved into the present Curtin University (Harman, 2003). Williams (1961, p 101) provided one of the most finely graded classifications of occupations in which to place vocational education –

- (i) trade
- (ii) post trade
- (iii) technician (production-maintenance)
- (iv) technician (research design)
- (v) professional
- (vi) post professional.

The category of ‘technician’ was considered problematic, and Moorhouse (1960, p 178), Williams (1961; 1963, p 112) and Hermann, Richardson & Woodburne (1976, pp 9-11) clarify its categorisation carefully. Swanson & Kramer (1965, p 176) observe that the term ‘technician’ was applied beyond its initial designation to occupations such as ‘food technician’, ‘medical technician’, ‘dental technician’, ‘nursing technician’ and ‘agricultural technician’, and propose a precise definition of the role. While Moorhouse believed that the occupational levels described the province of technical education, he deprecated as ‘a dangerous over-simplification’ the ascription of institutional roles to occupational levels (Moorhouse 1960, p 183). Nonetheless, just such an ascription was mapped by Herman, Richardson & Woodburne (1976, p 13) and as Stevenson (1992) notes, an alignment of educational and occupational levels was institutionalised by the British national vocational qualifications. Thus the national council for vocational qualifications established five levels of qualification (Cantor, Roberts & Pratley 1995, p 60) –

- 5 professional level
- 4 higher technician and management
- 3 advanced craft or technician
- 2 basic craft or intermediate level
- 1 workers closely supervised.

Australia sought to link rates of pay to composite educational-occupational levels in the restructuring of industrial awards from the late 1980s (Carmichael 1992), leading to the reductive compartmentalisation of knowledge and hierarchies noted by Stevenson (1992). Stevenson posited six different skill levels, from the routine proceduralised tasks to management responsibility over others, and eight occupational levels, from operative to senior professional. This potentially generates 48 skill-occupational types and levels, although Stevenson observes that not all of the categories are used in practice.

However, no sooner had this alignment been established than it became outmoded by changes in the economy and therefore the construction of work. Burgess (1986, p 123) notes that the existing classification of occupations as craftsman, technicians, technologists and engineers already seems inappropriate in the light of the changes wrought by the new technology. Cornford (1998) notes that such changes have occurred a number of times throughout the 20th century. However, (Cornford 1998, p 179) argues for the need to re-examine the historically deep-seated divisions between class and knowledge in the light of considerable changes to occupations and requisite skills.

So while occupational level or class may be part of a reasonably accurate descriptive definition of vocational education, such a definition would be contingent on the ascription of level or status in a particular society at a particular time. It also assumes that the current understanding of class is applicable to both contemporary and emerging economic developments.

Educational level

An obvious definition of vocational education is by educational level. Quebec neatly places its general and vocational colleges (collège d'enseignement général et professionnel) as stage three in a comprehensive four-tiered total system of primary, secondary, college and university (Campbell 1974, p 4), since it is not possible to proceed from school to university without first completing the CEGEP's diploma of collegial studies (diplôme d'études collégiales) (Quebec 2001). However, this neatness is unusual.

At least until 1993 programs that led to skilled worker level in social work, commerce, agriculture and forestry in Austria were offered in secondary schools to students from the age of 15, and even now not all these programs have been transferred to *Fachhochschulen* (tertiary vocational education institutions) (Pechar 2004a, p 37) and nurse training is still offered at secondary level in Germany. While vocational education had been transferred to tertiary education institutions earlier in most countries, there was nonetheless frequent equivocation, particularly in the early years, over whether vocational education is truly tertiary education (Jakupec & Roantree 1993, p 151). This led the sector's heads to try to define a level of occupational education which would differentiate such preparation for employment from secondary occupational programs and from those of special postsecondary schools (Medsker & Tillery 1971, p 60). Many vocational programs assume an educational level of ten years of formal schooling, which suggests that at least many vocational courses are secondary in level (McLure 1965, p 238; Murray-Smith 1965, p186). Thus Medsker (1960, pp 54-5) argues that not all occupational training in two-year colleges is at a semi professional level. In his view it takes on the characteristics of trade training such as is frequently offered by high schools.

This leads some to argue that vocational education should be defined by students' achievement upon their exit rather on their entry to the sector (Williams 1965, p 75) but this is hardly satisfactory. Venables (1978) took a longer view. He (Venables 1978, p 15) argued that the then 'present overlap between secondary schools and technical colleges is likely to be a transient problem and there are sound psychological considerations for making the attainment of adult citizenship at 18 in an unambiguous educational way, that is by eligibility for entry to tertiary institutions'.

This view seems to have been supported by experience. While the traditional locus of vocational education in the US has been high schools, secondary vocational enrolments declined substantially since the second half of the 20th century (Hermann et al 1976, p 6). The institutions that educate and train people for employment have grown in number and complexity over the past 30 years (Grubb 1996, p 30). Increasingly

vocational education takes place in post-secondary institutions including community colleges, technical institutes and area vocational schools (Grubb 1996, p 57).

Even if vocational education's lower boundary is now secure, its reach at the upper level is contested. One history of vocational education is the development of upper levels of technical education which are progressively transferred to upwardly mobile institutions and sectors, a history which is shared at least by the UK (Hyland 1999, p 27), Australia (Goozee 1993, p 7) and New Zealand. Thus Pratt (1970, p 33) noted in Britain the continuing shifting of responsibility for lower level programs as colleges aspired to higher status and therefore concentrated on higher level programs.

In Australia in the period of the implementation of the Martin report from 1964 the technical education sector lost many of its technology programs, initially to the universities and later to the colleges of advanced education and institutes of technology (Jakupiec & Roantree 1993, p 155). Following adoption of the Kangan report in Australia in the mid 1970s there was a contest between the technical and further education sector and the advanced education sector over associate diploma level qualifications (ACOTAFE 1975, p 109) which advanced education won (TAFE Commission 1976, p 100; Goozee 1993, p 6). Currently the Australian qualifications framework has an overlap between vocational education and training and higher education in responsibility for diplomas and for advanced diplomas (AQFAB 2001) which at least some technical and further education commentators fear will result in higher education again taking over their more popular upper level programs.

Medsker and Tillery (1971, p 60) noted attempts by leaders of US community colleges to establish a distinctive place between secondary and other post secondary schools but this has generally failed. In most US states community colleges have two roles: vocational education, which is shared with a plethora of other secondary and post-secondary institutions; and offering the first two years of baccalaureates, which is shared with four-year colleges and universities. This dual role places community colleges at an ambiguous level in US education.

Even community colleges' transfer role in providing the first two years of baccalaureates does not ensure that all community colleges are considered to be unambiguously of higher education level since many do not offer sufficient transfer subjects to qualify students to transfer to a four-year institution. So while vocational education may occupy a distinctive place amongst some educational sectors in some jurisdictions at some times, this is variable and contingent: it is different in different jurisdictions at any one time, and changes within many jurisdictions over time.

Cognitive level

Stevenson (1998a, p 135) refers to Engeström's (1994) hierarchy of learning: first order learning (conditioning, imitation and rote learning); second order learning (trial and error or learning by doing and problem solving or investigative learning); and third order learning (questioning and transforming the context or community of practice). This is sometimes mapped to educational levels, with vocational education said to involve first and second order learning and higher education involving second and third order learning and the development of Schön's critically reflective practitioner.

UNESCO's (1997) international standard classification of education makes a related distinction between the programs that give 'access to professions with high skills requirements (e.g. medicine, dentistry, architecture, etc.), and those programs which are practical/ technical/ occupationally specific' and which by implication have low skill requirements. But this section has already noted Stevenson's (2003) questioning of the distinction between levels of expert practice used to support the differentiation of professional from vocational occupations and therefore educational programs.

Pragmatic

Having failed to find an analytical or principled definition of vocational education, many people resort to a pragmatic definition of vocational education, one that seeks to state actual practice. The first pragmatic definition of vocational education is residual, that which is left over from the specification of the other sectors.

Residual – not elsewhere included

In many jurisdictions vocational education is the last sector to be established formally. It is therefore sometimes made up of the parts of post compulsory education left over from previous structurings. Thus Cotgrove (1958, p 194) observed that ‘The role of technical colleges in the educational system can be seen to be a changing and unstable one. They have acted historically as a residual category – making up the educational deficiencies of the primary and secondary system, providing vocational training rejected by the universities, meeting the need for an intermediate level, and of those who, for a variety of reasons, wished to pursue a university course in a technical college’.

Vocational education has been described as the ‘residual sector’ (Williams 1979, p 752), as ‘not elsewhere included’ (Wood & Boyd 1982, p 90), ‘non university sector’ (OECD 1991), education which is not secondary or higher education (Stevenson 1998a, p 155), as ‘filling in the gaps or complementing the provisions of other sectors of education’ (Batrouney 1985, p 134, cited in Anderson 1998, p 23) and as ‘that bit of education and training that is not schools or universities’ (ANTA 2002a, p 4). In the United Kingdom ‘the further education sector may be described as the “ragbag” into which are deposited courses not provided elsewhere’ (THES 1973) and Parkes (1991, p 42) describes Britain’s further education sector as filling the gaps not filled by alternative sectors.

The Kangan committee established a mission for technical and further education in Australia from the mid 1970 to the mid 1990s, which is still influential in shaping the scope and values of the sector. But Kangan did not define an identity for the sector, as it itself acknowledged. The opening sentence of the committee’s report describes its role and that of technical and further education residually – that left over from the other sectors.

The concept central to this report is the provision of unrestricted access to post school education through government maintained or administered institutions not already assisted through the Australian Universities Commission or the Australian Commission on Advanced Education.

(Kangan 1974, p xxvi)

The Kangan committee acknowledged interest in a precise definition of technical and further education but ‘it believes that it is beyond human capacity to devise a precise definition of technical or further education that would stand the test of time’ (Kangan 1974, p 2). Hence Abbott & Doucouliagos (1999, p 6) observe that ‘TAFE in Victoria consisted of the leftover components after the creation of colleges of advanced education and secondary schools rather than as well-defined colleges catering for well-defined regions and student demands.’

This definition of vocational education as the leftovers had occurred repeatedly previously (Fooks 1994, p 38). Similarly, part of the definition of vocational and technical education in the US federal education code is that it prepares individuals ‘for careers (other than careers requiring a baccalaureate, master’s, or doctoral degree)’ (Legal Information Institute 2002).

Status quo

The initial residual understanding of vocational education readily develops into another pragmatic construction of identity, the status quo: what happens to be the arrangement in a particular place at a particular time. Thus Cotgrove (1958, p vi) wrote ‘Technical education has been defined, therefore, for the purposes of this study, as those forms of education which have been included in the administrative conception of technical education in England’. Arrangements are commonly identified by institution: the vocational education sector is what the institutions identified as vocational education institutes do. The institutional construction of identity has also been proposed as an analytical basis for the sector’s identity (Williams 1979, p 752; Grubb & Ryan 1999, p 11) and has been adopted by the sector’s coordinating body in Australia (Carnegie 2000, p 23). Arrangements are also commonly identified by program. The programmatic construction of vocational education identifies the sector by a characteristic set of programs.

As will be seen, in Australia the institutional construction of vocational education largely coincides with the programmatic construction of the sector. But this coincidence is unnecessary, and indeed is unusual in English-speaking countries. In Canada, the UK and the US vocational education institutions offer higher education programs in addition to vocational education programs; and in these countries and in Australia there are higher education institutions that offer vocational education programs.

The pragmatic construction of vocational education's identity is considered a strength by some writers. In a paper descriptively titled 'Chameleon or phoenix: the metamorphosis of TAFE' Anderson (1998, pp 6-7) charted the changes in the identity of Australian technical and further education 'which to date have threatened TAFE's survival as a distinct sector of education and training'. Nonetheless, Anderson considers vocational education and training's adaptation to contemporary needs and circumstances to be a strength.

The institutional construction of identity is unproblematic if practice is consistent, at least within the jurisdiction of interest if not internationally, and if it is consistent with other constructions of identity. However, this is rarely the case and is of little use to a comparative study since practice varies so greatly between jurisdictions.

Discussion of the definition of 'vocational education'

Thompson (1973, p 105) observed that a major influence on vocational education is the definitions that have been applied to it and that have given it meaning and substance. This is a specific application of Bourdieu's argument that even the act of identifying and naming a group, and one may infer by extension an activity, exercises control over that activity –

To give a name, one single name, to an individual or group of individuals . . . is to adopt one of the possible viewpoints towards them and claim to impose it as the single, legitimate viewpoint. What is at stake in the symbolic struggle is the monopoly of legitimate nomination, the dominant viewpoint which, in gaining recognition as the legitimate viewpoint, causes its truth as a specific, situated, dated viewpoint to be misconstrued. Thus, to escape the danger of polemical recuperation, we might think of designating each of the

sectors of the space by a plurality of concepts designed to remind us that each of the regions of the space can, by definition, only be conceptualised and expressed in its relation to the others . . .

(Bourdieu 1988 [1984], p 26)

Nonetheless, to most people vocational education's lack of a clear identity is a weakness. (Goozee (1993, p 6) observes that 'To some extent, technical education in Australia had to be self-defining and it therefore lacked the immediate recognition of roles and structures that characterised both the school and higher education sectors.' Clark (1973, p 329) warned that 'The non-universities will fail us if they evolve only as carbon copies of the past or as institutions that zig and zag with the opportunism of the moment. A firm self-concept is essential to their promising new role in society.'

Stevenson (1998a, p 155) argues that 'one of the most problematic issues for vocational education and training is the achievement of a positive purpose (subject to constructive criticism), characterised by clarity, coherence and continuity'. Vocational education's lack of a secure identity (Goozee 1993) is one possible explanation for its defensiveness in its relations with higher education (Rushbrook 1997, p 109; for a prominent Australian example see Schofield 1998, 2000b). It is also arguably an obstacle to building the seamless web of post compulsory education that is considered necessary to support lifelong learning (Wheelahan 2000; Temple 2001).

There are a number of difficulties with founding vocational education's identity on a single characteristic. This chapter has found that no single characteristic consistently identifies vocational education in different jurisdictions or even in the same jurisdiction over different historical periods. Since a characteristic used to identify vocational education at one time has had to be changed as vocational education itself adapted and changed, it is unlikely that any single characteristic identified now will be adequate to encompass the next historical shift. It may not even be desirable to fix vocational education on a single characteristic since this may introduce a rigidity which thwarts the very changes in society and the nature of work for which vocational education is meant to be stimulating and equipping communities.

A characteristic such as Rushbrook's (1997, p 104) 'abstracted institutional teleology' or Stevenson's (1998a, p 155) 'positive purpose . . . characterised by clarity, coherence and continuity' would overcome many of these difficulties. But it has not been possible to identify such a purpose of sufficient generality to encompass vocational education even in the jurisdictions we have considered while at the same time being sufficiently precise to delineate it from other forms of education. Neither has it been possible to found a purpose that encompasses vocational education's past, let alone being a guide for the future.

Yet vocational education is clearly identified when observed on many occasions, presumably using Wittgenstein's (1968) family resemblance. An alternative approach is therefore to establish vocational education's identity not on a unique characteristic, but on a unique combination of characteristics. Bourdieu (1988 [1984], p 26) made a similar point.

In its 1996/7 annual report the Australian federal government's vocational education body described vocational education and training as 'post-compulsory education and training that provides people with the skills and learning required by enterprises and industries' (ANTA 1997, p 8), thus combining characteristics of educational level, content and purpose. The Smith-Hughes Act of 1917, which was the first US federal Act to fund vocational education, used a compound definition of vocational education (Campbell 1974 p 107); and the current US federal legislation defines vocational and technical education as a combination of several characteristics (Legal Information Institute, 2002), an approach that has been followed by the Texas Legislative Council (2001) amongst others.

Wellington (1993) argues that vocational education is technocratic, specific, practical and managerial; while general education is democratic, egalitarian, critical and collaborative, and Stevenson (2000, p 512) assembled a dozen pairs of vocational and general education dualisms. White (2001) observes of Ireland that 'the characteristics of those [technical] colleges have been identified as a) the provision of course programs of shorter duration than universities, b) the practical orientation of curricula, c) responsiveness to industry and business, d) limited ranges of subjects mostly in engineering and business studies, e) little, or only applied research and f) heavy teaching loads for faculty.'

These compound definitions are rather too specific, and it is unclear whether an activity needs to have all the characteristics precisely to be considered vocational education. The better approach is to define vocational education by the four general characteristics we have considered – epistemological, teleological, hierarchical and pragmatic. Thus, one may consider vocational education to be the development and application of knowledge and skills for middle level occupations needed by society from time to time.

This definition relies on the concept of applied knowledge as if Aristotle's notion of art or applied science (*techne*) is adequate, which it clearly isn't without elaboration. It also locates vocational education by occupational level thus making it subject to shifts in occupational hierarchy and economic structure. While it would be more satisfying to locate vocational education by educational level, this is probably the preference of an educationalist not shared by employers, workers and government.

For the purposes of a comparative study it is necessary or at least highly desirable to adopt a terminology that is used commonly, and preferably in the jurisdictions being compared. This study adopts UNESCO's (1997) international standard classification of education revised in 1997 (ISCED-97) since it is useful and widely accepted. The next and last section of this chapter maps the compound definition of vocational education proposed above to UNESCO's international standard classification of education.

'Tertiary education' and its subdivisions

Tertiary education is not defined directly in the international standard classification of education. However, it is described in OECD publications. Alexander (1998) defined tertiary education as 'A level or stage of studies beyond secondary education . . .' and Skilbeck and colleagues (1998, p 14) describe tertiary education sequentially as the next stage after primary then secondary education. They (Skilbeck, Wagner & Esnault 1998, p 14) define this as progression not only in academic terms but also include experience and maturity. The Australian Commonwealth's higher education division (2000, para 1.2) defined tertiary education mainly as a distinctive stage or level of education beyond secondary.

UNESCO introduces a subdivision of tertiary education in ISCED-97. This distinction is based on 2 elements: theoretical/practical and profession/trade.

84. The first dimension to be considered is the distinction between the programmes which are theoretically based/research preparatory (history, philosophy, mathematics, etc.) or giving access to professions with high skills requirements (e.g. medicine, dentistry, architecture, etc.), and those programmes which are practical/technical/ occupationally specific. To facilitate the presentation, the first type will be called 5A, the second, 5B.

(UNESCO 1997, para 84)

The OECD (2001) adopted a similar subdivision of tertiary education in *Education at a glance*. While this compound definition of vocational education is somewhat different analytically from that proposed above, each compound definition specifies a very similar if not completely identical group of programs, and so is satisfactory for the purposes of the present study. ISCED level 5A programs have a minimum cumulative theoretical duration (at tertiary) of three years' full-time equivalent, although typically they are of 4 or more years (OECD 1997, para 87). Tertiary-type B programs are of shorter duration, a minimum of 2 years' full-time equivalent duration but generally is of two or three years (OECD 1997, para 90).

'Higher education'

As Geiger (1992, p 1031) observes 'similar names may conceal quite different realities from one country to another', and an example is the term 'higher education'. In the US higher education refers to ISCED levels 5A and 5B and the institutions that offer them. Thus two-year or community colleges and (many of) their programs are included in all discussions of higher education, in descriptions of higher education systems and in higher education statistics. However, common Australian use restricts higher education to ISCED level 5A programs; tertiary-type B programs are commonly considered to be vocational education and therefore, it is assumed, not higher education. This leads to

some ambiguous if not inconsistent use, even within Australia. Two stark examples are diploma and advanced diploma programs.

Diploma and advanced diploma programs offered by higher education institutions are funded by the Commonwealth Department of Education, Science and Training and are included in the department's higher education statistics (DEST 2001). Advanced diploma and diploma programs offered by vocational education and training providers are funded by the Australian National Training Authority and State authorities and are included in the National Centre for Vocational Education Research's statistics.

In 2001 publicly funded vocational education and training had 18,520,000 annual hours at Australian Qualifications Framework advanced diploma level and it had 56,760,000 annual hours at AQF diploma level, totalling 75,280,000 annual hours (NCVER 2001, p 22). Annual hours may be converted to equivalent fulltime students by dividing by 720 (Williams 1979, p 55), giving 104,556 equivalent fulltime students at diploma and advanced diploma levels. This is almost 20% of total publicly funded vocational education and training load. By contrast in 2001 there were only 6,391 equivalent full time student units enrolled in diploma and advanced diploma level courses in higher education institutions, which was only just over 1% of total load in higher education institutions (DEST 2002a, table 46).

TABLE 3.1: STUDENT LOAD IN DIPLOMAS AND ADVANCED DIPLOMAS AND AS A PROPORTION OF ALL LOAD IN VOCATIONAL EDUCATION AND TRAINING AND HIGHER EDUCATION INSTITUTIONS

Diplomas and advanced diplomas	Vocational education and training	Higher education
Student load	104,556 efts	6,391 efts
Proportion of all student load	19.9%	1.1%

Sources: National Centre for Vocational Education Research (2001) Australian vocational education and training statistics 2001, table 18; Department of Education,

Science and Training (2002a) Students 2001: Selected higher education statistics, table 46.

Some 94% of all diploma and advanced diploma student load is therefore currently enrolled in vocational education and training institutions (Moodie 2003, p 47). Higher education institutions' offering of diplomas and advanced diplomas is therefore mostly overlooked and these programs are commonly considered tertiary-type B programs, or vocational education and training in common Australian terms. If diplomas and advanced diplomas offered by higher education institutions are considered at all it as equal to but different from diplomas and advanced diplomas offered by vocational education and training institutions (AQFAB 2001; ANTA 2002). Because the term 'higher education' is ambiguous at least across jurisdictions it is not used in this description of sectoral arrangements.

The next chapter will start the third step of the method adopted for this thesis, of classifying observations of vocational education as it has been defined for the study. It will observe a congruence of several characteristics of vocational education which will allow the thesis to escape, for the present study if for no bigger purpose, the definitional problems rehearsed in this chapter.

4 Four wealthy Anglo countries

This chapter starts with a brief description of tertiary education in Australia. It then describes the other jurisdictions used for comparison. Since the most similar systems design has been adopted for the study arrangements in Australia will be compared with tertiary education systems that are similar, but which nevertheless have different characteristics which will be the key points compared. The comparators are wealthy Anglo countries: Canada, the UK and the US.

Neave (2001, p 274) argues that international comparisons of higher education should be ‘situated within the broader, national setting, historical or political context within which they have to operate and which most certainly shapes, where it does not determine, the way in which such procedures, not to mention their *raison d’être*, are rooted, function and sometimes, dysfunction!’ Arguably the country descriptions should be very broad, since as Keep (1991, p 33) points out a very broad range of factors influence vocational education such as the organisation and functioning of the labour markets it serves. He says that factors such as the degree to which companies operate internal labour markets rather than rely upon external occupational labour markets are of crucial importance in structuring the shape and nature of vocational education. Additional relevant factors noted by Keep (1991, p 33) are the relationship between qualification and employment, the remuneration systems, the nature of industrial relations including the extent to which training is the subject of collective bargaining, work organisation, and the historical circumstances and processes of industrialisation.

However, only the most salient factors such as the nature of occupational regulation will be included in this overview. Other factors will be noted where they are directly relevant.

Australia

Australia is a sparsely populated English-speaking first world country located on the south west of the Pacific rim whose neighbours are densely populated developing countries of diverse Asian and Pacific cultures. Much of its past is in the UK, but many see its future in the US (Pascoe 2001).

Geography

Australia is 7.7 million square kilometres, a little smaller than the US's 48 contiguous states (CIA 2003), located between latitudes ten and 42 degrees south, at about the same latitude as southern Africa and the middle of South America. Australia's population is only 20 million people and so it has 2.6 people per square kilometre, less than Canada's 3.3, a tenth of the US's 30.4 and 52 times less than China's 135 people per square kilometre. Most of Australia is flat and dry, with a mostly temperate fertile coastal strip of up to 500 kilometres wide. 83% of Australia's population lives within 50 kilometres of the coastline and almost 80% live in cities and major towns (Australian Bureau of Statistics 2001b). Australia's geography is similar to Canada's with a big population centre on the south west coast separated by a large desert from the major population centres on the east coast. However, Australia's desert is hot and dry, while Canada's is of course frozen.

Australia was settled from 40,000 to 60,000 years ago, possibly in successive waves of migration that ended from 15,000 to 20,000 years ago. From about 2,000 years ago Tre pang fishers from the Makassan straits in present day Indonesia visited the northern coast of Australia for several months each year until they were outlawed by the newly federated Australian Government in 1906, and people from the north still fish in Australian waters. Migrations have continued until the present, alternately subsidised and suppressed by Australian governments.

Australia was forcibly settled by the British in 1788 who over the next century drove Indigenous peoples from their lands. For most of the period since then Australia's economy has been based on primary industries: initially wool, gold and wheat; and

more recently coal (exports now valued at \$9.3 billion), iron ore (\$3.8 billion), wheat (\$3.4 billion), beef and veal (\$2.9 billion), petroleum and other gases (\$1.7 billion) and cotton (\$1.6 billion) (Commonwealth of Australia 2000). Since world war II Australia developed agricultural and mining processing industries and mostly import-replacement manufacturing industries.

Since the oil shocks of the 1970s Australia has undergone industrial restructuring, in common with other industrialised countries, and Australia's economy has diversified into service industries, including education which attracts large numbers of international students. Education, professional, communications, insurance and financial services exports totalled \$8.4 billion in 1998-99 and tourism now accounts for 14% of Australia's total export earnings and is Australia's leading services export (Commonwealth of Australia 2000).

Most of Australia's population of 20 million is concentrated in two widely separated coastal regions. By far the largest of these in area and population is in the south-east and east around Australia's biggest cities Sydney and Melbourne. The smaller of the two regions is 3,000 kilometres distant in the south-west of the continent around Perth. In both coastal regions the population is concentrated in urban centres, particularly the State and Territory capital cities. Half the area of the continent contains only 0.3% of the population, and the most densely populated 1% of the continent contains 84% of the population (Australian Bureau of Statistics 2001a). Australia's biggest cities are Sydney (4 million), Melbourne (3.4 million), Brisbane (1.6 million), Perth (1.4 million) and Adelaide (1 million) (Australian Bureau of Statistics 2001a).

While 23% of Australia's population was born overseas, the large majority of Australia's population is white: 13% of Australians were born in Europe and the former USSR, 6 % in the UK, 5 % in Asia, 2% in Oceania, 1% in the Middle East and North Africa, and less than 2% in other regions. Indigenous Australians are some 2.5% of the population. 17% of Australia's population speak a language other than English at home. Australia has an annual gross domestic product of \$528 billion (purchasing power parity) or \$27,000 per capita (purchasing power parity) (CIA 2003).

Tertiary education overview

Australia's tertiary education is divided into two sectors: higher education and vocational education and training. Most students are enrolled part time in vocational education and training. Australia has an unusually low proportion of full time vocational education and training students (6% of Australian VET students study full time compared with 35% in the UK, 37% in the US and a very high 82% in Canada).

TABLE 4.1: TERTIARY EDUCATION ENROLMENTS BY SECTOR, AUSTRALIA, 2002

	Vocational education and training		Higher education		TOTAL
	Enrolments	% of total	Enrolments	% of total	Enrolments
Part time	1,530,300	59%	322,041	12%	1,852,341
Full time	159,900	6%	574,580	22%	734,480
TOTAL	1,690,100	65%	896,621	35%	2,586,721

Sources: NCVER (2002) table 3, page 4; DEST (2003), table 25.

However, the relatively light study load taken by a very large number of Australian part time vocational education and training students gives a misleading impression of their significance. Another perspective can be gained by considering students' study load. Study load is recorded in higher education as equivalent full time student units, and these are used in the following table. Student study load is recorded in Australian vocational education and training as annual contact hours. These are the total nominal hours of student learning supervised by a vocational education provider. The Williams Committee (1979, p 55) posited that a normal full time study load for a vocational education student was 720 hours per annum. This works out at 26 hours of supervised learning over two semesters of 14 weeks each. The Department of Education, Science and Training still regards a normal full-time study load as 720 student contact hours in a year (Knight & Nestor 2000, p 19). Annual contact hours may therefore be converted to equivalent fulltime students by dividing by 720. This shows that part time vocational education and training students comprise only 28% of total tertiary education load; as with other countries, the biggest tertiary education study load in Australia is taken by full time higher education students.

TABLE 4.2: TERTIARY EDUCATION STUDENT LOAD BY SECTOR, AUSTRALIA, 2002

	Vocational education and training		Higher education		TOTAL
	Load	% of total	Load	% of total	Load
Part time	319,385	28%	154,468	14%	473,853
Full time	180,006	16%	472,281	42%	652,287
TOTAL	499,364	44%	626,749	56%	1,126,113

Sources: NCVER (2002) table 3, page 4; and load from DEST (2002) applied pro rata by full/part time from proportions in DETYA (1998) Table 44. Student load (EFTSU) for all students by State, institution, type of enrolment and gender, 1998.

Higher education

What is called higher education in Australia has been long dominated by the 37 public universities. Australian higher education also includes two minor private universities and five specialist public academies which together enrol 0.5% of total student load, and 84 private non-university providers. Most of the private non-university providers are professional and industry associations (33% of private student load), theological colleges (17%) and providers of single disciplines (28%) (Watson 2000, p viii). Private universities and non university higher education providers enrol 3.4% of total student load (Watson 2000, p vii), but these are likely to grow in size for at least as long as the conservative Coalition parties are in government.

Universities range in size from 3,000 to 30,000 equivalent full time student units, with an average of 14,000 eftsu. 17% of university student load is in postgraduate courses. 59% of students study full time on campus, 28% part time on campus and 14% part time externally (DETYA 2001). Eight of the generally oldest and biggest capital city universities have formed themselves into a group of research-intensive universities. The Australian group of 8, like the UK Russell group, has no formal standing, even

within the Australian vice-chancellors' committee. However, it has a small secretariat and is a useful grouping for some purposes and will be used in this study.

Five universities which originated as capital city technology institutes have formed themselves into the Australian technology network, six universities established in the 1960s and early 1970s have formed a group, many of the universities established after 1988 have formed a group, and there is a looser association of regional universities. There is also an informal distinction between institutions that were established as universities before 1988 and those that were designated universities after 1987 when the former binary divide between university and advanced education was dismantled.

Universities are governed by councils or senates with typically from 15 to 30 members, one third of whom are typically internal to the university: the vice chancellor as chief executive officer and staff and student representatives. All but one university is established by State or Territory Acts of Parliament and they are formally accountable to their State or Territory legislatures. While this remains important for some matters, almost all universities' public funding comes from the Commonwealth Government from which derives considerable albeit formally indirect power.

The Commonwealth established a national funding and planning framework in 1988, the unified national system of higher education, which seeks to fund universities according to their 'merit and achievement rather than historical precedent and arbitrary classification' (Dawkins 1988, p 10). While a number of leading scholars have claimed that the unified system imposes a uniformity on the sector (eg Meek & Wood 1997; Meek 2000), this view is not shared by all commentators (Gallagher 2001). Universities nonetheless have considerable autonomy in comparison with other countries (Anderson & Johnson 1998; Gallagher 2001). In December 2003 the Australian Parliament passed the *Higher Education Support Act 2003* which, amongst several other changes, allows institutions to charge variable fees up to a maximum for most places supported by the Commonwealth and offers loans guaranteed and subsidised by the Commonwealth for full tuition fees for private places in public and private institutions.

Vocational education and training

The other sector of post secondary education is technical and further education, now called vocational education and training to include private providers. The sector comprises 85 public TAFE institutes offering courses on 1,100 campuses, community providers on over 1,000 centres, and 2,500 private providers receiving public funds. Five universities are dual sector institutions, having substantial student load in both higher education and vocational education and training. All these institutions have their origins in technical colleges, all but one in the late 19th or early 20th century. These institutions retained their lower-level work while acquiring baccalaureate-granting and then doctoral-granting status, unlike other former technical colleges which discarded their lower level programs as they acquired the right to offer higher level degrees.

As may be expected from the very high proportion of part time students, 67% of vocational education and training students study while employed. 20% of vocational education and training students are studying programs that prepare them for work or further study, about 60% are studying for a qualification to enter the workforce as a skilled or semi skilled worker although not necessarily for vocational reasons, and about 20% are studying to upgrade their entry-level qualifications (National Centre for Vocational Education and Research 2000).

75% of vocational education and training students are enrolled in public providers. The vocational education and training sector receives 73% of its public funding from Australia's eight State and Territory Governments. The balance is provided by the Commonwealth Government which has established a national vocational education and training framework which achieves considerable comparability between jurisdictions, although important administrative differences remain.

Public vocational education and training providers are funded and to varying extents planned and managed through State and Territory Government departments. Publicly funded vocational education and training programs are required to conform to the national training framework which specifies training packages and national recognition of all qualifications that conform to the framework. Training packages specify the

competencies that a person must achieve to be awarded a registered qualification and the assessment guidelines that must be used to assess whether candidates have achieved the required competencies. But training packages do not specify the content of the learning experience nor the learning-teaching method or duration (ANTA 2001). The national training framework was established in 1998 and there are still some variations between the jurisdictions in the way it is administered.

The current conservative Coalition federal government has sought to develop the size and importance of private vocational education and training providers. It has required a proportion of public funding to be allocated in a competition open to private providers and some conservative State/Territory governments have specified that a proportion of the competition be won by private providers. The federal government has also introduced what it calls 'user choice' in its funding of apprenticeships which facilitates employers providing apprenticeship training themselves or allocating it to a private or public provider of their choice. These policies have had mixed success. The number of private providers has grown and they have been allocated an increased proportion of public funds. But a series of evaluations reported serious concerns with quality and some even with probity (Schofield 1999a, 1999b, 2000a), private providers remain only a small part of vocational education and training and few offer programs outside one specialisation.

The Commonwealth Government has been concerned to ensure that workplace based education does not wither as the traditional industries for which the older apprenticeships are required disappear or are greatly reduced in size. It has therefore developed new apprenticeships to introduce workplace based training to newer occupations. The NSW vocational education and training accreditation board lists 607 declared traineeships in areas such as community services, entertainment, information technology, office administration and tourism.

Apprenticeships and traineeships may be taught entirely on the job, perhaps but not necessarily involving technical and further education institutes to assess competencies. They may equally have periods of off the job training, as typically the apprenticeships do, which is usually but not necessarily taken at TAFE institutes. In 2000 there were 290,000 apprentices and trainees or about 18% of all publicly funded vocational

education and training students. The balance of vocational education is provided by the arrangements described above.

Most recently the Commonwealth Government has sought greater involvement in vocational education and training by abolishing the Australian National Training Authority which was established jointly with the States and Territories in 1992 and transferring its responsibilities to the Commonwealth Department of Education, Science and Training (Howard 2004). The Commonwealth also foreshadowed establishing Australian technical colleges and funding them directly rather than through State and Territory departments of education and training (Coalition 2004b) and an institute for trade skills excellence headed by employers which would accredit vocational education programs and providers as one of several changes to make the system ‘industry-led’ and to give employers greater control over the outcomes as well as the inputs to vocational education and training (Coalition 2004a).

Historical antecedents

Vocational education and training institutions were established in Australia from the late 19th century, but they weren’t understood as a sector until the Kangan report of 1974. Vocational education and training institutions were a diverse range from single purpose to comprehensive institutions offering a range of qualifications from certificates to diplomas. Of those the older central technical colleges, which were the origins of the Australian technology network universities amongst others, had a plural role which included offering highly respected and high level conceptually based qualifications accessed by qualified tradespersons such as diplomas of mechanical and electrical engineering (Stevenson 1988b, p 132; 2003). The technical colleges were also multi purpose, teaching at a variety of levels, and many in a wide range of areas (Partridge 1968, p 163).

All Australia’s tertiary education institutions had general roles until 1965. Thus in 1939 some 15% of Australian university students were enrolled in subgraduate programs including undergraduate certificates (DEET 1993, p 5) and in 1979 some 21% of higher education students were enrolled in diplomas, associate diplomas and other subgraduate

programs (DETYA 1996, table 5.1). Australian vocational education and training institutions had struggled for control of diplomas and advanced diplomas since their foundation (Goozee 2001, p 7). In 1961 the Australian Government established the Martin Committee (1964) inquiry in 1961-4 into the future of tertiary education in Australia. The older central technical colleges proposed to the committee that they be established as a second sector of tertiary education with the dual roles of skills development and providing 2-year higher education programs, associate diplomas and diplomas.

However, the committee declined to accept that proposal and recommended instead that the teachers' colleges and the bigger and broader technical institutes be established as a new sector of colleges of advanced education with the diploma as their highest and distinctive qualification (Davis 1989). Universities were enjoined to relinquish their diplomas and concentrate on higher level study and research training, which was to be their distinctive role. With some exceptions or anomalies in Sydney and WA, the vocational colleges were restricted to sub diploma programs (Davis, 1989; Goozee, 2001: 7; ACOTAFE, 1975: para 5.69; CTEC, 1986: para 6.113). By 1977 diplomas were only 0.7% of vocational education's enrolments, 3% of university enrolments, but were 44.6% of advanced education enrolments.

TABLE 4.3: PROPORTION OF ENROLMENTS IN DIPLOMA LEVEL PROGRAMS IN UNIVERSITIES, COLLEGES OF ADVANCED EDUCATION AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS, 1977

Vocational education and training	Advanced education	Universities
2.6%	90.4%	7.1%

Source: Williams (1979, p 20) tables 1.1 and 1.7.

Advanced education's dominance of diploma level enrolments in 1977 was the result of its taking over diplomas from technical colleges (ACOTAFE 1975, para 5.69; Goozee 2001, p 21), which was given considerable impetus by the Commonwealth's decision to fund all these courses fully if offered in advanced education. As the Technical and

Further Education Commission (1976, para 5.59) observed at the time, the States and Territories were able to shift costs to the Commonwealth by shifting diploma level programs from vocational education and training institutes for which the States and Territories had sole financial responsibility to colleges of advanced education to which the Commonwealth made a much greater financial contribution. However, the Commonwealth continued to fund some diplomas offered by vocational education and training institutes, and a decade later the Commonwealth Tertiary Education Commission (1986, para 6.113) noted that a number of institutes in NSW, Queensland and Victoria were offering diplomas.

The Australian qualifications framework reflects the historical legacy of higher education institutions offering sub baccalaureate diplomas and advanced diplomas. It locates diplomas and advanced diplomas ambiguously, as both vocational education and higher education qualifications to buy a peace, however uneasy, in the sectoral contest over the qualifications.

TABLE 4.4: AUSTRALIAN QUALIFICATIONS FRAMEWORK

Schools	Vocational education and training	Higher education
Senior secondary certificate of Education	Advanced diploma Diploma Certificate IV Certificate III Certificate II Certificate I	Doctorate Masters Graduate diploma Graduate certificate Bachelor Advanced diploma Diploma

Source: Australian qualifications framework 2002, table 1

The establishment of the advanced education sector as a second general sector of higher education in 1964 by implication left vocational education with a specialised role in developing skills for industry. Since then Australia, like much of continental Europe, has confined its vocational education institutions to developing occupational skills. In the mid 1970s Kangan (1974) established vocational education and training's role in further education on the principles established in UNESCO's landmark 1972 report *Learning to be: the world of education today and tomorrow — the right of all people to education and lifelong learning* (Chappell 1999, p 6). However, from 1994 the Australian National Training Authority (2003a) has narrowed Australian vocational education's role again, specifying the sector as 'industry-led'.

Occupational regulation

When the state regulates a vocation it very often specifies an educational requirement, which in turn establishes and often structures a formal education provision. The extent and nature of occupational regulation therefore has an important effect on tertiary education. Almost every occupation regulated in Australia is regulated by each State or Territory. Exceptions are aircraft and ship pilots, who are registered by the Commonwealth. While historically there have been distinct differences between jurisdictions' occupational regulation, there has been a convergence of standards, processes and recognition over the last five to ten years. Annoying differences remain, but the arrangements for Australia's largest State New South Wales are a fair representation of the arrangements of the other States.

New South Wales has separate Acts to restrict practice to registered practitioners of 19 occupations. These are mostly the higher status occupations such as architects, medical practitioners and surveyors, but also include some newer occupations such as driving instructors, private investigators and real estate valuers. Section 21 of the *Industrial and Commercial Training Act 1989* gives the relevant minister power to designate any occupation a declared trade or calling. Section 24 of the Act prohibits persons under 21 from being employed in declared trades unless they are engaged as apprentices.

The NSW vocational education and training accreditation board lists 111 apprenticeships from aircraft maintenance engineering to wood machining. It is effectively impossible to practice many of these trades without having completed an apprenticeship, either because of another legislative provision proscribing unqualified practitioners or a requirement imposed by employers, unions or both. In addition there are various licensing requirements for businesses such as tow truck operators and travel agents, which are also effectively occupational regulations. In other occupations there are high proportions of unqualified practitioners, driven largely by a high demand for skilled labour. Unions are often unable to regulate entry to the workforce because they are competing with other unions that have coverage of all or part of their work.

Recent developments in tertiary education

Australian governments structure tertiary education in two different and seemingly divergent if not contradictory ways. Governments have long structured tertiary education directly through regulation and making specific decisions. More recently Australian governments have taken to structuring the system indirectly through its creation and structuring of various markets in tertiary education.

Instances of the first trend are the Commonwealth and State governments' funding of a proliferation of new campuses in regional communities and on the fringes of the big cities. Often these campuses involve two and sometimes three of the four post compulsory education sectors: secondary education, vocational education and training, higher education, and adult and community education. At the same time the Commonwealth Government has established mechanisms to concentrate its funding of research and research training on high performing departments and institutions. The Commonwealth Government plans and funds higher education within a firm if sparse national funding and planning framework, and publicly funded vocational education is required to conform to the national training framework managed jointly by the Commonwealth, State and Territory governments.

Overlayed above all these Commonwealth and national directive mechanisms is extensive if in some areas circumscribed competition between institutions, and arguably increasingly between the sectors. All earmarked funding for research and research student places are now allocated competitively in one way or another, 70% of graduate coursework students are funded entirely from tuition fees and hence in a competitive market, 17% of higher education student load is generated from international students and hence in a competitive market, 7% of domestic undergraduate students are funded entirely from tuition fees and hence competitively, and an estimated 12% of public vocational education and training funding is allocated by 'user choice' and other competitive mechanisms. The Commonwealth Government has recently proposed even further deregulation and competition between institutions over fees (Commonwealth of Australia 2003).

Current issues in Australian tertiary education

Having introduced market competition and increased the role of private providers in tertiary education, Australian governments are now confronted with the need to introduce quality controls to reassure the Australian public and overseas students of the quality of Australian tertiary education. The Commonwealth Government with the States and Territories has accordingly recently introduced an Australian universities quality agency and the Australian quality training framework. The effectiveness of these mechanisms in ensuring quality will be a continuing issue over the next three to five years.

A broader issue for governments is channelling tertiary education to support national goals, particularly economic development. Notwithstanding the considerable changes wrought on public vocational education and training in the last five years, there is still a widespread perception amongst employers and unionists that TAFE institutes aren't sufficiently responsive to employer and community needs. The Commonwealth has sought to sidestep this issue by establishing an institute for trade skills excellence to enable employers to accredit vocational education programs and providers and by establishing and funding directly Australian technical. However, these changes by themselves won't necessarily change the public technical and further education system which provide about 80% of publicly funded vocational education and training

programs. If TAFE institutes are still thought to be unresponsive over the next few years further major changes can be expected in vocational education and training, possibly towards making a higher proportion of public funds contestable.

The Commonwealth Government's offer of loans it guarantees and subsidises for tuition fees for private places in public and private institutions and the Government's further concessions and grants to private providers is likely to have a major effect on higher education for decades to come. It is also likely to have a major although indirect effect on vocational education and training. It will be recalled that in Australia diplomas and advanced diplomas are awards of both higher education and vocational education and training. Private vocational education and training providers are getting their diplomas recognised as higher education awards so that their students can obtain Government guaranteed loans to pay for their tuition fees. This will add considerably to the attractiveness of the upper levels of private vocational education and training, and it is likely that public technical and further education institutes will have to follow if they are to avoid becoming residual providers of lower level programs.

Canada

Canada is a land of vast distances and rich natural resources. It is almost ten million square kilometres, somewhat larger than the US, mostly plains with mountains in west and lowlands in southeast. Its climate varies from temperate in the south to subarctic and arctic in the north. Approximately 85% of its population of almost 32 million is concentrated within 300 km of the US/Canada border. Canada has a GDP of \$923 billion (purchasing power parity), or \$29,400 per capita (purchasing power parity) (CIA 2003).

Canada is a federation of ten provinces and three territories. However there is no such thing as a 'Canadian system' of higher education. As Jones (1996, pp 79-81) observes, there is no federal department of education or higher education, nothing equivalent to a national policy for higher education, and there is no national standard for either secondary or higher education. Consequently higher education evolved in different ways in different provinces. Jones (1996, pp 82-3) describes all provincial systems of

tertiary education as binary structures composed of a university sector and a community college sector. Universities are relatively similar across provinces. No province has created a stratified university sector, and there is relatively ‘little in the way of specialisation by function, field of study . . . or dominant educational philosophy’ (Skolnik 1986). In addition, there is a general view that Canadian universities are roughly comparable in the quality of the programs they offer (Jones 1996, pp 84-5).

Since the Royal Commission on Industrial Training and Technical Education in 1910 the federal government has provided direct assistance to agricultural, technical and vocational education through capital grants and student financial support (Dennison & Gallagher 1986, p 15). The 1960s ‘ . . . was the great period of the Canadian community college, which, with an absence of deep-rooted traditions, and with the need to respond to quite different social, economic and geographical circumstances in each of the provinces, evolved in strikingly different forms across the various provincial jurisdictions’ (Gregor 1994, p 340). Jones (1996, pp 82-3) observes that many provinces such as Manitoba, New Brunswick and Ontario operate non-degree institutions that offer technical/vocational programs but do not have a formal university-transfer function, and that these arrangements tend to be very variable. The provinces that have non-degree institutions with a formal university-transfer or pre-university function such as Alberta, British Columbia and Quebec have created much more formal structures for coordination between the sectors.

TABLE 4.5: COMMUNITY COLLEGES IN THE PROVINCES AND TERRITORIES OF CANADA

Province/Territory	Population	College designation	Number of colleges
Ontario	11,874,436	College of Applied Arts & Technology	25
Quebec	7,410,504	Collège d’enseignement général et professionnel	48
British Columbia	4,095,934	Community College, University College	15
Alberta	3,064,249	Public College	10

Province/Territory	Population	College designation	Number of colleges
Manitoba	1,150,034	Community College	4
Saskatchewan	1,015,783	Regional College	8
Nova Scotia	942,691	Community College	1
New Brunswick	757,077	Community College	9
Newfoundland	533,761	Provincial College	1
Prince Edward Island	138,514	Community College	1
Northwest Territories	40,860	Community College	1
Yukon	29,885	Community College	1
Nunavat	28,159	Community College	1
Canada	31,081,887		125

Sources: Statistics Canada and Burtch, Brian (2002, p 50) table 1: community colleges in the Territories and Provinces of Canada, adapted from Micromedia (2002), section 9; Heritage College (2002).

Canada has one of the highest post-secondary participation rates for 18-21 year olds (Burtch 2002, p 48) and Canada is distinctive in having a very high proportion of full time students, both in universities and community colleges. 75% of Canadian tertiary education students are enrolled full time, much higher than Australia (where 28% of tertiary education students study full time), the UK (47%) and the US (58%).

TABLE 4.5: TERTIARY EDUCATION ENROLMENTS BY SECTOR, CANADA, 1998-89

	Community college		University		TOTAL
	Enrolments	% of total	Enrolments	% of total	Enrolments
Part time	91,439	7%	245,985	19%	337,424
Full time	403,516	31%	580,376	44%	983,892
TOTAL	494,955	37%	826,361	63%	1,321,316

Sources: Statistics Canada, catalogue no. 81-229-XIB; CANSIM, cross-classified tables 00580701, 00580702.

British Columbia's tertiary education most resembles the archetypal arrangement in the U.S. (Campbell 1974, p 6). Jones (1996, p 82) contrasts British Columbia's 2-year colleges which serve a transfer function with Quebec where students cannot move directly from secondary school to university but must first complete a 2 year program in one of the *Collège d'enseignement général et professionnel*. The 2-year program for students seeking to transfer to universities is a diploma of collegial studies (*diplôme d'études collégiales*) (Quebec, 2001). Bilingual Quebec is unique amongst the jurisdictions considered in this study in requiring all students to complete a short-cycle higher education program before proceeding to medium or long cycle higher education (Dennison & Gallagher 1986, p 6; Butlin 2000; Burtch 2002, p 51). Quebec achieved this neatness by a *revolution tranquille* in 1967 (Gouvernement du Québec 2001). Quebec's public colleges of general and vocational education (*Collège d'enseignement général et professionnel*) also offer a 3-year terminal vocational track (Clark 1983, p 58).

UK

The United Kingdom is 244,820 sq km and has a population of almost 60 million. Its strong national government has devolved some powers to the Scottish Parliament, the National Assembly for Wales, and the Northern Ireland Assembly. Its gdp is \$1.52 trillion (purchasing power parity) or \$25,300 per capita (purchasing power parity) (CIA 2003).

Tertiary education in the UK is divided into two sectors. There are more than 600 further education colleges which offer English language programs, some year 12 programs, vocational programs (known in the UK as career based courses), access programs and some degree programs. Higher education institutions comprise more than 50 higher education colleges and over 90 universities (British Council 2003). Universities tend to be classified by age: ancient, recent and new. An informal self-selected group of 19 'research-led' institutions have formed themselves into the Russell Group, and this is also sometimes used to group universities by research intensity.

Part time further education students are the largest group of tertiary students, but not very much larger than the next largest group, full time higher education students. These in turn are balanced by the other student categories.

TABLE 4.6: TERTIARY EDUCATION ENROLMENTS BY SECTOR, UK, 1997-98

	Further education		Higher education		TOTAL
	Enrolments	% of total	Enrolments	% of total	Enrolments
Part time	1,616,000	37%	616,000	14%	2,232,000
Full time	864,000	20%	1,193,000	27%	2,057,000
TOTAL	2,480,000	56%	1,939,000*	44*%	4,419,000

* Includes students whose level of study is unknown.

Source: National Statistics website (2002) data set ST30312.

The sectoral distinctions in the United Kingdom are more familiar to an Australian observer, but interestingly the unequivocally higher education qualifications of the ordinary baccalaureate and foundation degree are offered by colleges of further education under licence or ‘franchise’ to a collaborating university or consortium of institutions as well as by universities in their own right (HEFCE 2001b, p 4) and further education colleges have offered higher education programs in some form for a considerable time (Field 2002, p 64). Furthermore, following the adoption of the recommendation of the Dearing Committee, all higher education programs offered by colleges of further education in England are now funded by the Higher Education Funding Council for England. This covers all first degree, postgraduate, higher national diploma and certificate, diploma of higher education and certificate of education courses offered by colleges of further education (HEFCE 2001a).

TABLE 4.7: QUALIFICATIONS BY TERTIARY EDUCATION SECTOR, UK

Level/qualification	Institutional type
<i>Higher education</i>	
Doctorate	University
Masters degree, postgraduate certificate, postgraduate diploma	University
Honours degree, graduate certificate, graduate diploma	University
Ordinary degree, foundation degree, Higher national diploma	University and college of further education
Higher national certificate	College of further education
<i>Further education</i>	
Various vocational certificates and diplomas	College of further education

Scotland

Scotland has a formally unified university sector, but they are informally grouped by age of establishment:

ancient universities – those founded before the 19th century – the Scottish ancient universities are the University of St Andrews (founded 1411), University of Glasgow (1451), University of Aberdeen (1494) and the University of Edinburgh (1583); (the other British ancient universities are the University of Oxford, founded in 1249, and the University of Cambridge, founded in 1284);

1960s universities – those institutions with university status before the *Further and Higher Education Act 1992* – University of Strathclyde (1964), Heriot Watt University (1966), University of Dundee (granted university status in 1967) and the University of Stirling (1967); and

post 1992 universities – those institutions redesignated as universities by the *Further and Higher Education Act 1992* or founded after the *Act* – Robert Gordon University (1992), Napier University (1992), University of Paisley (1992), Glasgow Caledonian University (1993) and the University of Abertay Dundee (granted university status in 1994) (HERO Limited 2003).

As we shall see in detail when we examine student transfer, Scottish universities are informally highly differentiated by status. Three universities win about 60% of formula-based research funding, another 5 get around 30% and the remaining 5 universities gain 10% of research funding (Scottish Executive 2001, p 10).

Gallacher (2002, p 5) says that further education colleges have moved from being fairly marginal and often having low status to having a much more significant role in the Scottish tertiary education. Enrolments have more than doubled from 175,216 in 1985-86 to 383,543 in 1999-2000, most in full time higher education programs which have grown by over 300% over the period (Gallacher 2002, p 5).

TABLE 4.8: STUDENTS ENROLLED IN FE COLLEGES BY LEVEL AND MODE, 1999-2000

Sector and mode	Students	% of total
Further education full time	38,176	10%
Further education part time	273,360	71%
Higher education full time	29,841	8%
Higher education part time	42,166	11%
TOTAL	383,543	100%

Source: Gallacher (2002, p 5) from SOEID 1999 and SFEFC 2001

The Scottish Executive (2001, p 6) reports that further education colleges offer 28% of higher education in Scotland, almost entirely at the level of higher national certificate and diploma. However, from Gallacher's (2002, p 7) figures on undergraduate entrants set out below it appears that further education colleges' share of higher education enrolments is growing.

TABLE 4.9: UNDERGRADUATE ENTRANTS TO HIGHER EDUCATION IN SCOTLAND, 1999/00,
BY MODE OF ATTENDANCE AND SECTOR

	Further education colleges		Higher education institutions		TOTAL
	Enrolments	% of total	Enrolments	% of total	Enrols
Part time	21,012	19%	37,491	34%	58,503
Full time	36,173	33%	14,852	14%	51,025
TOTAL	57,185	52%	52,343	48%	109,528

Source: Gallacher (2002, p 7) from Scottish Executive 2001

Until recently the Scottish Executive funded education by the sector of the provider rather than by the level of program, so higher education programs offered by further education colleges were funded by the Scottish Further Education Funding Council, not the Scottish Higher Education Funding Council (Scottish Executive 2001, p 6). As a result, says Gallacher (2002, p 14), 'Scotland now has 2 systems [sectors] of higher education which have developed in parallel, but with little attempt to plan them as a joint system'. The differences are in curriculum; culture and ethos, study skills and methods of assessment; and funding (Osborne 2002, p 69). 'Most links and relationships between these systems are ad hoc arrangements between programs and institutions' (Gallacher 2002, p 17). The Scottish Executive (2002, p 34) says that a current issue is 'Articulation and routeways: increasing the opportunities for articulation'. Gallacher (2002, p 17) says that while many of these are effective and useful to students, the structural arrangements between the sectors need to be established systemically.

However, as Gallacher acknowledges, Scotland has made considerable progress in systematising its awards. All Scottish qualifications are built up from modules and in 2001 they were brought into a single unifying framework, the Scottish credit and qualifications framework. This framework describes each qualification's level and credit value in SCQF points. The Scottish Qualifications Authority is implementing a credit accumulation and transfer framework across further education and higher education (SQA 2004a).

TABLE 4.10: SCOTTISH CREDIT AND QUALIFICATIONS FRAMEWORK

SCQF level	SQA national units, courses and group awards	Higher education	SVQ
12		Doctorate	5
11		Masters	
10		Honours degree	
9		Ordinary degree	
8		HND, Dip HE	4
7	Advanced higher	HNC, Cert HE	
6	Higher		3
5	Intermediate 2/Credit S grade		2
4	Intermediate 1/General S grade		1
3	Access3/ foundation S grade		
2	Access 2		
1	Access 1		

Source: Scottish Qualifications Authority (2004b)

Scotland introduced income contingent fees for higher education graduates ('the graduate endowment') in 2001. It is now £2,154 for students who began their degree in session 2004-2005 (Student Awards Agency for Scotland 2004). The Scottish Executive is consulting on a review of occupational standards and national guidelines on programs leading to the further education teaching qualification. Since 2002 the Scottish Executive has been conducting an extensive review of higher education, which has considered the performance of the Scottish Higher Education Funding Council, the future of higher education in Scotland and the competitiveness of higher education in Scotland.

U.S.

The United States of America is 9,629,091 sq km and has a population of 281 million. Its GDP is \$10 trillion (purchasing power parity) or \$36,300 per capita (purchasing power parity). The US is a federation of 50 states. In comparison with Australia and the UK education is highly decentralised in the US. State legislation establishes school rating districts which raise funds for school education and determine their distribution within their district. Since districts differ greatly in economic and cultural wealth schools in different districts have very different resources. A large amount of vocational education in the US is conducted by industries' internal training and educational programs which according to Henninger (1959, pp 7-8) range from trade apprenticeships to the highest levels of collegiate graduate work.

Perhaps the US' most distinctive higher education institution is the institution known successively as the junior, community and two-year college. Junior colleges were first proposed in 1831 by Henry Tappan, president of the University of Michigan and were further prominently promulgated by William Mitchell, a trustee of the University of Georgia, and William Folwell, president of the University of Minnesota (Cohen & Brawer, 1996). They proposed that their universities foster the development of strong academies and high schools which would complete a student's general education near their home, so that their universities may develop 'high-order scholarship' (Cohen & Brawer, 1996) as did the universities of France and Germany (Hirsch and Hagedorn no date, p 2).

The model for the 'lower schools' was the German gymnasium, a 13th and 14th year for those planning to pursue higher studies (Dennison & Gallagher 1986, p 13). In 1892 president William Rainey Harper reconstituted the University of Chicago into a lower division providing general education and an upper division providing professional education. While this structural change has been enduring, Martorana (1973) notes that Harper considered it a stage to a more radical repositioning of his university, 'aiming at the eventual abolition of the lower division or "junior college" (first use of the term) as he named it in 1896' (Martorana 1973, p 96).

Thus, two-year colleges were first proposed in the middle of the 19th century as a way of allowing four-year colleges to emulate the Germany research universities established by Wilhelm von Humboldt's founding of the University of Berlin in 1810 (Martorana 1973, p 97). However, these early proposals weren't followed. The first institution recognised as a two-year college was the addition of two years to high schools in Joliet, Illinois in 1901, and a similar development followed in Fresno in California in 1910. Thus, as Clark (1960) observes, the public junior college is entirely a 20th century phenomenon. None existed at the turn of the century. While there were 19 units that could be considered public junior colleges by 1915, their total enrolment did not exceed 600 students. Two-year colleges did not grow rapidly until after World War I (Clark 1960, p 3). While the universities weren't successful in relinquishing their lower divisions, they did establish a formal division between the general-education lower division and the professional-education upper division (Martorana 1973, p 96).

A second major force for the establishment of two-year colleges pursued in the middle of the 20th century by University of California system president Clark Kerr (Douglass 2000, p 18) was to cater for the great expansion of higher education to accommodate the post World War II baby boomers. That is, two-year colleges were proposed to protect the selectivity of the universities that had by that time established themselves as research institutions (Douglass 2000, p 18).

Since two-year colleges originated as 2-year extensions of secondary school they were administered, staffed and funded as extensions of the secondary school systems. Communities formed themselves into 2-year college rating districts, sometimes coextensive with school districts, but often larger. In the early 20th century States would typically provide assistance in the form of a capital or foundation grant and perhaps a small continuing subsidy, but the responsibility for financing and therefore managing 2-year colleges remained with local districts. State contributions increased over the century so that by the end of the century state governments assumed full responsibility for financing and by extension managing two-year colleges.

The New York State Board of Regents stated four major functions of two-year colleges in 1964: general education, transfer education, occupational or terminal education, adult or continuing education (quoted in Martorana 1973, pp 88-90). These were expanded by the Oklahoma State Regents for higher education in its guidelines for the role and scope of Oklahoma higher education issued in 1970 which identified the functions for two-year colleges in the state –

- 1) provide general education for all students,
- 2) provide education in several basic fields of study for the freshman and sophomore years for students who plan to transfer to senior college and complete requirements for the bachelor's degree,
- 3) provide terminal education in several fields of vocational and technical study, and
- 4) provide both formal and informal programs of study especially designed for adults and out of school youth in order to serve the community generally with a continuing education opportunity.

(Oklahoma State Regents for Higher Education 1970, p 47)

These functions remain current today, although the emphasis on each function differs in different States and colleges and changes over time. Thus, the transfer function became the dominant purpose for some two-year colleges but has subsequently fallen in significance. Almost two-thirds (63%) of US tertiary education students are enrolled in four-year colleges. This is similar to Canada (where 61% of tertiary students are enrolled in universities), but much higher than the UK (44%) and Australia (35%). This probably reflects a greater range in type of four-year institutions in the US, most of which are not accredited to offer more than a coursework or taught masters degree.

TABLE 411: TERTIARY EDUCATION ENROLMENTS BY SECTOR, US, 2000

	2-year institutions		4-year institutions		TOTAL
	Enrolments	% of total	Enrolments	% of total	Enrolments
Part time	3,731,382	24%	2,571,307	17%	6,302,689
Full time	2,217,049	14%	6,792,551	44%	9,009,600
TOTAL	5,948,431	39%	9,363,858	61%	15,312,289

Source: U.S. Department of Education, National Center for Education Statistics (2002), Table 177.--Total fall enrollment in degree-granting institutions, by level of enrollment, sex, attendance status, and type and control of institution: 2000.

While as will be shown below there is considerable variation between States, the general arrangement in the US is neatly summarised by the US Department of Education National Center for Education Statistics. Two primary distinctions are between two-year and four-year colleges, and between public and private colleges.

In the US higher education is normally understood as study beyond secondary school at an institution that offers programs terminating in an associate, baccalaureate, or higher degree. There are many classifications of higher education institutions or colleges in the US, but the most basic distinction is between 4-year institutions which are authorised to offer at least a 4-year program of college-level studies wholly or principally creditable toward a baccalaureate degree; and 2-year institutions, which are authorised to offer at least a 2-year program of college-level studies which terminates in an associate degree or is principally creditable toward a baccalaureate degree.

A second basic distinction is between public schools or institutions, which are controlled and operated by publicly elected or appointed officials and derive their primary support from public funds; and private schools or institutions, which are controlled by an individual or agency other than a state, a subdivision of a state, or the federal government, and which are usually supported primarily by other than public funds, and the operation of whose program rests with other than publicly elected or appointed officials. Private schools and institutions include both nonprofit and proprietary or for profit institutions.

(U.S. Department of Education 2000)

Notwithstanding this distinction, States provide 46% of the financial support for public institutions and approximately 29% of the total support for all public and private colleges. Most of the balance is from tuition fees, often supported by federal and State financial aid for students at public and private institutions (Callan 2000). In 1998 some 45% of US higher education students were enrolled in public four-year institutions, 28% in public two-year institutions, 24% in private four-year institutions and 2% in private two-year institutions. Almost 70% of students are therefore enrolled in four-year institutions, public or private.

TABLE 4.12: ENROLMENTS BY INSTITUTION TYPE, US, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)

<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

There are considerable differences between States, however. An appendix gives a brief description of each State and its post secondary education. It is possible to discern patterns and four are suggested here:

New England – a higher than average proportion of enrolments in private four-year colleges;
 West – a higher than average proportion of enrolments in public two-year colleges;
 South – a higher than average proportion of enrolments in public four-year colleges;
 Middle America – average proportions in all sectors.

Douglass (2004, p 9) argues that these reflect different patterns of economic development and political culture, and in turn different patterns of state building. He (Douglass 2004, p 9) says that most States along the eastern seaboard and centred in the northeast first developed private institutions which remain major providers of higher education. In the US south ‘institution building was slow, and participation rates have historically lagged behind the nation as a whole. In the Midwest, a vibrant mix of public universities and small denominational colleges emerged by the late 1800s, and that mix remains. In the expansive west, as territorial governments vied for statehood they developed schemes to invest almost exclusively in public higher education institutions, and they sought their rapid development to encourage economic development and socio-economic mobility (Douglass 2004, p 9).

New England – private four-year colleges

One pattern is a lower than average proportion of students in public colleges – typically 20% less than the national average – and a corresponding high proportion of students in private, mostly four-year colleges. These states also typically have 20% higher than average enrolment in 4-year colleges. Many of the states that fit this pattern are in New England: Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont. The nearby mid Atlantic states of New York and Pennsylvania also follow this pattern. The New England state of Maine is a variant.

TABLE 4.13: ENROLMENTS BY INSTITUTION TYPE, NEW ENGLAND PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Connecticut	39%	18%	56%	43%	1%	44%	82%	19%
Massachusetts	24%	14%	38%	60%	2%	62%	84%	16%
New Hampshire	44%	9%	54%	46%	1%	47%	90%	10%
New York	33%	20%	53%	44%	2%	46%	79%	22%
Pennsylvania	43%	12%	55%	39%	6%	45%	82%	18%
Rhode Island	31%	15%	46%	55%	0%	55%	86%	15%
Vermont	46%	6%	52%	46%	2%	48%	92%	8%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)

<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

Typically these states have above average median household income and above average college participation. The grades shown in table 4.14 and the following tables were awarded by the National Center for Public Policy and Higher Education by allocating the median score of the five highest performing states on each scale a score of 100 and scoring the other states as a ratio to the top performing states. The National Center then converted the scores to grades using this scale: A 93 and above, A- 90-92, B+ 87-89, B 83-86, B- 80-82, C+ 77-79, C 73-76, C- 70-72, D+ 67-69, D 63-66, D- 60-62, F below 60.

TABLE 4.14: PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Connecticut	B+	\$50,647
Massachusetts	A-	\$45,769
New Hampshire	C+	\$48,029
New York	B-	\$40,822
Pennsylvania	C	\$41,394
Rhode Island	A	\$43,428
Vermont	C-	\$40,908
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

Maine and Utah are similar to the New England pattern in having an unusually high proportion of students in four-year colleges, but unlike the New England group, not such a high proportion in private four-year colleges.

TABLE 4.15: ENROLMENTS BY TYPE, VARIANT ON THE NEW ENGLAND PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Maine	54%	11%	65%	30%	4%	34%	84%	15%
Utah	53%	16%	69%	29%	2%	31%	82%	18%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)
<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

Maine and Utah have average participation.

TABLE 4.16: COLLEGE PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Maine	C+	\$39,815
Utah	C	\$46,539
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

West – public two-year colleges

A second pattern is an unusually high proportion of enrolments in public two-year colleges, typically at least 10% and for many as much as 15% above average. This is combined with about average enrolments in public four-year colleges to give an unusually high proportion of students enrolled in public institutions. Many of the states with this pattern are in the west, but the pattern is also shared by Mississippi from the south.

TABLE 4.17: ENROLMENTS BY INSTITUTION TYPE, WESTERN STATES PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Arizona	43%	41%	84%	13%	3%	16%	56%	44%
California	34%	46%	80%	18%	2%	20%	52%	48%
Florida	38%	38%	76%	21%	3%	24%	59%	41%
Mississippi	49%	42%	91%	8%	1%	9%	57%	43%
New Mexico	52%	39%	91%	8%	1%	9%	60%	40%
Oregon	45%	36%	81%	18%	1%	19%	63%	37%
Texas	49%	36%	85%	14%	2%	16%	63%	38%
Washington	36%	48%	84%	15%	1%	16%	51%	49%
Wyoming	44%	51%	95%	0%	4%	4%	44%	55%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000) <http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

These states typically have participation rates around the median, but their median household incomes are spread from relatively low to relatively high.

TABLE 4.18: COLLEGE PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Arizona	C	\$39,653
California	B+	\$45,070
Florida	D+	\$37,305
Mississippi	D-	\$31,963
New Mexico	B-	\$34,035
Oregon	D	\$41,915
Texas	D	\$39,296
Washington	C-	\$46,412
Wyoming	B-	\$38,291
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

Illinois in the mid west is similar in having a high proportion of students enrolled in two-year public colleges, but has a lower proportion enrolled in public four-year colleges. Illinois has a top participation rate – graded A – and a higher than average median household income, of \$46,649 pa.

TABLE 4.19: ENROLMENTS BY INSTITUTION TYPE, VARIANT ON THE WESTERN STATES
PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Illinois	32%	37%	69%	30%	1%	31%	62%	38%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)

<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

South – public four-year colleges

A third pattern, and with its variants the most common, is a very high proportion of enrolments in public four-year colleges – from 10% to 25% higher than the US average – with corresponding lower than average proportions of enrolments in public two-year colleges and private colleges. Many of these colleges are from the south, but others are from the west and midwest, and Delaware is in the north. While Idaho in the west fits this pattern it is unique amongst US states in having such a high proportion of students enrolled in private two-year colleges – 17% compared with the national average of 2%.

TABLE 4.20: ENROLMENTS BY INSTITUTION TYPE, SOUTHERN STATES PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Alabama	60%	27%	87%	13%	0%	13%	73%	27%
Arkansas	64%	24%	88%	12%	0%	12%	76%	24%
Colorado	59%	23%	82%	16%	2%	18%	75%	25%
Delaware	62%	22%	84%	16%	0%	16%	78%	22%
Idaho	65%	12%	77%	5%	17%	22%	70%	29%

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Kansas	57%	31%	88%	11%	1%	12%	68%	32%
Kentucky	60%	19%	79%	17%	3%	20%	77%	21%
Louisiana	70%	16%	86%	14%	1%	15%	84%	17%
Montana	75%	13%	88%	9%	3%	12%	84%	16%
North Dakota	68%	20%	88%	10%	1%	11%	78%	21%
Oklahoma	58%	27%	85%	13%	2%	15%	71%	29%
South Dakota	68%	14%	82%	18%	0%	18%	86%	14%
West Virginia	79%	6%	85%	12%	2%	14%	91%	8%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)

<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

These states range from high participation to low participation. Most have lower than average median household incomes, although two have considerably higher than average median household incomes.

TABLE 4.21: COLLEGE PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Alabama	C+	\$36,268
Arkansas	D-	\$30,082
Colorado	B-	\$49,216
Delaware	A	\$47,438
Idaho	D	\$37,760
Kansas	A	\$38,393
Kentucky	D	\$36,826
Louisiana	F	\$32,500

	Participation	Income
Montana	D+	\$32,553
North Dakota	B	\$33,769
South Dakota	C	\$35,986
West Virginia	D+	\$29,217
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

There are two variants on this pattern. Some states have about 10% higher shares of enrolment in public four-year colleges which is at the expense of private four-year colleges – the other proportions being about average.

TABLE 4.22: ENROLMENTS BY INSTITUTION TYPE, 1ST VARIANT ON THE WESTERN STATES PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Maryland	50%	31%	81%	18%	1%	19%	68%	32%
Michigan	55%	26%	81%	18%	1%	19%	73%	27%
Nevada	53%	24%	77%	21%	1%	22%	74%	25%
South Carolina	53%	28%	81%	17%	1%	18%	70%	29%
Virginia	54%	26%	80%	18%	2%	20%	72%	28%
Wisconsin	55%	26%	81%	19%	0%	19%	74%	26%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)
<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

These states have a spread of participation rates but all but one have considerably higher than average median household incomes.

TABLE 4.23: COLLEGE PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Maryland	A	\$52,846
Michigan	B+	\$46,034
Nevada	D+	\$43,262
South Carolina	D-	\$36,671
Virginia	B-	\$47,701
Wisconsin	B	\$45,441
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

A second variation on this pattern formed by some mid west and southern states is moderately higher than average share of enrolments in public four-year colleges balanced by lower than average shares in public two-year colleges and average proportions of enrolments in private colleges.

TABLE 4.24: ENROLMENTS BY INSTITUTION TYPE, 2ND VARIANT ON THE WESTERN STATES PATTERN, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Georgia	55%	18%	73%	26%	1%	27%	81%	19%
Indiana	63%	10%	73%	24%	2%	26%	87%	12%
Ohio	53%	20%	73%	24%	3%	27%	77%	23%
Tennessee	50%	24%	74%	24%	2%	26%	74%	26%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)

<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

These states tend to have average median household incomes but below average participation.

TABLE 4.25: COLLEGE PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Georgia	F	\$41,481
Indiana	C-	\$41,315
Ohio	C-	\$41,972
Tennessee	D-	\$35,874
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

Middle America – average

The fourth discernable pattern is shares of enrolments close to the US average.

TABLE 4.26: ENROLMENTS BY INSTITUTION TYPE, MIDDLE AMERICA, 1998

	Public			Private			TOTAL	
	4-year	2-year	Total	4-year	2-year	Total	4-year	2-year
Iowa	41%	29%	70%	29%	1%	30%	70%	30%
Minnesota	45%	27%	72%	24%	4%	28%	69%	31%
Missouri	42%	19%	61%	36%	3%	39%	78%	22%
New Jersey	46%	32%	78%	20%	2%	22%	66%	34%
North Carolina	46%	31%	77%	22%	0%	22%	68%	31%
US	45%	28%	73%	24%	2%	26%	70%	30%

Source: US Department of Statistics, Integrated Postsecondary Education Data System, Fall Enrolment surveys (table prepared July 2000)

<http://nces.ed.gov/pubs2001/digest/dt202.html>, downloaded 13.01.02

All but one state has higher than average participation rates and higher median household income, some considerably higher.

TABLE 4.27: COLLEGE PARTICIPATION AND MEDIAN HOUSEHOLD INCOME, SELECTED STATES 2000

	Participation	Income
Iowa	B	\$41,560
Minnesota	B-	\$50,088
Missouri	C-	\$44,247
New Jersey	B+	\$51,739
North Carolina	D	\$38,413
US	C	\$41,789

Sources: National Center for Public Policy and Higher Education (2000), U.S. Department of Commerce (2001)

States chosen for detailed study

Keating and colleagues (2002, p 173, note 19) observed of Australia that the nation is too heterogeneous as the unit of comparison and argued for adopting regions as the unit of comparison. This is particularly true of the USA as has been shown, so a selection of States had to be made for detailed study. A State was not chosen for the study if its population was below three million, which was considered too small to be similar to the other jurisdictions studied and therefore not a useful comparator since the most similar systems design has been chosen as the study method. A State was also excluded if it did not report on its web site a good range of data, particularly on student transfer. This

ruled out, for example, the otherwise interesting Great Lakes states of Michigan and Wisconsin and the important Commonwealth of Pennsylvania. New York was excluded partly for this reason, and partly because its arrangements are too complicated to be readily understood and too specific to its own circumstances to be readily applicable to other jurisdictions. These negative criteria biased the selection of States to those with a big public sector and a strong coordinating authority. In this they are similar to the non US jurisdictions considered in the study and indeed to many other US States. But there are several important US States which have interesting higher education arrangements which do not share these characteristics.

California was chosen because it is well known and now is almost archetypal of a particular arrangement: a strongly segmented system. Colorado was chosen because it is the home state of one of the author's supervisors, who is able to correct an outsider's learned knowledge with lived experience. Texas was chosen because its population is about the same size as Australia and because it has a geography similar to much of Australia's. The study therefore makes no claim to represent the US, but rather to make some informative comparisons with Australia.

5 Three US states

This chapter describes in more detail the US states chosen for detailed comparison – California: the global state; Colorado: regulation a mile high; and Texas: cowboys and silicon chips.

California: the global state

California – the home of Hollywood, Silicon Valley, Berkeley, CalTech, Stanford and UCLA – is a state of international significance.

Geography

California is 411,015 square kilometres located in the south west corner of the US spanning latitudes 42 to almost 32 degrees north. It is about four times longer than it is broad, bordered by the Pacific ocean on the west and Nevada in the east, and importantly sharing a border with Mexico in the south. California's large and diverse landscape is defined by patterns of mountains and valleys creating four major natural ecosystems: the coast, the Central Valley, the Sierra Nevada mountain range, and the deserts in the east (Starr 2001).

Numerous Indigenous peoples had settled in Californian regions for thousands of years before 1769, when the Spanish forcefully settled what is now San Diego, a large coastal city in the south of California. Spanish rule was replaced by that of the Mexican Republic in 1823, which in turn was replaced by the United States in 1847, California being admitted as the 31st state in 1850. Gold was discovered in 1848, starting a massive rush of immigrants from around the world (Starr 2001).

Mining was replaced as the State's main industry in the 1870s by agriculture, which was further developed by large dam and irrigation projects around the turn of the century. Military spending on aircraft production in California in the first decades of the 20th century lead to the development of an aviation industry, which in turn lead to the development of aerospace technologies and a research and development environment at Stanford University in Palo Alto and surrounding communities. That 77 km stretch of highway 101 half way between San Francisco 70 kms to the north of Palo Alto and San Jose to the south became Silicon Valley, the cradle of the information and communication technologies (Starr 2001). California had a gross state product of \$1,118,945 million in 1998 (Bureau of Economic Analysis 2001) which, if it were a country, would be among the top 7 in the world (Douglass 2000, p 10).

California now has a population of 33 million, the larger centres being the Los Angeles area in the south (9 million), San Diego on the Mexico border (2.8 million), San Bernardino inland from Los Angeles (1.7 million), Sacramento north east of San Francisco (1.2 million) and San Francisco (0.8 million) on the central coast (US Census Bureau 2000a). California has one of the most diverse populations of the US states, and probably of the western world. 50% of California's population is white non Hispanic (who are 72% of the US as a whole), 32% Hispanic (US 11%), 12% Asian and Pacific Islander (US 4%), 8% black (US 13%) and 1% American Indian and Alaska Native (US 1%) (US Census Bureau 2000b). California will be the first mainland US state to have a majority of non-white population, predicted to be around 2010 (California Postsecondary Education Commission 2000b, p 19).

Tertiary education overview

Descriptions of higher education in California usually start with the master plan for higher education enshrined in the Donahoe Act of 1960, however Douglass (2004, p 11) points out that the State developed three distinct and geographically dispersed and multi-campus public segments as early as 1920. The University of California at Berkeley became the US's biggest university in 1910, and it 'became the first multi-campus state university in the nation with the inclusion of a "southern branch" in Los Angeles in 1919 – what became UCLA' (Douglass 2004, p 15). 'California was the

first state to develop the public community college, passing legislation in 1907 for their creation as an extension of public high schools (Douglass 2004, p 15). Graduates of community colleges were guaranteed admission to the University of California Berkeley campus from 1910 and ‘in the 1930s, some 40 to 50 percent of all admissions to both Berkeley and what became UCLA were transfer students from local community colleges’ (Douglass 2004, pp 13-14). Community colleges expanded rapidly: almost two new colleges were established in California each year from 1910 until 1970 (Douglass 2004, p 15). According to Douglass (2004, p 15) the California State University system did not grow substantially until the 1950s, after it gained authority to offer the master’s degree in 1948 and with the introduction of new undergraduate education in fields such as engineering.

Douglass (2004, p 21) reports that the State maintained a tripartite structure well before the master plan. In the 1940s, for example, the State rejected ‘efforts by local communities to expand a number of community colleges into four-year institutions’ and in the 1950s rejected attempts to merge the missions of California State University and the University of California to expand the number of research universities (Douglass 2004, p 21). The 1960 California master plan for higher education ended these aspirations for institutional elevation. As Douglass (2004, p 21) says, ‘the master plan was more important for what it prevented . . . than what it created’.

Public higher education in California is formally organised in three sectors or segments. At the peak is the University of California, ‘a semi-autonomous and constitutionally protected “public trust” . . . governed by the Board of Regents’ (Douglass 2004, p 12) which has ten campuses throughout the State, the most famous of which are Berkeley, which Shanghai Jiao Tong University’s institute of higher education ranks as fourth best in the world, and Los Angeles which is ranked 14th best in the world. The University of California’s intake is restricted by legislation to the top 12.5% of high school graduates. The University of California system enrolls 174,000 students, 8% of the total public tripartite system. It has an annual budget of \$US11.1 billion, giving a crude funding rate of about \$US64,000 per student (Douglass 2000, p 3).

The middle tier of California's public higher education system is the California State University, which has its origins in teachers colleges ('normal schools') established in the late 19th century (CSU 2001). California State University now has 24 campuses offering a comprehensive range of bachelors and masters degrees, some professional degrees and has areas of research strength (Clark, 1990). California State University does not have authority to offer PhDs, and while many of its campuses 'compete for federal and other extramural research funds' (Douglass 2004, p 12), relatively little research is done in the system and teaching loads are about double those of the University of California. California State University's intake is restricted to the top 33.3% of high school graduates. CSU's 23 campuses throughout the State teach 350,000 students, 19% of the tripartite system's total. The university has a budget of \$US3.8 billion, giving it a crude funding rate of about \$US11,000 per student (Douglass 2000, p 4).

The lower and by far the largest sector is the California Community Colleges, which have open admission. The sector's 107 campuses include some of North America's oldest community colleges established in the first decades of the 20th century, and include what is now called the San Jose City College, which was the subject of Burton Clark's *The open door college: a case study* (1960). Community colleges offer associates in arts and science which require two years' full-time study and allow students who achieve a grade point average of 2.0 (CSU) or 2.4 (UC) to transfer, mostly with full credit, towards the four-year baccalaureate awarded by universities and university-level colleges. Community colleges also offer occupational certificates and various community education and bridging programs.

Community colleges enrol 1.5 million students, which are 73% of the system's total, although a higher proportion are studying part time than in the other sectors. California's high proportion of higher education enrolments in community colleges reflects its early and strong support for the establishment of the sector, and its mandated restrictions on the proportion of high school graduates who may be admitted to the more selective sectors. The community college system has an annual budget of \$US3.6 billion, giving it a crude funding rate of about \$US2,400 per student (Douglass 2000, p 4). Shulock (2004, p 69) observes that the 'disparity' in funding rate between community colleges and 4-year

colleges in California is far greater than in other States, and ‘deficient by any standard’ in her view. Community colleges have a strong legacy of local control through locally elected boards (Hayward et al 2004, p 19). Callan (2004, p x) says that as a legacy from their origins as schools, California community colleges have long been ‘plagued’ by a myriad of detailed prescriptive statutes and regulations, which Callan (2004, p x) and Hayward and colleagues (2004, p 40) say hamper their ability to responding to their communities.

Some 180,000 or 17% of all California higher education students are enrolled in 118 private universities and colleges (National Center for Public Policy and Higher Education 2000). These are very varied institutions of different types: two- and four-year specialised schools in the arts and sciences, traditional liberal arts colleges, small comprehensive universities, major research universities such as the California Institute of Technology (CalTech) and Stanford University, free-standing graduate and professional schools, and campuses for working adults (AICCU 2001).

There are in addition more than 300 institutions which are not regionally accredited but are nevertheless approved by the State to offer various degree programs. There are also more than 3,000 non degree-granting institutions which offer vocational and occupational training programs. State approved schools and colleges enrol an estimated 400, 000 students (California Postsecondary Education Commission 2000a, p 7).

The three tiers of public higher education are managed as largely separate systems within the sectoral boundaries established by the master plan. The University of California system is governed by a board of regents established with considerable autonomy by the State’s constitution in 1880. Section 9 of article 9 of the constitution invests the regents of the University of California ‘with full powers of organisation and government’ of the university, subject to limited legislative controls to ensure the security of its funds, compliance with endowments and competitive bidding for letting contracts and purchasing (California 2001). This level of autonomy is unusual in the US, shared by public universities in only 5 other states (Douglass 2000, p 6).

The California State University is governed by a board of trustees established by an Act of the State's legislature. But the constitutional amendment establishing the CSU board of trustees gave it little autonomy. While the University of California is allocated a block grant, CSU is granted funds for specific programs and has limited flexibility to change priorities (Douglass 2000, p 28). Broad policy and guidance of Californian community colleges is provided by a board of governors established by the legislature. More detailed oversight of the colleges in each of 71 districts is provided by a locally elected board of trustees for each district. The two levels of boards operate what is known as 'shared governance' (Douglass 2000, p 8).

The three systems of higher education in California are coordinated by the California Postsecondary Education Commission established by statute in 1974. The commission is required to 'assure the effective utilization of public postsecondary resources, thereby eliminating waste and unnecessary duplication, and to promote diversity, innovation and responsiveness to student and societal needs.' The commission's responsibilities are long-range planning, policy development and analysis, program administration, review of new campuses and off-campus centres and to be a State clearinghouse for information on higher education. Its priorities are to improve the use of resources by promoting better coordination and collaboration between California's systems of postsecondary education, increase the public accountability of postsecondary institutions, and plan for a better California future by ensuring postsecondary education opportunities for all students (CPEC 2001). Douglass (2000, p 9) says that the commission has little legislated authority and is not influential. Hayward and colleagues (2004, p 18) say that the commission is 'relatively weak' and that California does not have an effective mechanism for dealing with issues that transcend segments.

Occupational regulation

The California department of consumer affairs regulates more than 200 occupations, many of which have licensing requirements. Typically registration requires a minimum period of work experience and passing assessment. Credit towards work experience but less usually the assessment is often given for technical training, apprenticeship training, or education (Department of Consumer Affairs 2001).

Vocational education

Vocational education, or ‘occupationally related training’ in California is offered by 199 public secondary schools with occupational programs, 241 public adult schools with occupational programs, 136 2-year technical and community colleges, 354 four-year colleges and universities, 1,412 private business and technical schools (many of which offer only one or two programs), 86 schools which offer apprenticeships, 14 schools offering hospital and health programs, and 199 various other educational providers including job corps centres and community based organisations (California Occupational Information Coordinating Committee 2001).

Recent developments in tertiary education

In 2000 then Governor Davis announced the establishment of 4 institutes for science and innovation at the University of California: The California nanosystems institute at UCLA with a partner campus UC Santa Barbara; the California institute for telecommunications and information technology at UC San Diego with a partner campus UC Irvine; the California institute for bioengineering, biotechnology and quantitative biomedical research at UC San Francisco with the partner campuses UC Berkeley and UC Santa Cruz; and the center for information technology research in the interest of society at UC Berkeley with the partner campuses UC Santa Cruz, UC Davis and UC Merced (Governor of California 2003).

The California State University admitted its first students at its 23rd campus California State University, Channel Islands in the third quarter of 2003. CSU Channel Islands is in Ventura County on the Pacific Ocean coast at the foot of the Santa Monica Mountains halfway between Santa Barbara and Los Angeles (California State University Channel Islands 2003). The University of California plans to open its 10th campus, UC Merced in North Central Valley, in 2005. UC Merced will initially have a capacity of 6,000 full time equivalent students.

Current issues in Californian tertiary education

In its higher education state report card for California the National Center for Public Policy and Higher Education identifies as a performance gap the under-representation of 18 – 24 year olds from low income families in higher education (33%) compared to those from high income families (58%) and similarly the under representation of students whose parents did not attend college (31%) compared with those whose parents have at least some college education (55%) (National Center for Public Policy and Higher Education 2000).

The main higher education priority for the then California Governor Gary Davis was to make college education more accessible and affordable, which he pursued by increasing state financial aid to students and increased funding to institutions which in turn charge lower fees, at least for in state students (Davis 2000). As a result fees for UC and CSU schools were reduced by 5% to the lowest amount since 1992-93, while two-year college fees were lowered to \$11 per unit (Governor of California 2003). However, more recently a projected State budget deficit of \$US38.2 billion led the Governor to propose cutting the budgets of two-year institutions by 5.6% and increasing their tuition fees by \$7 per credit unit, or 63.6%, to \$18 per unit (Hebel 2003).

The Californian Postsecondary Education Commission (2000b, p 6) said in its report for 2000 that access, affordability and accountability continue to be the three fundamental issues critical to the future of postsecondary education in California. The squeeze of increased demand and less funds led the California Postsecondary Education Commission to consider measures to increase capacity with no additional capital costs such as expanding year-around operations and evening, weekend, and shortterm intensive courses; increasing the use of regional educational centers and joint intersegmental facilities; and online and distance education (California Postsecondary Education Commission 2003, p 8).

In 2001 the Commission conducted a series of discussions and reviews to produce the *Public agenda*, the Commission's 'planning goals for the coming years' (California Postsecondary Education Commission 2002, p 1). The Commission identified priorities

in addition to its recurring responsibilities in 4 thematic areas: (1) growth and access; (2) preparation for postsecondary education; (3) baccalaureate degree attainment; and (4) workforce preparation /economic development (California Postsecondary Education Commission 2002, p 4).

The Commission's activities in growth and access include analysing data on college going rates, student transfer rates and estimating the State's capacity to accommodate more students. Its activities in preparation for postsecondary education are to estimate the proportion of high school graduates who meet the eligibility requirements for the California State University and the University of California; evaluate pre-collegiate outreach and academic development programs; facilitate student transfer from a community college to a baccalaureate degree-granting institution; monitor student progression patterns; and describe pre-service, in-service, and professional development for existing teachers to meet future demand for teachers in the subject areas in which they are most needed. Its activities in the other themes are similarly collecting and analysing statistical data (California Postsecondary Education Commission 2002).

US State legislatures legislate in much greater detail than in the English tradition. The California Postsecondary Education Commission (2003b) lists 94 Bills affecting postsecondary education that are currently before the California legislature for the 2003/2004 legislative session. The first five Bills listed by the Commission would equalise community colleges' funding per full-time equivalent student, require universities to keep students' social security numbers confidential, commission a study of the availability and effectiveness of cross-cultural training for teachers and administrators, change the name of the African American Political Institute to the African American Political and Economic Institute and move it from California State University, Northridge to the Dominguez Hills campus, and change the method for projecting enrolments and student load in the community college system. Assembly Bill 705 would seek to establish a model uniform set of academic standards for career technical courses for high school pupils by requesting the California State University and the University of California to identify a model set of discrete competencies necessary for the successful completion of a course of instruction in career technical education.

Consistent with this legislature activism the chairs of the education committees of the California State Assembly and the California State Senate adopted the *2001 democratic education package*, an ‘agenda for student learning and achievement’ (Strom-Martin & Vasconcellos 2001). The committees’ first agendum is to address the needs of the State’s low-achieving students, which it plans to do by ‘Bringing our own high expectations to all of these low-achieving students’, ‘Preparing parents to become full partners in the education of their children.’, ‘Providing every California low-achieving student a personal mentor’, ‘Assuring every California low-achieving student a safe, modern and healthy school facility and environment’, ‘Designing a curriculum – a personalized learning contract - tailored to the needs of each and every low-achieving student’, ‘Providing adequate logistical support systems – instructional materials, computers, and supplies - for every low-achieving student’ and ‘Adopting an accountability and assessment system which recognizes and smartly addresses the situation and needs of every low-achieving student’. (Strom-Martin & Vasconcellos 2001). The other items in the committees’ program are to attract and retain teachers, aim for universal preschool education, Refine the Legislature’s accountability and assessment system and to review the State’s public school vocational education system.

The State’s budget difficulties led to the election of a new Governor Arnold Schwarzenegger in November 2003 and the introduction of several budget cuts. Those most affecting higher education are increases in fees, reductions in student financial aid, not funding growth in enrolments at the four-year institutions and diverting some of their intake to community colleges (California Postsecondary Education Commission 2004). The Governor also proposes to consolidate and restructure approximately \$300 million in community colleges’ categorical funding – State funds appropriated for a specific purpose – to give colleges greater flexibility in responding to local needs (and increased budget pressures). This would address at least to some extent address the excessive budget inflexibility criticised by Callan (2004, p x) and Hayward and colleagues (2004, p 40).

Colorado: regulation a mile high

The Columbine High School massacre occurred in suburban Denver, the capital of Colorado; and South Park in the Rockies south west of Denver is the inspiration for the eponymous cartoon. The Rockies give Colorado the highest average elevation of US States. Colorado has some fine higher education institutions within a system more heavily regulated than other US States (NORED 2000, p 8). Hence Colorado is a State with regulation a mile high.

Geography

Colorado is almost a perfect rectangle of 104,247 square miles located just south west of the geographic centre of the US. The eastern half of the State has flat, high plains rising to the Rocky Mountains that run north-south through the centre and west of the State. Colorado's average elevation is 6,800 feet or over a mile high (Colorado State Archives 2001).

Gold was discovered in Colorado in 1858, leading to a gold rush and the foundation of the State's economy on mining, which expanded to silver, uranium, coal, molybdenum and petroleum. Colorado's main agricultural products are grains, beef, fruit and vegetables. Much of its economy is now built on high technology and on providing transport and other services to its greater region (Colorado State Archives 2001).

Colorado's gross state product is \$153,728.million and its per capita income is \$32,949 per annum (Bureau of Economic Analysis 2001).

Colorado has a population of 4.3 million, most located on the front range along the Denver metropolitan/I-25 corridor that runs north-south through the State where the eastern plains meet the Rockies: 2 million in the State's capital Denver, 500,000 in Colorado Springs, 250,000 in Fort Collins, 180,000 in Greeley and 140,000 in Pueblo (Colorado Demography Section 2000). Colorado's population is not as racially and ethnically diverse as the US as a whole. 78% of Colorado's population is white non Hispanics (72% in all of the US), 15% of its population is Hispanic (11% US), but only

4% are black (13% US) and 2% Asian and Pacific Islander (4% US) (U.S Census Bureau 2000b).

Tertiary education overview

Just over 200,000 students are enrolled in Colorado post-secondary education institutions (National Center for Public Policy and Higher Education 2000). The National Center for Public Policy and Higher Education report that a fairly low percentage of Colorado's students proceed to college immediately after high school, and only a fair proportion of young adults (ages 18 to 24) are enrolled in education or training beyond high school. However, it reports that a very large percentage of the State's working-age adults (ages 25 to 44) are enrolled in college-level education or training.

Half of Colorado's higher education students are enrolled in public 4 year colleges. The role and mission assignments of Colorado's higher education institutions are specified by statute according to institutional type, admissions selectivity, and, to some extent, program differences. Eleven types are specified, although some of the distinctions seem insignificant (NORED 2000). The Colorado Commission on Higher Education groups the sectors thus (1995):

research universities

Colorado School of Mines, Colorado State University, and University of Colorado at Boulder;

universities/colleges

Adams State College, Fort Lewis College, Mesa State College, Metropolitan State College of Denver, University of Colorado at Colorado Springs, University of Colorado at Denver, University of Northern Colorado, University of Southern Colorado, and Western State College;

specialised medical

Colorado State University Professional Veterinary Medicine and the
University of Colorado Health Sciences Center;

community colleges

Arapahoe Community College, Community College of Aurora,
Community College of Denver, Front Range Community College,
Lamar Community College, Morgan Community College, Otero
Junior College, Pikes Peak Community College, Pueblo Community
College, Red Rocks Community College, and Trinidad State Junior
College; and

local district colleges

Aims Community College, Colorado Mountain College, Colorado
Northwestern Community College, and Northeastern Junior
College.

The University of Colorado at Boulder is Colorado's premier research university. The *US News & World Report* ranks it as equal 74th of national doctoral universities, and the 2001 Nobel Prize in physics was shared by Carl E Wieman of the University of Colorado at Boulder and his colleague Eric A Cornell of the National Institute of Standards and Technology also in Boulder and Wolfgang Ketterle of MIT. Previous CU-Boulder laureates are Thomas Cech (chemistry 1989) and William Phillips (physics 1997).

The Colorado Commission on Higher Education (2002) *Blue ribbon* panel recommended the missions for Colorado's four-year colleges set out below. Also shown is the proportion of undergraduate students in each institution who transferred from a two-year college.

TABLE 5.1: PROPORTION OF UNDERGRADUATE STUDENTS AT COLORADO FOUR-YEAR PUBLIC INSTITUTIONS WHO TRANSFERRED FROM A TWO-YEAR INSTITUTION, BY INSTITUTION'S SELECTIVITY, 2001

Institution	Transfer students
<i>Highly selective</i> – competitive admission to students who at minimum have an index of 110, rank in the top 10% of high school class, and earn 27 or above on the ACT composite test.	
The Colorado School of Mines	1%
The campus of the University of Colorado associated with the University of Colorado Hospital (UCHSC)	
<i>Selective</i> – competitive admission to high school graduates with an index score that meets or exceeds the institutional admission index, or who earns the specified high school GPA or specified ACT score. The minimum index score is 90.	
Colorado State University	4%
University of Colorado Boulder	2%
University of Colorado Colorado Springs	7%
University of Colorado Denver	9%
University of Northern Colorado	5%
<i>Moderately selective</i> – guaranteed admission to high school graduates who achieve a high school GPA of 2.5 or ACT score of 20 or above. Competitive admission with index score of 80 or above. Admission into selected degree programs is based on program admission standards (e.g., teacher education, business).	
Adams State College	3%
Fort Lewis College	3%
Mesa State College	2%
University of Southern Colorado	7%
Western State College of Colorado	2%
<i>Modified open admission standards</i> – guaranteed admission to students over 20, admission to students who have an index of 76.	
Metropolitan State College of Denver	7%

Institution	Transfer students
<i>Open admissions program</i> – guaranteed admission based on a high school diploma or its equivalent.	
Community and technical colleges – Aims Community College, Colorado Mountain College	

Source: Jacobs, Jim (2002) Colorado Commission on Higher Education, Data file

Universities and colleges is the biggest sector, although most recent growth has been in community colleges.

TABLE 5.2: FULL-TIME EQUIVALENT (FTE) STUDENT ENROLMENT, COLORADO, 1993-94

	In-state	% of total	Out of state	% of fte who are out of state
<i>Public institution total</i>	<i>117,628</i>		<i>21,491</i>	<i>18%</i>
<i>State system summary</i>	<i>108,861</i>		<i>20,672</i>	<i>19%</i>
Research universities	31,611	27%	12,840	41%
Universities and colleges	43,971	37%	5,297	12%
Specialised-medical	2,511	2%	664	26%
Community colleges	30,769	26%	1,871	6%
Local district colleges	8,767	7%	819	9%
TOTAL	117,629	100%	21,491	18%

Source: CCHE, 1995.

Higher education in Colorado is coordinated by the Colorado commission on higher education, an agency of the department of higher education. The commission has dual functions – executive policy and legislative implementation. By statute the commission is responsible for higher education finance and appropriations, academic programs and

systemwide planning, capital construction and long-range planning, and for overseeing the administration of a research grant program to develop new technologies and materials in the universities' research laboratories and bringing them into the marketplace. (CCHE 2000a) The director of the commission is appointed by the State governor, one of the few in the US (NORED 2000, p 14). Colorado's higher education institutions are governed by what a mixture of multi-campus, single campus, elected, and appointed boards. The Northwest Education Research Center (2000, p 6) suggests that Colorado may be unique among the US states in its mixture of governance arrangements.

The community college missions are stated in fairly conventional terms: open door, associate degree, liberal arts transfer, occupational and technical programs, and personal and vocational programs for adults. However adult basic education, which is a fairly significant community college responsibility in most states is the responsibility of the department of education in Colorado (NORED 2000, p 48). Local district colleges raise a proportion of their funds from local rates and are governed by community boards elected locally.

Occupational regulation

The Colorado department of regulatory agencies regulates 41 occupations, and legal practice is regulated by the Colorado Supreme Court board of law examiners. There is no licensing requirement and in many cases seem to be no apprenticeship for bricklayers, car mechanics, carpenters, fitters and turners, painters and decorators, riggers or welders (DORA 2001).

Vocational education

Vocational education in Colorado is provided by six public area-vocational/technical schools and several private occupational and trade schools. Most of these offer a few programs in one or two areas of specialisation, but the Colorado Technical University (2001), offers programs from associate degrees to doctorates.

Recent developments in tertiary education

Colorado has recently established the Colorado Institute of Technology, a partnership between the high-tech industry and the state's public and private colleges and universities which is planned to graduate up to 1,500 technically trained students every year to meet the lack of skilled workers in the fastest growing sector of Colorado's economy (Colorado Department of Local Affairs 2001). In 2001 the Colorado General Assembly passed 2 general education mandates to establish a common college curriculum in communication, technology skills, and critical thinking and to improve ease of transfer (Colorado Commission on Higher Education 2003a).

From 2005 the State's appropriation to colleges will be converted to the 'college opportunity fund' or voucher, valued at \$2,400 per equivalent full time student. Each prospective student will apply, be admitted and enrol in the normal way. Upon their enrolment their stipend is allocated to their college to offset the cost of their enrolment. The balance is charged in tuition fees up to a cap specified by the legislature. The fund is available only to in-state students, and normally only to students enrolled at State institutions of higher education (College opportunity fund, 2004). However, half the amount of funds provided to students attending public higher education institutions is provided for in-state students eligible for means tested Pell grants attending approved private higher education institutions (Colorado Department of Higher Education 2004a, p 2). By the end of 2004 three private schools had been awarded qualified status: Colorado College, Regis University and the University of Denver (Colorado Department of Higher Education 2004b).

All institutions participating in the college opportunity fund are required to sign a performance contract of four years' duration which limits tuition increases to inflation, imposes the Colorado core curriculum, restricts higher pay to academics who demonstrate superior performance in teaching and research on published measures, requires institutions to report publicly on the distribution of grades in each department and adopt other measures to reduce grade inflation, meet specific numerical retention and graduation rate targets, and make various changes to teacher education. State institutions which execute a performance contract are freed from the State's current

regulatory oversight, which is rather detailed (Colorado Commission on Higher Education 2004) and are also released from the revenue limitations of TABOR - the Taxpayer's Bill of Rights - because state funding will be funnelled to colleges indirectly. All state colleges and universities have agreed to their performance contract (Curtin 2005).

Current issues in tertiary education

One of the key trends observed in a study conducted by the Colorado commission on higher education was that enrolment in Colorado's institutions of higher learning has remained relatively stable during the past five years, despite fairly significant increases in the State's population and in the number of graduating high school seniors (CCHE 2000). The National Center for Public Policy and Higher Education (2000) also observes that a fairly low percentage of Colorado's students go on to college immediately after high school, and only a fair proportion of young adults (ages 18 to 24) are enrolled in education or training beyond high school. On the other hand, it observes that a very large percentage of the State's working-age adults (ages 25 to 44) are enrolled in college-level education or training.

The commission observed that fluctuating, flat and declining enrolments are a particular problem for the smaller institutions (2000b), most of which are located in sparsely populated and low socio-economic status areas. The NORED study (2000, p 40) further observed that only two institutions outside the Denver metropolitan/I-25 corridor region, Alamosa and Mesa, offer masters programs. Providing a reasonable range of higher education programs for the extensive sparsely populated areas of Colorado is a continuing issue for the State, and one of the priorities identified by the commission in its master plan.

Another issue identified by the commission was the internet, which the commission envisages will profoundly change not only how education is delivered but also the source of its delivery. Allowing each institution to spend limited resources to develop similar distance learning programs with slight variations is inefficient, the commission argued. It concluded that a single provider for developing general distance learning

courses could eliminate costly duplication and allow reallocation of resources to technology innovation (CCHE, 2000b).

The commission's general position is that 'duplication is inevitable in a multi-institutional system. However, some duplication saps resources and stifles innovation. Reassessing administrative, instructional and operational duplication is crucial' (CCHE 2000a). Other priorities set by the commission include moving the State's colleges and universities towards performance-based budgeting and 'implement fully the quality indicator system set out by the Colorado General Assembly in C.R.S. 23-13-107, which calls for collecting and reporting institutional performance based on various qualitative and quantitative measures and the presentation of certain key elements of those measures in a consumer guide' (CCHE 2000a).

In 2003 the Governor's Blue Ribbon Panel on higher education for the 21st century recommended the establishment of education savings accounts, tied grants to institutions to pursue a specific role and mission, giving institutions which achieve retention and graduation benchmarks tuition flexibility or other flexibility, and a report on the funding of remedial programs at the college level (Colorado Commission on Higher Education 2003b). Many of these issues have been included in the institutional performance contracts described above, but are likely to remain alive until the State has some experience operating the contracts.

Texas: cowboys and silicon chips

Texas is a mixture of rural fundamentalism, aggressive entrepreneurialism and sophisticated technology.

Geography

Texas has an area of 267,277 sq. miles of varied geography extending from sea level at the Gulf of Mexico to over 8,000 feet in the Guadalupe Mountains of far West Texas, and from the semitropical Lower Rio Grande Valley to the High Plains of the

Panhandle. At its longest Texas is 801 miles north-south and 773 miles east-west (The Dallas Morning News 1999).

The area that is now Texas was first settled around 10,000 BC. At the time of European settlement by the Spanish in the late 17th century Texas was occupied by Kiowas, Comanches, Southern Cheyennes and Arapahoes. Texas joined the United States Union in 1845. The cattle drives which are so prominent in the US myth had been occasional in the 1830s, sporadic during the 1840s and 1850s, and almost nonexistent during the Civil War, but began in earnest in the 1860s, mostly to markets and railheads in the Midwest. They were at their peak for only about 20 years until the proliferation of railroads made them unnecessary.

Oil was discovered in Texas in 1894. In 1958 Jack Kilby of Texas Instruments developed the integrated circuit and in 1962 the National Aeronautics and Space Administration opened its Spacecraft Center in Houston. The siege in Waco, Texas was in 1993. Texas' main industries are manufactures, chemicals and allied products, petroleum and coal products, cattle, cotton, dairy products, and transport equipment (The Dallas Morning News 1999). Texas' gross state product was \$551.8 billion in 1996 and per capita personal income was \$23,656 in 1997 (Texas Department of Economic Development 2001).

Texas' population reached 20,851,820 in 2000 (U.S. Census), almost 85% of whom live in metropolitan areas. Its largest cities are Houston (1,841,064), San Antonio (1,123,626), Dallas (1,085,614), Austin (608,053) and El Paso (600,277) (Texas State Data Center estimates, 1998). Much of Texas' character is shaped by its origins as a part of the former Spanish colony of Mexico and its sharing of an extensive border with Mexico.

Tertiary education overview

Texas has 960,000 students studying at post secondary education level, but the National Center for Public Policy and Higher Education (2001) says that a very low percentage of students in Texas proceed to college immediately after high school, and only a fair

percentage of young adults (ages 18 to 24) in the State are enrolled in college-level education or training. A small proportion of working-age adults (ages 25 to 44) are enrolled in educational programs beyond high school.

Some 48% of students are enrolled in four-year institutions. While Texas has the very prominent Rice University (ranked number 12 of national doctoral universities by the *2001 U.S. News & World Report*) Rice has a relatively small enrolment of 4,000 students and only 10% of students are enrolled in private four-year colleges. Private two-year colleges enrol less than 1% of Texas students (Texas Higher Education Coordinating Board 2001a).

Higher education in Texas is coordinated by the Texas Higher Education Coordinating Board, which was established by the Texas Legislature in 1965 to 'provide leadership and coordination for the Texas higher education system to achieve excellence for the college education of Texas students' (Texas Higher Education Coordinating Board 2002a). The board has a strong role.

The Texas education code requires the Texas Higher Education Coordinating Board to review periodically the role and mission statements, the table of programs, and all degree and certificate programs offered by the public institutions of higher education to assure that they meet the present and future needs of the State and the counties in which they are located. The code also requires the board to order the initiation, consolidation, or elimination of degree or certificate programs where that action is in the best interest of the public institutions themselves or the general requirements of the State of Texas, the counties in which they are located, or when that action offers hope of achieving excellence by a concentration of available resources. Further, no new department, school, degree program, or certificate program may be added at any public institution of higher education except with specific prior approval of the board (Texas Legislative Council 2001).

Texas has four public university systems: Texas A & M University system, Texas State University system, The University of Texas system and the University of Houston system. Texas A&M University is a land-grant, sea-grant and space-grant institution

(TAMU 2002). The TAMU system has ten institutions, most of which are comprehensive masters-granting institutions, but three of which are research doctoral granting universities. Texas A&M University – College Station is ranked by the 2002 *U.S. News & World Report* as the equal 48th top doctoral university nationally. It was the State's first public institution of higher education, established in 1876 as the Agricultural and Mechanical College of Texas.

The Texas State University system has eight institutions, all masters comprehensive. It was established in 1911 to consolidate the management of teacher colleges, but now the components offer a comprehensive range of programs. The system is governed by a Board of Regents comprising nine members appointed by the governor with the advice and consent of the State Senate. An administrative staff headed by a Board-appointed chancellor administers the central activities of the system and provides support to the system components (Lamar University 2002).

The University of Texas system comprises nine institutions, five of which are masters comprehensive institutions and four of which are research doctoral granting institutions. The oldest institution, the University of Texas – Austin, was founded in 1883 and is also ranked with Texas A&M University as the equal 48th top national doctoral university. The University of Houston system has four institutions, ranging from a general baccalaureate granting institution to an extensive research doctoral granting institution. The oldest component was established in 1927. In addition to the university systems there are six separate universities serving specialist needs.

Texas has 74 public community and technical colleges. Most two-year colleges are established by their district. Each district is formed by a local community and governed by a locally elected board. Colleges are funded through a combination of locally assessed taxes, tuition fees, and State general revenue appropriations. Sub section 130.003 (e) of the Texas Education Code provides that public community colleges primarily serve their local taxing districts and service areas by offering technical programs leading to associate degrees or certificates; vocational programs leading directly to employment in semi-skilled and skilled occupations; freshman and sophomore courses in arts and sciences; continuing adult education programs for

occupational or cultural upgrading; compensatory education programs; workforce development programs; and adult literacy and other basic skills programs for adults (Texas Higher Education Coordinating Board 2000).

Some 2% of two-year college enrolments are in the Texas State Technical College System, a system of public two-year institutions of higher education which includes four colleges and three extension centres located throughout Texas. The technical college system's role is described in section 135.01 of the Texas Education Code as 'offering courses of study in vocational and technical education for which there is demand within the State of Texas' and 'emphasizing highly specialized advanced and emerging technical and vocational areas . . . The emphasis of each TSTC System campus shall be on advanced and emerging technical programs not commonly offered by public junior colleges.'

The Texas State Technical College System institutions and the Lamar University lower-division institutions have no taxing authority and are funded by local tuition fees and State general revenue appropriations. As a result, the service area for these colleges is the whole State and their profiles vary slightly in content from the community colleges' profiles. TSTC offers more than 75 associate degree and certificate programs ranging from laser electro-optics to telecommunications, from environmental science to aircraft pilot training, from biomedical equipment to webmaster, from culinary arts to automotive (Texas Higher Education Coordinating Board 2000).

The Texas charter for public higher education adopted by the Legislature in 1987 provides that 'Each postsecondary educational institution should be assigned a distinct role. Each college and university should strive to excel in selected academic or technical areas and to achieve distinction among peers nationwide' (Texas Higher Education Coordinating Board 2005, principle III). The Texas Higher Education Coordinating Board (2003) has interpreted this as encouraging each college and university to have at least one program or service of nationally recognised excellence. However, Texas does not have an explicit policy of distinguishing public four-year colleges by selectivity of student admissions. A measure of the selectivity of institutions is the proportion of their first-time undergraduates who were in the top 10% of their high school class.

The next table shows public four-year institutions' proportions of transfer students, which the Texas Higher Education Coordinating Board defines as undergraduate students who enrolled in 30 semester credit hours or more in the past six years at a public community or technical college. The table lists institutions by the proportion of first-time undergraduates who were in the top 10% of their high school class which is taken as a measure of selectivity of undergraduate admissions. The most selective public institution on this measure is Texas A&M University – College Station; 39% of its admissions were in the top 10% of their high school class and 17% were transfer students. The next most selective public institution is The University of Texas at Austin, which had 31% of its admissions in the top 10% of their high school class and 13% transfer students. There is a gap to the group of moderately selective institutions which are of gradually lesser selectivity but which have very variable transfer rates apparently unrelated to their selectivity and probably heavily influence by local factors. Finally there is a group of not so selective institutions which again have variable transfer student admission rates. But the average transfer student admission rate for not so selective institutions is a little less than the average for the moderately selective institutions, probably because they are less attractive institutions for transfer students.

TABLE 5.3: PROPORTION OF UNDERGRADUATE STUDENTS AT TEXAS FOUR-YEAR PUBLIC INSTITUTIONS WHO TRANSFERRED FROM A 2-YEAR INSTITUTION, BY INSTITUTION'S SELECTIVITY, 2000

Institution	Transfer students	Total under graduate enrolments	% transfer	% admissions in top 10% of class
Texas A&M University – College Station	5,947	35,880	17%	39%
The University of Texas at Austin	4,647	37,159	13%	31%
Sub total highly selective institutions	10,594	73,039	15%	35%
Texas Tech University	3,295	20,227	16%	26%
The University of Texas at Dallas	2,387	5,881	41%	25%

Institution	Transfer students	Total under graduate enrolments	% transfer	% admissions in top 10% of class
Texas A&M University-Corpus Christi	1,588	4,843	33%	21%
The U of Texas of the Permian Basin	821	1,663	49%	19%
University of Houston	7,216	23,525	31%	19%
The University of Texas at Arlington	4,857	13,939	35%	19%
Southwest Texas State University	6,135	18,855	33%	18%
Texas A&M University at Galveston	159	1,271	13%	17%
The University of Texas at San Antonio	4,509	15,796	29%	17%
Texas A&M International University	1,056	2,240	47%	17%
Texas A&M University-Kingsville	701	4,635	15%	16%
Texas A&M University-Commerce	1,470	4,531	32%	15%
Lamar University	979	6,890	14%	15%
University of North Texas	6,310	20,449	31%	12%
Stephen F. Austin State University	2,439	10,511	23%	12%
Sam Houston State University	3,384	10,825	31%	11%
Midwestern State University	474	4,776	10%	9%
Tarleton State University	1,450	5,983	24%	8%
Prairie View A & M	390	4,954	8%	7%
Sub total moderately selective institutions	49,620	181,794	27%	16%
West Texas A&M University	1,182	5,399	22%	0%
Angelo State University	761	5,733	13%	0%
Sul Ross State University	163	1,457	11%	0%
The University of Texas at El Paso	2,581	12,471	21%	0%
The University of Texas-Pan American	1,624	10,361	16%	0%
The University of Texas at Tyler	1,480	2,188	68%	0%
University of Houston-Downtown	2,337	8,344	28%	0%
Texas Southern University	509	4,829	11%	0%
Texas Woman's University	1,711	4,453	38%	0%

Institution	Transfer students	Total under graduate enrolments	% transfer	% admissions in top 10% of class
Sub total not so selective institutions	12,348	55,235	22%	0%
Sub total moderately & not so selective	61,968	237,029	26%	
TOTAL	72,562	310,068	23%	

Source: Texas Higher Education Coordinating Board (2001b) Report on the performance of Texas public universities.

The distinction between moderately selective and not so selective institutions is not so significant for transfer student admission rates so it is convenient to treat them as one group. This allows me to construct a table for Texas in the same form as the table for the other jurisdictions.

TABLE 5.4: PROPORTION OF STUDENTS AT THE HIGHLY SELECTIVE AND THE MODERATELY SELECTIVE 4-YEAR PUBLIC INSTITUTIONS WHO TRANSFERRED FROM A 2-YEAR INSTITUTION, TEXAS, 2000

Institution	Number of transfers	Total u/grad enrolments	% of u/grad enrols who are transfers
Sub total highly selective institutions	10,594	73,039	15%
Sub total moderately selective institutions	61,968	237,029	26%
TOTAL	72,562	310,068	23%

Source: Texas Higher Education Coordinating Board (2001b) Report on the performance of Texas public universities.

Occupational regulation

Texas Higher Education Coordinating Board Community and Technical Colleges Division's *2001 Statewide Annual Licensure Report* includes data on 23 licensure examinations for occupations such as aircraft mechanic, court reporting, funeral directing, law enforcement (academy, corrections, criminal justice), nursing (nurse aide, licensed vocational nurse and registered nurse) and radiation therapy. In addition at least a further 20 occupations are licensed by specialist agencies and boards, such as accountants, air conditioning and refrigeration, architects, chemical dependency counselor, child care administration, (building) code enforcement, dental hygienist, engineer, fitting and dispensing of hearing instruments, marriage and family therapists, medication aide, optometrists, pharmacists, plumbers, polygraph examiners, real estate appraiser, real estate sales agent and respiratory care practitioner and veterinary medical examiners.

By virtue of the *Texas Public Accountancy Act* of 1991 Texas is one of 36 states to require candidates for the Certified Public Accountancy exam to have a baccalaureate or graduate degree and a minimum of 150 semester credit hours of recognised courses or subjects. Since the normal full time study load is 15 hours per semester or 30 hour per annum, this requirement is normally met after 5 years' full time study, often leading to the joint award of a Bachelor of Business in Accounting and a Master of Business Administration (Tarlton State University 2001; San Houston State University 2001; Stephen F. Austin State University 2001).

Recent developments and current issues

The National Center for Public Policy and Higher Education notes that Texas has low participation in higher education amongst school-leavers, young adults (ages 18 to 24) and working-age adults (ages 25 to 49). The center reported that Texas compares well with other states in the affordability of two-year college but poorly in the affordability of 4-year colleges. It reports that the State's investment in financial aid for low-income families has increased, but remains very low (National Center for Public Policy and Higher Education 2002).

The Texas Legislature recently passed a bill to allow public institutions to set tuition fees themselves provided they set aside a portion of fee increases for financial aid (Couturier 2003, page B20). The Texas Senate education committee is investigating programs to increase the accessibility of higher education for educationally and economically disadvantaged students (Senate Committee on Education 2001). The Texas Higher Education Coordinating Board's Texas higher education plan *Closing the gap* notes that there is a big gap in enrolment and graduation rates between racial/ethnic groups, and that the groups with the lowest enrolment and graduation rates will be a larger proportion of the Texas population. It therefore proposes 'bold steps' to close the gap (Texas Higher Education Coordinating Board 2000b, p 4).

The Texas Higher Education Coordinating Board (2004a, pp iii-vi) recently completed a study of doctoral education in Texas which considered issues familiar around the world: methods for assessing the quality of doctoral programs, determining which institutions should have doctoral programs and in which disciplines, high attrition rates of from 40% to 50%, excessive time to complete (median of 7.6 years), extent of specialisation in programs, under representation of members of equity groups, over supply of doctoral graduates, and the costs and benefits of doctoral programs.

In January 2004 Governor Perry issued Executive Order RP 31 requiring the Coordinating Board and each public university, health-related institution, state college, technical college, and system to collaborate to provide 'the information necessary to determine the effectiveness and quality of the education students receive at individual institutions' and also to provide '... the basis to evaluate the institutions' use of state resources.' In October 2004 the Texas Higher Education Coordinating Board (2004b) adopted 'Accountability in higher education: promoting excellence in Texas public universities through institutional groupings, peers, and benchmarks'. This groups institutions of similar types and missions, determines for each group appropriate measures of institutional performance, establishes benchmarks against which to measure success, and assesses progress annually and takes steps to improve performance.

6 Sectors

The third step followed in this thesis is to classify the phenomena we observe, first, as a way of summarising data as Anderson (1961, p 7) says and secondly as an analytical tool, as a way of building a simplified but explanatory model of reality as Spolton (1968, p 114) suggests. The main classificatory concept in this study, as in many others, is the sector. Burton Clark stated the signal importance of sectors.

Academic systems, in varying degrees, have their activities separated into different types of institutions. Those institutions, deliberately or otherwise, are arranged in hierarchies. As systems become more loaded with activities, these larger forms of differentiation become increasingly important, perhaps obtaining an even greater role than the internal divisions in determining the nature and capabilities of academic systems. If there is a single structural key in the negotiating of effective modern systems, it appears to lie in sectoral differentiation.

(Clark 1983, p 53)

This chapter starts by recalling some of the historical antecedents of the establishment of vocational education as a sector or system of activities separate from general education. It then defines with greater precision vocational education as it is used in current comparative studies. The chapter concludes by considering arguments for establishing or maintaining sectors within tertiary education.

Historical development of vocational education

Formal education in Europe during the Middle Ages was provided by the monasteries which educated their pupils for religious duties and by apprenticeships (Bennett 1926, pp 21, 266). Craft skills were passed from parent to child with little collective instruction until the establishment of guilds which had among their purposes some forms of

vocational education (Barlow 1965, p 1). One of the earliest was the Candlemakers' Guild founded in 1061 (Barlow 1965, p 1). England established a national system of apprenticeships remarkably early with the *Statute of Artificers* of 1562. The US colonies were strongly committed to education to teach people to read and thus receive the authority of the bible directly, unmediated by the teaching of the church (Thompson 1973, p 58). Apprenticeships soon followed, supported by laws and rules adopted by towns and counties but without the support of guilds and other craft organisations that fostered the apprenticeship system in England (Thompson 1973, p 59).

Apprenticeships had three characteristics which became anachronistic after the industrial revolution (Bennett 1926, p 266). Apprenticeships were based on the handicraft mode of production, while the first industrial revolution was distinctive not in its introduction of power and mechanisation, but in its introduction of factory production. Secondly, the apprenticeship as with all other relations of the trade was long term, normally seven years (Bennett 1926, p 21), and terms including price were based on 'custom', or those traditionally accepted as just. One of the critical changes in England from the Napoleonic Wars was to set prices by supply and demand and establish terms by contract 'freely' negotiated separately and for the rather short duration of each transaction (Thompson 1980, p 260).

Thirdly, apprentices normally lived with their master's family. The relationship between a master and their apprentice established by the indenture was of guardianship or custodian of the apprentice's whole development rather than the narrow employment relationship of the factory. So masters were expected to give their apprentices moral, religious and civic instruction as well as teaching their craft's technical skills and introducing their charges to the 'mysteries' of their trade (Bennett 1926, p 21). Some guilds even required masters to teach their apprentices how to read and write (Bennett 1926, p 267) and masters who didn't have the ability or time to fulfill this responsibility personally did so by sending their charges to continuation schools established for this purpose.

Among the upheavals of the industrial revolution was the collapse of the apprenticeship system and in 1814 the government repealed the apprenticeship clauses of the *Statute of Artificers*, which had been on the statute books for 252 years. As contemporaries observed, the division of labour in the new factories did not develop workers' skills or their knowledge of the whole production process, yet skilled workers were still needed and were not being produced by the 'now almost obsolete' apprenticeships (Magnus 1888, pp 21-2). Magnus (1888, pp 21, 23) concluded that workers' 'only opportunity of acquiring such knowledge is outside the workshop or factory – in a technical school . . . or some other substitute for apprenticeship'.

Apprenticeships were therefore replaced, at least partly, by Sunday schools, part time schools and factory schools (Bennett 1926, pp 266, 272). In 1791 'schools of industry' were established in England (Bennett 1926, p 88) as a substitute for apprenticeships (Bennett 1937, p 46). France established its *Écoles Nationales d'Arts et Métiers* (National Schools of Arts and Crafts) in 1799 and its *École Centrale des Arts et Manufactures* (Central School of Arts and Industries) in 1829. A very influential model was Russia's School of Trades and Industries established in 1830, which became the Imperial Technical School in 1868 (Bennett 1937, p 14). Magnus (1888, p 23) also argued for the establishment of a system of technical education for social reasons, to occupy and train children factory workers who are dismissed when they mature. 'Numbers of young men are thus thrown upon the labour market, competent to do nothing more than children's work, and to earn children's wages, and knowing no trade to which they can apply their hands' (Magnus 1888, p 23). The industrial revolution was not as quick and extensive in Germany, hence its guilds and apprenticeship system remained (Bennett 1937, p 193) to form Germany's modern dual system of post compulsory education.

At about the same time (1824) the London Mechanics Institution was established inspired by George Birbeck's lectures in Glasgow and London 20 years earlier. The main purpose of these institutions was to disseminate 'useful knowledge' but even so their courses were limited to instruction in the scientific principles underlying a craft and did not include instruction in the craft itself (Cotgrove 1958, p 13; Magnus 1888, p 20). Practical trade instruction in workshops was opposed both by employers who

feared that they would sell their output at subsidised prices (Cotgrove 1958, p 36) and by unions which feared that they would produce too many and too cheaply skilled workers who would depress wages and working conditions (Bennett 1937, p 518; Summerfield & Evans 1990, p 3). The Australian colonies followed the UK example remarkably quickly, establishing the Van Dieman's Land Mechanics Institute in 1827, the Sydney Mechanics' School of Arts in 1833 and similar institutes in Adelaide 1838, Melbourne 1839, Brisbane 1849 and Perth 1850 (Murray-Smith 1965, p 174). Again following the UK model, 'All of these institutions placed emphasis on "Instruction in the principles of the Arts and in the various branches of science, and useful knowledge" as the objects of the Van Dieman's Land Mechanics Institution had it' (Murray-Smith 1965, p 174). Their emphasis on the principles underlying a craft rather than the craft itself separates theory from practice (Murray-Smith 1965, p 175).

While the mechanics institutes did not survive their original purpose beyond 25 years, they 'were particularly important as early examples of further technical instruction for their influence on later developments' (Cotgrove 1958, p 13). 'Moreover the teaching of the scientific principles underlying a craft in the mechanics' institutes and the separation of theory from practice became an established tradition which set the pattern for later provision and persisted in its influence over technical education throughout the century' (Cotgrove 1958, pp 13-4). Thus the *Technical Instruction Act* of 1889 defined technical instruction as 'instruction in the principles of science and art applicable to industries, and in the application of special branches of science and art to specific industries or employments. It shall not include teaching the practice of any trade of industry or employment' (quoted in Pratt 1970, p 14).

The early success of the mechanics institutes encouraged the philanthropist Quintin Hogg to open his polytechnic in Regent Street in 1881. This was a great success and by 1897 another 8 polytechnics had been established with a total enrolment of 26,000 students, a large proportion of whom were manual workers (Cotgrove 1958, p 60). But manufacturers doubted that trades could be taught satisfactorily outside a workshop (Cotgrove 1958, p 67) and largely ignored the new institutions. Cotgrove (1958, p 65) argues that polytechnics were established to serve social, not industrial or business interests –

The extension of technical instruction in the polytechnics and elsewhere was the outcome of efforts to elevate the working classes, rather than any concern with the contribution of education to industrial proficiency. It was the child of educationists, philanthropy, and the demands of students, and received little blessing or guidance from the manufacturing and business community.

(Cotgrove 1958, p 65)

Connell & Irving (1980, p 64, quoted in Hyde 1982, p 112) make the same point about Australia, that 'from the start education of the people had a cultural rather than a technical rationale'. Only later was vocational education redirected from serving individuals' needs to those of an industrial economy (Hyde 1982, p 125; Ely 1978, p 53, quoted in Hyde 1982, p 125).

From this quick review 2 analytic distinctions can be posited. First, one may distinguish training for a job, for a vocation, for a career and training for life. Medieval apprenticeships were clearly training for a vocation – from apprentice to journeyman and then to master – but also training for life in their inclusion of moral, religious and civic instruction. Secondly, educational institutions may provide education and training that complements, substitutes or is an alternative to training for a job. Thus the pre industrial revolution continuation schools complemented the on the job training of apprenticeships, but in teaching literacy they provided education for life as well as enhanced career prospects. On the other hand, England's schools of industry and France's Écoles Nationales d'Arts et Métiers were substitutes for apprenticeship systems heavily eroded if not completely destroyed by the industrial revolution. The mechanics institutes provided education for a career and for life as alternatives to apprenticeships.

From its antecedents there was no obvious reason in principle for systematic vocational education to be separated from general and higher education. It was established for social and moral improvement rather than to contribute to industrial efficiency, it provided education for life as much as developing technical skills, and it taught the principles underlying crafts rather than the crafts themselves. Nonetheless, as we shall see in the next section, vocational education was separated from general education much farther than might be warranted by its different subject matter.

Historical separation of vocational education from general education

Despite their being established to offer lower level education, polytechnic students expressed strong demand for more advanced studies. By 1904 some six polytechnics were offering baccalaureates and 50 of their teachers were recognised as university teachers, teaching 500 undergraduates (Cotgrove 1958, p 64). By 1909 this had increased to 100 recognised teachers and 836 matriculated students (Cotgrove 1958, p 64). Some 80% of polytechnic undergraduates attended lectures part time in the evening, indicating that then (and possibly now) UK universities did not make much of an effort to accommodate part time students. However, there was considerable resistance to polytechnics offering higher academic studies, from, for example Millis, principal of the Borough Polytechnic and Quintin Hogg himself (Cotgrove 1958, p 63). Hogg argued that polytechnics were intended mainly for artisans and workers and ‘I did not include the [cultural] subjects you mention for fear of attracting a class of young men of a higher educational status than those for whom the institute was intended’ (Cotgrove 1958, p 63). Nonetheless, technical colleges maintained baccalaureate programs as a substantial part of their offerings (Cotgrove 1958, p 193).

Central governments’ antipathy to vocational education also contributed to its deep separation from general education. Sir Robert Morant, the permanent secretary for education from 1902 and the main architect of the English educational system, separated ‘technical’ from ‘secondary’ education under the *Education Act* of 1902 rather than develop them as an integrated whole. Morant redirected resources, attention and prominence from vocational education to classical education in the grammar schools he promoted (Vlaeminke 1990, p 64). The other countries covered in this study followed similar patterns. The separation of technical colleges and universities was established in Australia by the 1880s (Hyde 1982, p 121). It was reinforced by the Murray Committee of 1957 which criticised the blurring of responsibilities in many places between universities and technical colleges, but emerged again after 1964 when the bigger technical colleges were promoted to colleges of advanced education and did not relinquish all of their vocational education programs (Williams 1979, p 752). Education authorities’ comparative neglect of vocational education provoked a

defensive reaction from its champions. Thus in 1917 the US federal Government became involved in education, a State responsibility under the US constitution, to fund vocational education under the Smith-Hughes Act. The champions of vocational education and the Act sought to protect it from encroachment by general education by encouraging separate administration of the program (Venn 1964, pp 64-66; quoted in Thompson 1973, p 108).

Neave (1992, p 10) argues that vocational education and general tertiary education were organised into vertically differentiated systems in western Europe during the mid 1960s when student enrolments in tertiary education were from 5% to 8% of the relevant age group. He therefore sees it as a result of the massification of tertiary education in many countries. In others a two-track system was established to have one sector catering for short term changes in the economy while the other sector would continue to deal with long term shifts (Neave 1992, p 10). The rest of this chapter considers the desirability of establishing tertiary education sectors and different ways of configuring sectors.

Why have sectors?

Clark gives three arguments for dividing tertiary education into sectors. First, it greatly facilitates student access, at least to the lower tier (Clark 1983, p 51). Secondly, Clark (1983, p 66) argues that a lack of sectors leads to an overload of activities and conflicting priorities. This in turn leads to the burdens of mass teaching and counselling crowding out research and advanced training according to Clark (1983, p 66). But this depends on which activities are taken as given and which are variable. Clark seems to assume that universities will retain a comprehensive range of disciplines while the activities of teaching, counselling, research and advanced training are opportunities for specialisation. But in many ways it would be more logical for institutions to specialise by discipline but conduct a comprehensive range of activities for their specialised disciplines. An example is the former Soviet Union and communist countries of central and eastern Europe which unified tertiary type A and B education within sectors defined by field. Thus monotronics in agriculture, economics, engineering, fine arts, medicine, pedagogy and physical education (Pilipovski 1992, p 1243) included both types A and B of tertiary education.

Thirdly, Clark (1983, p 67) argues that new sectors should be established to discharge major new functions, and Kogan (1993, p71) made a similar argument. Thus, two-year colleges were created in the US to handle mass participation and the UK established its Open University to offer mass distance education. According to Clark (1983, p 67) adding new types of institutions to handle new functions makes the system as a whole more adaptive than trying to get the old sectors to discharge new functions in addition to their current functions. But on this argument research should not have been added to the then mostly teaching-only universities in the 19th century, but a new sector should have been established specifically to discharge this new function, and indeed this was argued by Newman (1959 [1853]) in his *The idea of a university*. Depending on what is considered a major activity or contradictory operation, graduate professional education, part-time study, distance education, mature age entry and on-line learning should not have been added to universities throughout the 20th century which at least until World War II were then dominated by fulltime face-to-face undergraduate education for school-leavers.

Even granting the need or desirability for organisational specialisation, Clark's argument does not help in deciding the organisational level at which specialisation should occur. Consider graduate programs such as the MBA. These could be made the specialised responsibility of a sector such as France's *Grandes écoles*; of an institution such as Quebec's *École des Hautes Études Commerciales*; the responsibility of part of an institution such as the graduate schools of management common in Australia, the UK and the US; or of part of a faculty also responsible for undergraduate teaching and research. Likewise baccalaureates are variously the specialised responsibility of sectors, of institutions, in the US of undergraduate colleges within institutions, and of program coordinators within faculties within institutions. As will be seen below, in parts of continental Europe mode 1 (Gibbons *et al* 1994) investigator-initiated and discipline-based research is mainly the responsibility of what might be considered a fourth sector of research-only institutes and in other jurisdictions such as California research is concentrated in research-intensive universities. It is also commonplace for research centres to be established within institutions and within faculties and departments within institutions. It is not obvious that labour is better divided at one level of organisation rather than any other.

A modern variant of this argument of Clark's is that formally prescribed institutional diversity supports programmatic diversity – the capacity of the system to offer a diversity of programs for a diversity of learners and for a diversity of outcomes (Shapiro 1993, p 53; Meek 2000; Trow 2005, p 9). However, Huisman and colleagues (2003, p 14) found exactly the opposite: 'high levels of diversity are not related to high levels of participation. On the contrary: the results indicate that the lower the level of diversity, the higher the level of participation'. Huisman, Kaiser & Vossensteyen (2003, p 26) claim that this is consistent with what little empirical research there is in the area. They cite Teichler's (1988, p 225) conclusion that 'the data made available in the six country studies [USA, Japan, Switzerland, Singapore, China and Germany] do not suffice to draw any conclusions about the relationship between massification and structural diversification'.

Trow (1976, p 98) and Husén (1976) argued for the maintenance of sectors to promote excellence in the more selective sector or to protect 'elite segments' from the pressures of more (Pechar 2004a, p 47) and more diverse students. More recently Trow (2005, p 9) argues that 'The second great advantage of diversity is that, when coupled with institutional autonomy, it creates or allows to emerge a series of educational experiments.' Scott (2000, p 198; Nowotony, Scott & Gibbons 2001, p 85) observes that the differentiation which was initially based on a distinction between academic and vocational programs which was closely aligned with social class hierarchies is now based on a distinction by research activity. Scott doesn't quite disentangle three successive drivers of differentiation:

- 1 cognitive, when academic education was differentiated from vocational education which in turn is related to different labour force needs and outcomes (Huisman and colleagues 2003, p 4);
- 2 access, when open entry sectors were established to preserve selective entry of the 'noble' sector; and
- 3 research, when support for research is concentrated.

These drivers have been overlayed on existing structures, so that most tertiary type A sectors in the jurisdictions in this study are academic, have selective student entry and provide the research-intensive institutions. Scott (2000, p 199) further observes the point made earlier, that research funding might be concentrated by sector, by institution or by centre within institution. He (Scott 2000, p 199) adds that the differentiation extends to the division of university staff into teachers or researchers.

While most arguments for the establishment of sectors are from or on behalf of the more selective institutions, Schofield (1998, p 5) argues for the maintenance of sectors to protect vulnerable vocational education institutions from predation by university ‘timber wolves’, echoing vocational education’s defensive position early in the century. Keating and colleagues (2002, p 169) hint at a final motive for differentiating tertiary education sectors. There has been considerable ambiguity in financial and policy responsibility for education and many other areas between the Australian federal and State governments since the federal Government effectively gained exclusive income tax powers from WWII. The Australian federal Government has primary responsibility for financing tertiary type A education, whereas the States still have primary responsibility for financing tertiary type B education. Maintaining sharp distinctions between the sectors has largely prevented cost-shifting between State and federal governments and reduced ambiguity and conflict over policy responsibility for the sectors.

Two sectors

UNESCO’s and the OECD’s distinction between tertiary-type A and B programs sometimes also coincides with a distinction between programs leading to the award of a baccalaureate or bachelor’s degree and programs leading to sub baccalaureate awards. It also often but again not necessarily coincides with a distinction between short-cycle and medium cycle higher education (Furth 1973; Kintzer & Bryant 1998). Thus the late Dorotea Furth (1973) defined short-cycle higher education as ‘post-secondary education of a mainly terminal character designed to train students for middle-level manpower positions’.

Conveniently, but not necessarily fortuitously in view of the conscious decision to choose for study systems that are most similar, these distinctions coincide with the main sectoral distinction in the study. So this study will be able to adopt the usage that Furth (1992, p 1217) observed in retrospect: ‘“short-cycle higher education” and “short-cycle institutions” were terms adopted in the 1960s in comparative studies which aimed at highlighting the main characteristics of structural reforms designed to expand and diversify provision of post-secondary systems.’ Geiger (1996, 193) observes that 2-year colleges have differed from ‘the upper reaches of U.S. higher education’ in their students’ ‘social origins, occupational destinations, manner of attendance and relationship with higher learning’. This is certainly true of Australia and seems also to be true of the UK. Tertiary type A institutions are also distinctive in having at least a significant proportion of students in residence, whereas tertiary type B students commute. These institutional types are also sometimes referred to as ‘noble’ and ‘less noble’ (Furth 1973, 18), referring to their status or esteem. This allows us to tabulate the distinctions between tertiary type B and tertiary type A and map these onto the arrangements in different jurisdictions.

TABLE 6.1: TERTIARY TYPE B AND TERTIARY TYPE A

Characteristic	Tertiary type B	Tertiary type A
Award baccalaureate?	No	Yes
Program duration	Short	Medium-long
Student admissions	Less selective – open entry	More – highly selective
Student class	Broad	Weighted to middle-upper
Student attendance	Most part time	Most full time
Student residents	All commute	Significant residents
Status	Less noble	Noble
Jurisdiction		
AUSTRALIA		
Institutions	TAFE institutes / vocational education and training providers	Universities/ higher education institutions

Characteristic	Tertiary type B	Tertiary type A
Sectoral tag	Vocational education and training	Higher education
UK		
Institutions	Colleges of further education	Universities
Sectoral tag	Learning and skills sector	Higher education
US		
Institutions	2-year / community colleges	4-year colleges / universities
Sectoral tag	Higher education	

Different motives for establishing a tertiary education type B sector posit different models of type B institutions. If the purpose is to support cognitive differentiation between academic and vocational education then an appropriate model is of a specialised vocational provider as Furth (1992, p 1,218; see also 1973, p 17) describes. She (Furth 1992, p 1218) gives as examples of specialised vocational institutes the Instituts Universitaires de Technologie in France, Više Škole in Yugoslavia, Fachhochschulen in Germany, regional colleges in Norway, and hogescholen (higher vocational institutes) in the Netherlands.

However, if the main function of a tertiary type B sector is to provide scope for higher education to expand to mass participation (Trow 1974) without reducing the selectivity of type A institutions (Parry 2003, p 309), then an appropriate model is a sector that is 'equal to but different from' tertiary type A education. This, often described as the binary model, is best instanced by the UK polytechnics but other examples are New Zealand's polytechnics and Australia's former colleges of advanced education. Following the dismantling of the binary divide in the UK in 1992 colleges of further education have taken on the role of providing mass participation (MacLennan 2000, p 1). Jakupec & Roantree (1993, p 163) predicted that a new sector would emerge to take this role in Australia following the dismantling of its binary divide in 1988, but one has yet to emerge, probably because the university sector expanded to handle most demand for higher education.

Providing for mass participation was the initial motive of the University of Chicago president William Rainey Harper and of University of California system president Clark Kerr (Douglass 2000, p 18) in advancing in the US what are now commonly referred to as two-year colleges. However, providing mass participation in the US was grafted onto the upper stream of secondary education which until then had provided vocational education. Neave (1992, p 11) reports that a similar procedure ‘of upgrading establishments which previously occupied a precarious and uncertain position on the margins of higher education or were establishments whose official status placed them firmly in secondary education’ was adopted in England and Wales, Spain and in the then Federal Republic of Germany with the upgrading of the *Fachschulen* to *Fachhochschulen*. Consequently in the US two-year colleges were expected to perform dual and then multiple purposes. They offer ‘a large variety of short-cycle programs ranging from the purely academic – first two years of university degree (undergraduate) studies – to various types of vocational training and continuing education schemes’ (Furth 1992, p 1218). This in turn has caused competing and in some cases conflicting roles and priorities within 2-year colleges (Grubb 1996; Douglass 2002). Arguably Clark’s (1983) functional segmentation in the US has simply shifted role overload from the more powerful and better resourced tertiary type A institutions to the more vulnerable and lesser resourced type B institutions.

We may therefore observe two broad patterns or tendencies for structuring tertiary education into two sectors. One tendency is to seek to serve the different needs of different students, employers and the different needs of society generally by structuring sectors and institutions to serve specific needs, most commonly to establish tertiary type B institutions to specialise in developing skills for employment and type 5A institutions to provide general education and education for the high status-high paying occupations. This tendency, which is most associated with western continental Europe, separates tertiary type B education from type A tertiary education in organisation, curriculum and student groups, often from the postcompulsory years. Another tendency has been to seek to accommodate more diverse needs by broadening the roles of institutions and sectors. Institutions which are perhaps structured into sectors may have different emphases and orientations, but this is within a comprehensive framework. This is the pattern in many Anglophone countries – Canada, New Zealand, the UK and the U.S. In

these countries the type B and type A sectors and institutions merge and overlap considerably (Furth 1973; Clark 1983). As Furth (1992, p 1217) argued, both strategies accommodate diversity, but in structurally different ways.

These patterns in postcompulsory education provision coincide with two patterns for structuring economies and their relationship with postcompulsory education. Western continental Europe tends to have market economies which are coordinated by their social partners: government, business and labour. Tertiary type B and A students might be placed on quite separate postcompulsory education tracks, but the coordinated market economy matches graduates and job vacancies for most. The market economies of the Anglophone countries are rather freer, relying more on the market to sort and match graduates and employment. In the unpredictable liberal market economy students need more general postcompulsory education and greater mobility between type B and A tertiary education to match their education with employment opportunities. This distinction is made and expressed as the difference between coordinated market economies and liberal market economies by Hall & Soskice (2001). A very similar distinction was made by Audretsch & Thurik (2001, p 30), but their distinction is between the old managed economy ‘versus’ the new entrepreneurial economy. They (Audretsch & Thurik 2001, pp 30-1) argue that the correct policy debate is not between ‘more versus less government’ but ‘the inherently different role of government policy’ in the entrepreneurial and managed economies.

As was shown in chapter 4, Australia followed the Anglo pattern of giving tertiary education institutions general roles until 1965. However type B institutions were confined to sub diploma programs following the Martin report of 1964 (Davis 1989; Goozee 2001, p 7; ACOTAFE 1975, para 5.69; CTEC 1986, para 6.113). Since then Australia has followed the western continental European pattern of keeping largely separate its tertiary type A and B sectors, institutions, programs and students. So Australia is anomalous or at least distinctive in formally distinguishing its tertiary type B and A sectors as deeply as many western continental European countries, but it does so within a liberal market economy which in other Anglophone countries is associated with merged and overlapping type 5B and 5A sectors. This is illustrated in table 6.2.

TABLE 6.2: PATTERNS OF ORGANISATION OF THE ECONOMY AND TERTIARY EDUCATION

Market economy	Tertiary education sectors	
	Merged	Separate
Liberal	Anglo	Australia
Coordinated		Euro

Australia's distinctive pattern means that it can learn from examples in both the Anglo and the Euro traditions, but that none can be a direct model. Or to express the same point epigrammatically, Australia can learn a little from a lot of countries but a lot from only few countries.

The different roles served by tertiary type A and B institutions require different curricula, student entry requirements and different staff qualifications. But the differences between the sectors in Australia go far beyond what may be required to discharge their different roles and closer to the 'tracking' that Neave (1992, p 10) observed is 'an enduring characteristic of Europe's secondary school systems'. Responsibility for financing and coordinating tertiary type B education is mostly with State and Territory governments, students pay tuition fees up front, the curriculum framework is set by training packages, and qualifications are accredited in accordance with the national training recognition framework. Conversely, almost all of the distinctively tertiary type A qualifications are offered by universities for which the Commonwealth has primary responsibility for financing and coordinating, fees are mostly collected through the higher education contribution scheme and higher education's curriculum is based largely on content which the universities accredit themselves.

Teaching staff in the two sectors think of themselves very differently and construct their industrial interests differently. Teaching staff in vocational education and training are represented by the Australian Education Union which also represents school teachers,

while higher education teaching staff are represented by the National Tertiary Education Industry Union which also represents general staff in higher education. Some of the tensions in inter-sectoral relations and obstacles to closer integration of the sectors can be traced to teaching staff of one sector protecting work and conditions from alternatively undermining or encroachment by staff of the other sector. The State branches of both unions are particularly jealous – or vigilant – in maintaining the sectoral boundaries.

TABLE 6.3: THE AUSTRALIAN SECTORAL DIVIDE

Characteristic	Vocational education and training	Higher education
Institution	VET provider/TAFE institute	University
Programs	Advanced diploma Diploma Certificate	Doctorate Masters Graduate diploma Graduate certificate Bachelor
Financing and reporting	States	Commonwealth
Fees	Up front	Income contingent loans
Curriculum	Training packages	Content
Accreditation	National training framework	Self-accrediting
Union	AEU	NTEU

The alignment of vocational education's identity with distinctive organisational arrangements leads the sector's supporters to resist the harmonisation of organisational arrangements between the sectors despite obvious advantages. Thus in its submission to the Commonwealth review of higher education in 2002 the vocational education provider Canberra Institute of Technology (2002, p 6) argued for 'the need to preserve different management and funding arrangements as the means to preserve essential differences based on government objectives, industry input, educational philosophy and

industrial relations realities as outlined above'. And several submissions to the same review from other vet interests rejected the extension of income contingent loans to vet despite their obvious equity benefit. (See, for example, the submissions from the Australian Education Union (2002) and the somewhat ambiguous submission from TAFE Directors Australia 2002.)

In contrast the organisational division between the sectors is less distinct in the other English-speaking jurisdictions we are considering and the sectors share more organisational characteristics (Osborne 2003, pp 7-8). While tuition fees for programs in tertiary type B institutions are lower than in tertiary type A institutions, they are set within the same financing framework. This is partly because the sectors are now the responsibility of the same level of government in these jurisdictions. Tertiary type B institutions have been brought within the same financing framework since US State governments gradually took over more responsibility for financing community colleges from local government districts from the 1980s and since the English government took over responsibility for financing colleges of further education from local government in 1992. Greatest variability remains in curriculum frameworks.

TABLE 6.4: SECTORAL DIVIDE IN AUSTRALIA AND SELECTED OVERSEAS JURISDICTIONS

Jurisdiction/ administration	Tertiary type B	Tertiary type A
AUSTRALIA		
Financing	States	Commonwealth
Fees	Up front	Deferred income-related loans
Curriculum	Training packages	Content
CALIFORNIA		
Financing	State Government	State Government
Fees	Up front and loans	Up front and loans
Curriculum	Mandated core	Mandated core at junior level
CANADA		
Financing	Provinces	Provinces
Fees	Up front and loans	Up front and loans

Jurisdiction/ administration	Tertiary type B	Tertiary type A
Curriculum	Mandated in some provinces; unregulated in others	Mandated in some provinces; unregulated in others
ENGLAND		
Financing	National	National
Fees	Up front and loans	Up front and loans
Curriculum	National vocational qualifications	Content

The proportions differ in different provinces and States, but in the US associate degrees typically comprise from 20% to 40% of total higher education load, with the national average being 30% (US Department of Education 2000). Some 11% of higher education load in England and 27% of higher education load in Scotland is taken in colleges of further education (Parry & Thompson 2002). If diplomas and advanced diplomas are considered part of higher education in Australia, 15% of higher education load is taken in vocational education and training institutions.

TABLE 6.5: ENROLMENT IN SUB BACCALAUREATE QUALIFICATIONS AS A PROPORTION OF ALL HIGHER EDUCATION ENROLMENTS, SELECTED JURISDICTIONS

Jurisdiction	%
Australia	15%
Canada	10-30%
England	11%
Scotland	27%
USA	30%

While the overlap of the Australian sectors at diploma and advanced diploma levels is not very large, the combination of overlap of qualification levels but almost complete separation of the sectors in almost all other characteristics generates a host of anomalies and inconsistencies. As the federal minister's overview paper for the Commonwealth's

Crossroads review of higher education in 2002 observes (Nelson 2002b, para 81), students pay different fees under different arrangements and with different levels of subsidy by different levels of government depending on whether they are taking the program in vocational education and training or a higher education institution. This may have some rationale were programs substantially different in each sector, but they are described almost identically by the Australian qualifications framework advisory board (2001), and there is considerable overlap between the sectors. The equivocal treatment of diplomas and advanced diplomas also causes difficulties for any Australian government that seeks to develop an integrated series of offerings between the sectors, as the Commonwealth argued in its issues paper *Varieties of learning: the interface between higher education and vocational education and training* (DEST 2002b) relying on the work of Doughney (now Wheelahan) (2000b).

Mechanisms for bridging the sectoral divide

Australia's former National Board of Employment, Education and Training (NBEET 1995, pp 9-11) identifies 7 types of cross-sectoral collaboration between tertiary types B and A: strategic alliances, pathways, co-location and joint developments, specialised education and training facilities, joint programs, cross-sectoral institutions, and cross-sectoral provision of subjects. Young, Howieson, Raffe & Spours (1997) systematise these relations in what they (Raffe et al, 1998) subsequently call a 'matrix of unification' which classifies systems as unified, linked and those that operate on separate tracks. Their matrix maps systems on 4 dimensions – content and process, system architecture, delivery, and government and regulation –

TABLE 6.6: A MATRIX OF UNIFICATION – TYPES OF SYSTEMS AND THEIR DIMENSIONS

Dimension	Unified system	Linked system	Tracked system
CONTENT AND PROCESS			
Purpose and ethos			
Curriculum			

Dimension	Unified system	Linked system	Tracked system
Teaching-learning processes			
Assessment			
SYSTEM ARCHITECTURE			
Certification			
Course structure and pathways			
Progression to tertiary type A			
DELIVERY			
Local institutions			
Modes of participation			
Staff			
GOVERNMENT & REGULATION			

Source: Young et al (1997).

Sommerlad, Duke & McDonald (1998, p li) position institutions as largely conforming to, or tending towards, one of 4 approaches to cross-sector collaboration: amalgamation, partnership, association and separation. They (Sommerlad *et al* 1998, p lxvi) observe that collaboration might occur in teaching, research and development, professional development, consultancy, promotion, marketing and recruitment, and shared use and development of infrastructure.

This section considers four levels of collaboration, but at different levels of organisation, from the jurisdiction (which in a federation may be a State or nation depending on the issue) through sectors, sub systems, institutions and faculties to basic units of organisation, departments, programs and subjects and finally to individual teachers and students. At each level tertiary types A and B may be unified, there may be a formal legal association of independent bodies which I will call a partnership, there may be collaboration, or the 2 types may be quite separate. The table below maps the possibilities.

TABLE 6.7: LEVELS OF ASSOCIATION OF TYPES 5A AND 5B EDUCATION AT LEVELS OF ORGANISATION

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Supra institutional</i>				
Jurisdiction				
Sector				
Sub system				
Network				
<i>Institution-wide</i>				
Institution				
Campus				
Division				
<i>Organisational units</i>				
Group				
Faculty				
Department				
<i>Curriculum</i>				
Program				
Subject				
<i>Person</i>				
Manager				
Teacher				
Student				

This typology is perhaps simplistic in ignoring pedagogy and considering only levels of organisation, some of which may have been overlooked. The levels of association could certainly be elaborated, but at the price of clarity. This table is the framework for the literature and practices reviewed in this section. The review starts with the top level of organisation and considers examples of levels of association of tertiary education types B and A from unified to separate. The review proceeds sequentially down the levels of organisation.

Supra-institutional levels

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Supra institutional</i>				
Jurisdiction				

So starting at the highest level of organisation, the jurisdiction, tertiary education types A and B may be unified, there may be a formal legal association or partnership of independent bodies, there may be collaboration, or the two types may be quite separate.

Notwithstanding the powerful arguments – and dynamic – promoting formal segmentation of tertiary education systems, there are good reasons for establishing unitary systems. Williams (1979, p 761) provides what is still a powerful argument. It is very expensive to establish in each small town separate institutions discharging the specialised functions of each sector. Therefore people in smaller population centres are either deprived of access to whichever sector is not represented in their town, or comprehensive institutions should be established in the smaller centres. This has been tried in several countries, but hybrid systems of functionally differentiated sectors in the major cities and comprehensive institutions in the smaller population centres are unstable and rarely work beyond the enthusiasm of their initial founders.

Clark (1983, p 66) observes that a unitary system encourages greater similarity in practices and more equal funding of its components since unitary systems encourage “coercive comparisons” in which “have-nots” exercise strong leverage for equity against the “haves”, the less-noble against the noble’. This may be an advantage or disadvantage depending on a prior position. Bastedo & Gumport (2003, p 354) follow Clark in arguing that differentiated systems are also subject to pressure from academic staff left out of the better resourced campuses. Clark (1983, p 66) observes that sectors quickly become hierarchies. He (Clark 1983, p 67) therefore concedes that a unitary system probably advances equity, at least in the short term. Stevenson (1988, p 140) argues more radically for ‘the paradigm shifts needed to unify and redefine the tertiary

sector', a position that has been also advocated by Wheelahan (2000), Temple (2001), and by Marks (2002) in a paper which states its main argument in its title: 'Weaving the "seamless web": why higher education and further education need to "merge" if lifelong learning is to become a reality'. Scott (2000, p 192) argues that in any case the development of new modes of knowledge production appears to be making higher education an anachronism as a distinctive category of institutions.

An alternative, Furth (1992, p 1222) notes, is to give students opportunities to transfer between sectors, and this will be the subject of the next chapter. Nonetheless Furth (1992, p 1222) remains sceptical of institutional differentiation because of the risks of developing limited and rigid sector structures. Skilbeck and colleagues (1998, p 25) argue that coherent policies are facilitated by unitary systems or at least a strong bridging mechanisms between sectors. Raffe, Howieson, Spours & Young (1998, pp 171-2) argue that the sectors are based on an industrial division of labour which is now outmoded. However, Clark (1983, p 52) observes that the equitable motives for establishing a unitary tertiary education system may be thwarted by internal differentiation within the system. Just such a phenomenon will be observed in the next chapter which reports and examines rates of transfer from tertiary type B to different types of type A institutions.

In the US Wisconsin and Georgia have the most comprehensive systems which incorporate all their State's tertiary type B and A institutions except 'non-collegiate technical institutes'. Technical institutes are separate from two-year colleges, they award certificates and diplomas of 2 or fewer years' duration and few if any of the credits are transferable to four-year degrees (Johnstone, no date). In 1996 Minnesota combined three hitherto separate systems (four-year colleges, two-year colleges and vocational-technical institutes) into the single State university system of Minnesota, but this still excludes the flagship University of Minnesota and its branches (Johnstone, no date). So only part of these systems is unified.

There are many examples of jurisdictions in which tertiary types B and A are associated in partnerships and collaborations, although again are often smaller and therefore less applicable to Australia. Arguably at the level of national jurisdiction Australia separates its tertiary sectors. With the limited exception of the ministerial council on education,

employment, training and youth affairs, there is only one national public cross sectoral body, the Australian qualifications framework advisory board. This board has been a forum for dispute between rather than cooperation of the sectors recently (over associate degrees) and arguably its long term role has been to separate, not unify the sectors (Wheelahan & Moodie, 2004).

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Supra institutional</i>				
Sector				

At the next level of organisation which is most commonly the sector, it will be recalled that the former Soviet Union established monotronics in pedagogy, agriculture, medicine, economics, fine arts, physical education and engineering (Pilipovski 1992, p 1243) which included both types A and B of tertiary education. Sectors based on the distinction between types 5A and 5B may form partnerships or they may collaborate as is common but by no means pervasive in the US. On this typology the type 5A and 5B sectors of continental western Europe would be shown as quite separate; they would be coordinated, however, or more precisely their role in the economy would be coordinated through regional councils.

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Supra institutional</i>				
Sub system				

‘System’ is often used ambiguously. It has been used so far in this section to refer to all of tertiary education coordinated or operated under a single high level policy. It is, however, also often used to refer parts of the larger system when probably ‘sub system’ would be more correct. Thus one may observe that the Victorian ‘system’ of technical and further education has from its foundation in the middle of the 19th century been less closely coordinated than, for example, the NSW TAFE system which is rather tightly coordinated. Some (sub) systems in the US and Canada integrate tertiary type A and B,

mostly by including what in Australia would be considered tafe institutes and higher education institutions within one sub system.

An example of sub system collaboration is NSW TAFE which had a credit transfer agreement with all NSW universities from 1991 to 1996. The NSW TAFE educational service divisions, which are the groups responsible for curriculum development in each broad field, negotiated credit for programs with each NSW university. Because then TAFE curriculum was based on content and was uniform throughout the State universities could confidently award the same credit for a program offered throughout the NSW TAFE system (Carnegie 2000, pp 151-2).

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Supra institutional</i>				
Network				

Networks are rather more common in the US than in other jurisdictions, but the Victorian College of Agriculture and Horticulture was a network before it was incorporated within the University of Melbourne's institute of land and food resources, and arguably the Australian Catholic University has many characteristics of a network as well as of the unified multi campus institution that it presents itself as. Harvey (1996, p 4) has proposed a variant of Clark Kerr's (1963) multiversity, the 'federal omniversity', which would combine all further and higher education institutions in a region within a single institutional framework. The vice chancellor of the University of Derby has proposed just such an arrangement for Derbyshire (Waterhouse 1998, 2000).

The University of the Highlands and Islands is a network of 14 partners, mostly colleges of further education, a marine laboratory and marine farm. The partners enrolled 3,000 full time equivalent higher education students and 5,000 full time equivalent further education students (Shoemaker 2000, pp 66-76). A similar arrangement has been proposed for Cornwall. Parry, Davies & Williams (2003, p 11) report that the Higher Education Funding Council for England funds consortia or clusters of further education colleges and higher education institutions to offer higher education in further education colleges.

Institution-wide levels

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Institution-wide</i>				
Institution				

More familiar in Australia is the institution which unifies tertiary types A and B, called dual sector universities. Victoria University of Technology and Swinburne University of Technology unify tertiary types A and B at the institutional level but not at lower levels except for central services which are mostly fully integrated. Shoemaker *et al* (2000, p 95) and Sommerlad *et al* (1998, p 123) claim that different industrial awards are an obstacle to deeper unification and Wheelahan (2000) has reported extensively on the difficulties of integrating tertiary types A and B within institutions in Australia. Sweden has a formally unified system of tertiary education since 1977, but within that there are a number of different types of institutions, including universities, university colleges, and specialised institutions for fields such as health sciences (Klemperer 2001, p 95) so Sweden is not a strong case of a unified system.

The US has over 400 institutions that offer both type B and type A programs. These include institutions that offer type B and A programs on the same campus, those that offer types B and A programs on different campuses, and three large State systems that incorporated type B institutions (Prager 1993, p 540). Some 13 institutions allocate responsibility for type B programs to a separate division (these include Brandywine College of Widener University, University of the District of Columbia, Kentucky State University, University of Chicago at Illinois, University of New Hampshire, Southern Illinois University at Carbondale, Virginia Commonwealth University and Youngstown State University).

Several US institutions include both types of programs within faculties or departments. There are 36 such public institutions including Ball State, Colorado State, Humacao State, Indiana, Purdue, the University of Georgia, the University of Maine, the

University of Pittsburgh and Western Michigan. Other institutions which integrated type B and type A programs at the faculty or department level are small private liberal arts schools (Gwynedd-Mercy College, Huron University, Lincoln Memorial University and Salem College) and 2 are church related (Concordia University, Wisconsin and Gannon University). The University of Rio Grande is a private institution which offers type B programs under contract from the State government. Type B programs are offered at branch campuses of Pennsylvania State University, the University of Connecticut, the New Mexico State University and the University of South Carolina and several others (Prager 1993, pp 542-8).

The sectors are still generally quite distinct in Canada (Jones 1996), but Eastern Nova Scotia Institute of Technology amalgamated with Xavier College to form the University College of Cape Breton (Dennison & Gallagher 1986, p 120). Several mergers of tertiary type A and B institutions have been proposed in England, the most advanced being at Bradford between the university and its neighbouring college and between Thames Valley University and Reading College (MacLeod 2002). In addition there are 'mixed economy' institutions in the UK – colleges of further education with sizeable amounts of higher education (Parry 2003, p 3).

In one of the many attempts to reform the German system of higher education which many consider to be inflexible, prolonged (the average length of undergraduate studies is 6.4 years) and wasteful (Huisman & Kaiser 2001, p 63), two *Länder* or State governments established *Gesamthochschulen* (comprehensive universities) in the 1970s. *Gesamthochschulen* incorporate in one institution the programs of universities, technical universities, *Pädagogische Hochschulen* (teacher training colleges), *Fachhochschulen* (polytechnics) and *Kunsthochschulen* (art colleges) (NOOSR 1992). *Gesamthochschulen* therefore seem similar in scope to Australia's dual sector universities. They offer programs that integrate those of *Fachhochschulen* and of traditional universities. Furth (1992, p 1218) says that *Gesamthochschulen* were established to moderate status differences and institutional hierarchies, but it appears that they have not been very successful (Teichler 1988). Only 6 *Gesamthochschulen* were established (Stumpf 2003) and only 1 remains (Huisman & Kaiser 2001, p 59).

Sommerlad *et al* (1998) strongly prefer partnerships between tertiary type B and A institutions to other levels of association, and there are numerous examples of institutions that have partnerships and collaborative arrangements with institutions of the other sector. There is probably no Australian tertiary education institution that does not have some form of collaboration or association with an institution in the other sector and thus is completely separate from the other sector. In the UK 21 consortia or partnerships of multiple type B and type A partners have been formed to offer foundation degrees (Parry & Thompson 2002, p 57). For example, the Bedfordshire federation for further and higher education is a partnership of Luton University, Dunstable College, Luton Sixth Form College, Bedford College and Barnfield College for offering year 12 programs enriched by tertiary studies, foundation degrees, and ready transfer to tertiary type A studies (Midgley 2002). There are also numerous ‘franchises’ between tertiary type A and B institutions in the UK that allow type B institutions to offer foundation degrees certified and awarded by type A institutions (Parry 2003) which involve over half of all higher education institutions and two-thirds of further education institutions (Parry, Davies & Williams 2003, p 11).

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Institution-wide</i>				
Campus				

One of Australia’s earliest association of tertiary type A and B campuses was the location of the South Australian School of Mines and Industries next to the University of Adelaide in 1888 (Duncan & Leonard 1973, p 25). Shoemaker *et al* (2000) argue for campuses that integrate not only tertiary education sectors but also small to medium sized enterprises. Such a campus could house tafe, higher education programs, local government facilities and small business projects (Shoemaker *et al* 2000, p xvii). They propose 12 points for viability: a central, serviced location; an iconic building; local government support; independent governance; champions; physical co-location; symbolic co-location; the involvement of all three educational sectors; a strategy to enrich small business; the best of IT infrastructure; a point of difference; and demand (Shoemaker *et al* 2000, pp xvii-xviii).

Shoemaker *et al* (2000) prefer what they call multi partner campuses – campus partnerships that adopt a new, joint name and logo – since this almost always denotes a higher level of cooperation and integration of sectors than a decision to brand as a branch of an existing institution, which they call multi campus partners. They give as Australian examples of this preferred approach: Coffs Harbour education precinct (which involves Coffs Harbour Senior College, North Coast Institute of TAFE and Southern Cross University); the Esperance Community College (south east of WA, which involves a senior high school, tafe, Curtin University, the WA high schools hostels authority and the Shire of Esperance); the Joondalup education precinct (north of Perth, which involves the West Coast institute of TAFE located adjacent to Edith Cowan University’s Joondalup campus and the WA police academy); the Rockingham regional campus (45 kilometers south of Perth, which involves the South Metropolitan TAFE co-located with Murdoch’s Rockingham campus and Kolbe Catholic College); the central coast campus, Ourimbah (Central Coast Community College, Hunter Institute of TAFE, University of Newcastle); and Nirimba education precinct (Western Sydney Institute of TAFE Nirimba, UWS Hawksbury Blacktown, Terra Sancta Catholic College and Wyndham Senior College.

The experience of at least some of these arrangements has not lived up to their press. The Coffs Harbour education precinct has not developed as strongly as perhaps unrealistically hoped by its partners, probably because of weak student demand. The relationship between the partners of the Rockingham regional campus have become strained, possibly because head office has not always given the satellite campus over-riding priority.

International examples of this stronger form of campus partnership are higher education Almere (an education park 28 kilometres from Amsterdam which includes business and community premises and involves the University of Amsterdam (UvA), the Institute for Information Engineering established by Hogeschool van Amsterdam (HvA) and Hogeschool Holland, the province of Flevoland and the municipal government of Almere), Universiteit en Hogeschool Amsterdam (UHA) (the University of Amsterdam (UvA) and Hogeschool van Amsterdam (HvA)) (Shoemaker et al 2000, pp 64-6),

Seneca@York (Seneca College of Applied Arts and Technology and York University, Toronto) (Shoemaker et al 2000, pp xix, 48-55), the Auraria higher education center (Community College of Denver, Metropolitan State College of Denver and the University of Colorado at Denver), Macomb's university center (Macomb Community College, Michigan and 10 type 5A institutions) and the University Center (North Harris Montgomery Community College District, Texas and 6 type 5A institutions) (Windham *et al* 2003). In England the University of Kent, Greenwich University and Mid Kent further education college are establishing a joint campus in Chatham called the Universities at Medway (Kingston & Midgley 2002).

Examples of the weaker form of campus partnerships – multi campus partners – are the Berwick and Gippsland campuses of Monash which are co-located with the locale TAFE institute, Emerald campus of CQU with Central Queensland Institute of TAFE, the Western Institute of TAFE which is adjacent to Charles Sturt University's Dubbo campus, Orana, several 'concurrent use' campuses in Florida (Windham *et al* 2003) and the University of Texas at Brownsville and Texas Southmost College.

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Institution-wide</i>				
Division				

Both Swinburne University of Technology and Victoria University of Technology are examples of institutions with type B and A divisions which work in partnership and collaboration.

Organisational units

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Organisational units</i>				
Group				

It would be possible to establish levels of association between tertiary type A and B education within broad supra-faculty groups, although no example has been found.

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Organisational units</i>				
Faculty				

Both RMIT and Charles Darwin University (formerly Northern Territory University) unify tertiary type A and B education within faculties. Anglia Polytechnic University recently established five regional faculties and a single regional academic council to oversee programs on its campuses and at 22 partner colleges. The aim is to establish common standards and promote a sense of collegiality between staff teaching the same disciplines across the region. The vice chancellor Michael Malone-Lee said ‘We don’t want two classes of citizen’ and that the scheme would avoid the ‘unnecessary hassle’ of mergers (MacLeod 2002).

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Organisational units</i>				
Department				

No department which unifies tertiary types B and A has been found. RMIT seems to have separate type B and A departments within unified faculties. Charles Darwin University seems closer to unifying type B and A departments, but a review of their departments’ staff listing shows that unification at this level is at least incomplete.

Program

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Curriculum</i>				
Program				

A fully unified tertiary type A and B program would be taught jointly by staff from each sector. Robinson & Misko (2001, p 93) call this a blended program and give as an example staff of the Hunter Institute of TAFE teaching into the University of Newcastle's hospitality programs at Ourimbah. Charles Darwin University also has some programs unified in this strong sense, but there seems to be few others. However, there are numerous examples of programs unified in other ways.

Wheelahan (2000, pp 19-20) describes 4 types of unified programs: *customised programs* which incorporate offerings in each sector within one award; *integrated programs* which incorporate two awards normally in the same field within one program, such as a TAFE laboratory technician's certificate within a higher education bachelor of science; *dual award programs* which are like integrated programs but involve complementary fields, such as a higher education bachelor of accounting and a TAFE certificate in information technology; and *nested programs* which integrate programs in the same field sequentially rather than concurrently.

Wheelahan (2000, pp 18-19) describes three types of partnerships or pathways between programs: *standardised pathways*, which are formally approved by the educational institution, thus ensuring that all students meeting the specified conditions will be granted the same benefits, usually academic credit in the destination program; *customised pathways* which are negotiated for a specified student or group of students and are therefore available only for those students, although they may be a precedent for a standardised pathway; and *guaranteed entry pathways*, which may be based on either standardised or customised pathways but which guarantee entry into the destination program upon completion of the initial program at a specified standard.

Examples of integrated programs are Victoria University of Technology's certificate, diploma and advanced diploma and bachelor of health science – paramedic and community studies – youth work; RMIT's certificate of engineering production/bachelor of aerospace engineering; and the Joondalup diploma of occupational health and safety/bachelor of health science (safety science).

An example of guaranteed entry pathways is Rutgers University's dual admission program with each of the 19 public community colleges in New Jersey. Rutgers guarantees students of community colleges accepted in the dual admission program transfer with full credit if they complete the required pattern of study with a grade point average of three out of four (Nespoli 1997). Mercer County Community College has dual admissions agreements with 6 New Jersey type A institutions. Each requires completion of a specified program and a minimum grade point average, which varies by institution and program (Coley 2000, p 24). Ohio also has dual admission programs.

Another type of program partnership is the arrangement in England (Parry & Thompson 2002) and Scotland (Gallacher 2003) where tertiary type A programs are offered under franchise in tertiary type B institutions, known as higher education in further education. Examples are the universities of Bournemouth, Newcastle, Northumbria, Plymouth and Sunderland. Staffordshire University also has a network of colleges in an area where participation in higher education is very low (MacLeod 2002).

Quebec is distinctive amongst OECD jurisdictions in having unified but end-on tertiary type B and A programs. Its tertiary type B institutions *Collège d'enseignement général et professionnel* (colleges of general and vocational education) offer a 2-year *diplôme d'études collégiales* (diploma of collegial studies) for students seeking to transfer to universities (Quebec Ministère de l'éducation 2001) and a 3-year terminal vocational track (Clark 1983, p 58). 'Quebec students cannot move directly from public school to university; university-bound students must first complete a two-year program in one of the *Collège d'enseignement général et professionnel*' (Jones 1996, p 82). This table shows the standard progression through Quebec's educational levels.

TABLE 6.8: STANDARD PROGRESSION THROUGH QUEBEC'S EDUCATIONAL LEVELS

Qualification	Institution
Doctorate	University
Masters	University
Baccalaureate	University
Diploma of collegial studies	General and vocational college
Secondary school diploma	Secondary school

Quebec achieved this unusual neatness by a *revolution tranquille* in 1967 (Gouvernement du Québec 2001). The president of the University of Chicago William Rainey Harper attempted to establish a similar structure when in 1892 he reconstituted the university into a lower division providing general education and an upper division providing professional education (Martorana, 1973, p 96). However, the four-year colleges retained their lower divisions which therefore overlapped with the programs offered by the newly established two-year colleges. Nonetheless, these can be fairly classified as unified programs in the states which specify closely the core curriculum requirements of the first two years of baccalaureate programs whether taken in type B or A institutions and thus guarantee full credit transfer between the program.

There are, of course, numerous examples of program collaboration. The Illinois articulation initiative is well organised and has a good web site (Illinois Board of Higher Education *et al* 2003). An interesting form of program collaboration is the field of study approach (Wheelahan 2001, p 33). This groups type A and type B programs by a combination of discipline and vocational outcome. The fields are used to develop new programs, particularly dual-award and nested programs and learning pathways. Field of study groups are also responsible for surveying programs in their field to ensure appropriate coverage and to anticipate emerging needs for new programs (Wheelahan 2001, p 33).

Subject

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Curriculum</i>				
Subject				

Grubb and colleagues (1991, p 15) suggest that vocational and academic education could be integrated by incorporating more academic content in vocational subjects and vice versa, for example by converting some subjects to projects. Grubb and colleagues (1991, p 15) also suggest what in this typology would be subject partnerships by what they call horizontal and vertical curricular alignment: modifying and coordinating vocational and academic subjects taken in the same and sequential years. Subject partnerships are established by legislation in Florida, Georgia, Illinois, Massachusetts, Nevada, Rhode Island, South Carolina and Texas which specify curricula and examinations, including a common subject numbering system and/or core general education curriculum (Coley 2000, p 24). Another form of subject partnerships is cross crediting and credit transfer arrangements which are too familiar to require elaboration here. Grubb and colleagues (1991, p 15) suggest a form of collaboration in what they call the academy model, aligning vocational and academic subjects in groups with a common vocational outcome.

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Persons</i>				
Manager				

In Australia's dual sector universities responsibility for tertiary type A and B programs is unified in the vice chancellor, the chief executive officer, and in the managers of most central and general services. But in all dual sector universities most academic responsibility immediately below the vice chancellor at deputy and pro vice chancellor level is split. However, it is combined again at the decanal level at Charles Darwin University and RMIT which have cross-sectoral deans. It splits again – in practice if

not in ideal – for heads of department at RMIT and for many at Charles Darwin University.

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Persons</i>				
Teacher				

The penultimate level of organisation – and ultimate level of integration – is to have teachers who teach across the types of tertiary education. This was achieved briefly by the Western Institute, one of Victoria University of Technology’s predecessor institutions, when it was first established in 1986. Teaching staff were initially employed on a combined Western Institute award but this was soon disbanded and staff were employed on separate higher education and TAFE awards (McConville 1991, p68) apparently due to pressure from the unions. A combined award for teaching staff was also achieved – or imposed – by the Bjelke-Peterson government at the Hervey Bay College (Finn 1991, pp 122-3) but this, too was dismantled as a result of union pressure with the election of the Goss Government (Smith 2003).

Wheelahan (2000, p 43) reports that of Australia’s dual-sector universities, only Charles Darwin has cross-sectoral teaching as part of its industrial agreement. This agreement has four parts. The most substantial part contains conditions which are common to all staff of the university. The other three parts contain provisions specific to each of three groups of staff: tertiary type A teaching staff; type 5B teaching staff; and administrative, technical and general staff. Wheelahan (2000, p 43) reports that cross-sectoral teaching occurs in reality as well as in the agreement.

Grubb and colleagues (1991, p 15) suggest a form of teacher collaboration by associating tertiary type B and A teachers in occupational clusters rather than or in addition to conventional departments. The aim would be to align subjects within clusters and to support the development of occupational clusters, ‘career paths’, and majors which would be coherent sequences of subjects.

Level of organisation	Levels of association			
	Unified	Partnership	Collaboration	Separate
<i>Persons</i>				
Student				

There is considerable evidence that students overcome various administrative obstacles to combine tertiary type A and B studies within one award, sometimes concurrently and sometimes sequentially. This is considered at length in the next chapter on student transfers.

Three sector systems

While there are some interesting attempts to bridge the divide between tertiary type A and B sectors, institutions and programs, they do not seem part of a general trend to integrate the sectors. On the contrary, the trend seems to be to further segment tertiary education. We have seen that California formally segments its tertiary type A or four-year colleges and universities between the University of California which has a formal research role, offers doctorates in a wide range of disciplines and which is restricted to admitting the top 12.5% of high school graduates; and the California State University, which does not have a formal research role (although research is conducted in the university), does not offer doctorates in its own right and is restricted to admitting the top 33.3% of high school graduates.

There is no formal bifurcation of tertiary type A in the other jurisdictions we are considering, but in some jurisdictions the older, more research intensive and more selective institutions have formed themselves into a group. Thus in the UK ‘an informal self-selected representative body from research-led institutions’ (NISS 2003) formed itself into the Russell group and in Australia the eight universities with the biggest research expenditure formed itself into the group of eight, ‘a coalition of Australia’s leading universities’ (Group of eight 2003). This bifurcation is shown in the table below, with the more selective institutions labelled tertiary type A - 1 and the moderately and less selective institutions labelled tertiary type A - 2.

TABLE 6.8: BIFURCATION OF TERTIARY TYPE A IN SOME JURISDICTIONS

Characteristic	Tertiary type A – 2	Tertiary type A – 1
Designation	Comprehensive university	Research-intensive university
Age	Generally younger	At least 50 years old, most older
Research	Generally less expenditure	Big research expenditure
Admissions	Moderately and less selective	Highly selective
Jurisdiction		
Australia	Other universities	Group of eight
California	California State University	University of California
UK	Other universities	Russell group

The next chapter considers transfer between tertiary type A and B institutions. It considers the proportion of type B students accepted by the highly and moderately selective type A institutions, and finds that type A institutions are informally segmented in practice despite formally policies not to differentiate between groups of type A institutions.

7 Student transfer

Comparative educationalists have long warned against considering educational systems as static structures. Spicker argues for examining their internal relations.

Systems are not simply collections of different policies; the constituent elements are inter-related . . . there is something about the way in which the parts are related which makes it possible to talk sensibly about the system as a whole. There are three main stages in analysing a system: identifying its elements, examining the relations between them and, finally, within them.

* * *

The second common error is to seek to identify systems in terms of particular characteristics, rather than the relations between them.

(Spicker 1996, pp 67-8)

This thesis considers one aspect of the dynamic relations between sectors within tertiary education systems, the transfer of students between non baccalaureate-granting and baccalaureate granting parts of the system.

Significance of student transfer

A critical issue for mass tertiary education systems with only one tier is the balance between student access to the system and the funding needed to maintain the system.

While broadening access increases the funds needed to maintain the system, reducing funding for the system narrows access. Harman (2005) notes that one option is to separate funding for teaching and research. Thus, 24% of the Higher Education Funding Council for England's recurrent grants to universities is for research (Higher Education Funding Council for England 2004, table 1). This is allocated very selectively according to institutions' performance in the most recent research assessment exercise. The funding council funds 82 universities, but for 2004-05 it allocated 75% of university recurrent research funds to only 19 universities to which it allocated only 30% of university teaching funding, and it allocated 90% of university recurrent research funding to only 32 universities which accounted for only 41% of university teaching funding (Higher Education Funding Council for England 2004, table 1). While these types of systems may be structurally unified, student access to the universities which gain the bulk of research funds is important as well as access to the whole system.

Another option is to structure the system into multiple tiers. Access to lower level and lower cost tiers can be reasonably broad, while the funding needed for higher level and higher cost tiers can be limited by limiting access to it (Wellman 2002, pp 3). Clark (1983, p 51) observed that the lower tier is both a screen and a route to access the upper levels. Clark (1994, p 92) insisted that 'for the sake of equality of opportunity in a segmented system, it is essential that highly successful students, with appropriate academic backgrounds, be able to move from one segment to a segment or segments at a higher level, as we provided in the Californian master plan and increasingly also elsewhere'. Laurente & Pailthorp (2002, p 1) argued in a recent study for the California Postsecondary Education Commission that the transfer between the California community colleges and four-year institutions which was important to the system's design in 1960 remained equally important four decades later.

Cohen (1992, p 33) reiterates the importance of student transfer in the US 'because two-year colleges provide access to many students who might not otherwise participate in higher education.' Furth (1992, p 1219; see also p 1222) also argued that student transfer is the complement to a tiered structure. Earlier Furth (1973, p 24) had noted the USA country statement for the OECD in 1970 which said that 'community colleges are assigned the role of "serving both the lower socio-economic strata and the lower ability youth"' which led

her to argue that student transfer is an important compensatory mechanism to prevent students from lower socio-economic status backgrounds being trapped in the less selective sector to which most gain access. Wellman (2002, p 3) also argued that transfer is important in 'reducing achievement disparities that prevent low-income and minority students from obtaining the baccalaureate degree'. She (Wellman (2002, p 6) adds that 'Numerically, 2/4 transfer affects many more students of color than does the more prominent issue of affirmative action admissions in higher education.' Douglass (2005, p 5) argues that a 'robust system to facilitate progress between institutions is . . . an essential component of a flourishing mass higher education system.' In addition to the roles of student transfer previously mentioned, Douglass (2005, p 5) says that 'Most importantly, it helps to build a culture of aspiration important in a society in which class-consciousness is still significant'. Building aspiration is surely also important in societies which don't have high class consciousness but in which aspiration is an important influence on higher education participation.

Grubb (1991, pp 195-6) reiterates Clark's argument for student transfer and adds that 'a strong transfer program is a confirmation of the academic purposes of community colleges and strengthens their claims to being colleges. . . . the ability of students to transfer to four-year colleges and then compete as equals against students who begin in four-year colleges is one test of the acceptability of community colleges within higher education.' Fryer, Berman, Weiler & Clawson (1990, pp 30-1) elaborate the importance of student transfer in advancing the institutional interests of the lower tier since 'transfer is the mission of two-year colleges most broadly understood and accepted by the public, and in order to secure a long-term base of public and financial support, transfer education must be delivered effectively'.

Dougherty (1994) notes that this reflects the original mission of two-year colleges. However, not all two-year college teachers agree with renewing emphasis on their transfer function. Some argue that the transfer function may subvert other important functions of two-year colleges 'such as commitments to access, vocational education, comprehensiveness, and local mission' (Eaton 1990, p 18).

Student transfer also has implications for institutional prestige. Institutions and sectors that provide direct access to high paying and high status occupations have highest

prestige. Institutions and sectors that offer intermediate access through transfer to higher levels have less prestige. But according to Clark (1983, pp 63-4) institutions and sectors which do not even offer the possibility of transfer to higher levels have more sharply defined lower status.

Thus, student transfer is important in five ways:

- 1 it is one of the mechanisms that regulates students' access to levels of education and with that occupation, prestige, life chances, and indeed, income which Clark overlooked;
- 2 it provides social mobility;
- 3 it establishes the lower tier's role as a scholarly institution and its standing in higher education;
- 4 it raises the standing of lower tiers; and
- 5 it is an important aspect of the relations and interactions between sectors and institutions.

Upward student transfer¹

Most studies of student transfer in the US consider the rate of transfer from two-year to four-year colleges, and this is thought to indicate the success of two-year colleges in at least one of their important roles (Dougherty 1992; Shaw & London 1995; Gelin 1999,

¹ I thank Jim Jacobs of the Colorado Commission on Higher Education for providing a data file from his research group on transfers between Colorado 2-year and 4-year higher education institutions.

A first and very early version of the material in this section was published in MOODIE, GAVIN (2002) 'Counting on an end to the sectoral divide' *Perspectives*, **6, 2**, pp 45-9. I thank an anonymous reviewer of a previous version of this paper for pointing out problems with my initial approach and making valuable suggestions for their solution.

A subsequent version was published in Griffith University's submission to the Senate Employment, Workplace Relations and Education References Committee inquiry into current and future skills needs. I thank Professor John Stevenson of Griffith University for his comments on a first draft of that submission.

p 4; Striplin 1999; Carlan & Byxbe 2000; Wassmer, Moore & Shulock, 2003, p 21) or to illuminate important characteristics such as their culture and ideology (Shaw & London 2001). But as Gelin (1999, p 11) observes –

Effective transfer is a function of both sending and receiving institutional policies, practices, and culture. Using transfer rates to measure the effectiveness of the sending institution leaves out one half of the equation.

Several studies compare transfer rates between States, but this is misleading unless at least four factors are controlled for. First, the overall participation rate and the participation rate in each sector must be considered. A State with a very high proportion of the population participating in four-year colleges is likely to have a lower rate of transfer from two-year colleges than a State which has high participation in two-year colleges and a much smaller proportion of students enrolled in four-year colleges.

Secondly, a range of inhibitory and facilitative factors needs to be considered: geographic access, financial factors (Alkin & Hendrix 1967), flexibility of study mode, curriculum integration and support and encouragement of student transfer (McIntyre 1987; Berman & Weiler 1990, p 21; Banks 1992; California Postsecondary Education Commission 2002b, p 15). Thus, most 2-year college students study part time while commuting from home or work and are unlikely to seek to transfer to a college which is beyond convenient commuting distance (Laurente & Pailthorp 2002, p 4) or to a college that does not support part time study. Two-year colleges have a higher proportion of students from low socio economic status backgrounds who are more discouraged by financial barriers than others, and who have less cultural capital to negotiate complex or technical admission or transfer requirements.

Thirdly, even within States students with different backgrounds and aspirations are likely to have different rates of transfer (Grubb 1991; Higgins & Katsinas 1999; Wassmer, Moore & Shulock 2003, p 3). Some studies seek to control for this by measuring college preparedness – how adequately students in each State are prepared for education and training beyond high school (National Center for Public Policy and Higher Education 2002). This shifts attention on transfer from an indicator of the

performance of 2-year institutions to an indicator of the performance of their students (Lee & Frank, 1990). Other studies seek to use as the denominator for transfer rates students who are in transfer programs or who express an aspiration to transfer upon entering higher education (US Department of Education 2003, p 44; Bradburn & Hurst 2002), but even the investigators acknowledge that these are inadequate measures, or at least that the choice of numerator and denominator depends upon the purpose underlying the collection of the information (Gelin 1999, p 3).

Fourthly, the selection practices of the receiving institutions are critical to student transfer. Receiving institutions' admissions practices are complemented and are often reinforced by several factors listed by the California Postsecondary Education Commission (2002b, p 15): 'academic major and general education requirements, course articulation, information dissemination, faculty interaction, program availability, and actual institutional behaviors'.

This section considers upward transfer as an indicator of the structure and performance of the whole system, rather than of the performance of the less noble part or of their students. This approach is advanced by the California Postsecondary Education Commission (2002b, p 15) which argues that transfer is a function of such an array of elements that it reflects the performance of the whole system. In particular, the section compares the proportion of transfer students admitted by highly selective institutions with the proportion of transfer students admitted by moderately selective institutions.

Selectivity of receiving institution was chosen as the salient factor, rather than, for example, research intensity because 'the principle of selectivity is central' to the structuring of tertiary education as Kerr (1994, p69) argued. Kerr (1994, p 69) posited three levels of selectivity:

- 1 highly selective higher education
- 2 selective higher education
- 3 nonselective higher education.

The section first compares the different rates of transfer of students from, in Kerr's terms, nonselective higher education institutions to (moderately) selective and highly

selective higher education institutions. Transfer rates rather than the absolute level or number of students transferring are considered because transfer rates correct for the comprehensiveness and selectivity of the top tier and for many of the other factors that have been noted. Transfer rates also allow one to compare transfer in different jurisdictions, and five are considered in this study.

Upward transfer in Australia

Six of Australia's eight States and Territories have more than one university. In each of these States the institutions have jointly formed a State tertiary admission centre to receive applications on behalf of the institutions, allow applicants to express from six to eight preferences for programs processed through the admissions centre, and to offer places in accordance with the selection criteria specified by each institution for each program. There are minor variations in the admissions processes in each State, and applications for some programs such as graduate programs are received by institutions directly rather than through the State tertiary admissions centre. Neither do the centres handle all applications from some students such as those wishing to study by distance education or those seeking admission through special admission schemes for Indigenous Australians. Nevertheless, the State tertiary admissions centres process the bulk of applications for undergraduate programs in Australia and are a good source of data.

Table 7.1 below shows the proportions of applicants of different types who were offered and enrolled in a university place through the Queensland Tertiary Admissions Centre and the Victorian Tertiary Admissions Centre for admission in 2003. Victoria is Australia's second largest State with a population of 4.9 million and Queensland is Australia's third largest State with a population of 3.7 million (ABS 2003, p 3). Only Queensland and Victoria report these data on their web site. It would probably be possible to get the data by special request from the other State tertiary admissions centres, but this table is to set the context for more detailed data that follows and so comprehensive data are not needed for this table.

It will be noted, first, that offers were made to 62% of Victorian school leaver applicants but only 50% enrolled (or deferred), suggesting that 12% of Victorian school

leaver offers were of a low preference for these applicants. The offer rate for Victorian applicants who completed a higher education qualification was somewhat lower but the enrolment rate was much lower, suggesting that further study was more discretionary for graduates who declined to accept lower preference offers. But the offer rate for Victorian applicants with a completed technical and further education (TAFE) qualification was much lower and the offer rate for Victorian applicants with incomplete TAFE qualifications was the second lowest of applicant types, being above only unqualified applicants.

The offer and enrolment rates for Queensland were much higher than Victoria's reflecting less pressure on places in that State, and the outcomes for Queensland applicants with a completed TAFE qualification were outstanding. However, the offer and enrolment rates for Queensland applicants with an incomplete TAFE qualification were the lowest of the applicant types.

TABLE 7.1: APPLICATIONS, OFFER RATE AND ENROLMENT RATE FOR UNIVERSITY HECS PLACES THROUGH THE QUEENSLAND TERTIARY ADMISSION CENTRE AND THE VICTORIAN TERTIARY ADMISSIONS CENTRE FOR ADMISSION IN 2003 BY APPLICANT TYPE

Applicant type	Applicants		% offered		% enrolled	
	Qld	Vic	Qld	Vic	Qld	Vic
School leaver	28,682	43,620	86	62	58	50
Completed higher education studies	2,705	4,034	85	56	46	35
Incomplete higher education studies	10,653	8,254	79	57	55	40
Completed TAFE studies	2,064	6,843	91	51	69	39
Incomplete TAFE studies	2,257	1,747	70	34	49	26
Other non school leaver qualified	5,496	587	75	48	53	36
No qualification	1,462	1,055	73	23	52	19
Total	53,319	66,140	83	58	56	45

Sources: *Queensland Tertiary Admission Centre (2004) Statistical reports 2002-2003, table 18: analysis of origin and level of highest entry qualification 2002-2003,*

http://www.qtac.edu.au/Statistical_Reports/2002_2003/Table18.xls; Victorian Tertiary Admissions Centre (2003) VTAC statistics 2002-2003, table A 3: analysis of university applications, offers, enrolments and deferments by fee type by category, <http://www.vtac.edu.au/pdf/stats/2002-2003/section-A.pdf>

This suggests three conclusions. First, any national pattern in the transfer of TAFE students to higher education is very broad. There are considerable differences between these two populous States probably due to the different pressure on places, the different treatment of TAFE applicants in the two States and the different selection policies of each institution. Secondly, applicants with incomplete TAFE qualifications fare much worse than all other applicants with previous studies, particularly in comparison with applicants with incomplete higher education qualifications. This probably reflects considerable ignorance of TAFE studies amongst higher education selection officers and more generally, but whatever the reason, it is a major problem for TAFE transfers.

Thirdly, the proportion of each applicant type offered a place is influenced primarily by public policy and only secondarily by likelihood of success or some other educational consideration. Students who have already succeeded in higher education are more likely to succeed in subsequent higher education studies than other types of applicants, yet school leavers enjoy higher offer rates. This is presumably due to the priority all governments give to achieving successful outcomes for school leavers. Thus transfer rates depend importantly on government policy.

Australian higher education institutions reported that in 2000 they admitted 6.6% of their commencing bachelor students on the basis of a complete or incomplete technical and further education program (DETYA 2001). The group of eight highly selective Australian universities which have the biggest research budgets reported that they admitted 1,028 students or 2% of their total commencing bachelor students on the basis of a TAFE qualification. The other Australian universities reported that they admitted 10,308 of their commencing undergraduate students, or 8% of their total commencing undergraduate students on the basis of a TAFE qualification.

It is also possible to compare for Australia Prager's (1993) findings on transfer and articulation within US colleges and universities. Prager surveyed 408 chief executive officers of campuses which Peterson's Directory identified as sponsors of 2-year tracks within a college, university or system also offering 4-year curricula (Prager 1993, p 541). She concluded (1993, 551) –

It appears that students from some two-year programs within four-year contexts may have as much, if not more, difficulty in 'transferring' within their institutions as do students who begin at a community college and seek to transfer to a senior one. Indeed, the findings explored here suggest that problems with internal student transfer and program articulation may be as pervasive within some institutions sharing a common institutional identity as external ones are for some from different sectors, such as community and senior colleges, that do not.

Australia has five so-called 'dual sector universities' which comprise substantial student load in both higher education and vocational education and training programs. Transfer student admission rates for Australian dual sector universities are shown separately in the table below.

TABLE 7.2: PROPORTION OF UNDERGRADUATE COMMENCING STUDENTS AT THE GROUP OF EIGHT AUSTRALIAN HIGHLY SELECTIVE AND OTHER MODERATELY SELECTIVE UNIVERSITIES WHO WERE ADMITTED ON THE BASIS OF A VOCATIONAL EDUCATION AND TRAINING QUALIFICATION, 2000

Institution type	Admitted on basis of VET	Total bachelor commencers	% of commencers who are transfers
Group of 8 universities	1,028	45,359	2%
Dual sector universities	1,231	24,602	5%
Other universities	9,077	110,323	8%
Total	11,336	180,284	7%

Source: DETYA (2001) Higher education student statistics, 2000.

It will be noted that while the dual sector universities had a higher transfer student admission rate than the group of eight highly selective Australian universities, they had a lower rate than the other moderately selective institutions, thus replicating Prager's US findings in Australia. By including the dual sector institutions with the other moderately selective institutions it is possible to calculate the relativity in TAFE admissions between the group of 8 highly selective universities and the other Australian universities. TAFE transfers were 2% of commencing undergraduate students of the highly selective group of 8 universities but were 8% of the commencing undergraduate students at the other universities, giving a ratio of 1:4. Considering the ratio should avoid many of the problems with and limitations of Australian data that are described extensively later. This ratio will be compared with similar ratios in other jurisdictions.

Transfer student admission rates in three US States

The different transfer student admission rates of Australian universities are now compared with transfer student admission rates for three US States. There are problems with the accuracy of US statistics on student transfer. Romano & Wisniewski (2003, p24) demonstrate that US studies have underestimated transfer rates by as much as 25%. The absolute rates found in this study are probably vulnerable to this criticism. Also, differences in data definitions and collection methods may affect the different rates found for each State. But again, this study considers the relative transfer student admission rates within States rather than absolute transfer levels or even rates and so escapes most of the difficulties with the comparability of data. In 2 of the 3 States examined the transfer student admission rates are much higher than Australia's. In the third State it is much lower. In all the States examined the differences in transfer student admission rates between the highly selective and moderately selective institutions are much less than in Australia.

California

The California Postsecondary Education Commission (1998, 2000a) reports that in 1998-99 a total of 59,906 students transferred from California community colleges to

California universities. Since there were 1,304,554 students in California community colleges in 1996, approximately 4.5% transfer to higher level studies in the same State each year. A total of 10,161 transferred to the University of California. The University of California enrolled 155,412 students in 1996. So California community college transfer students comprised 6.5% of the University of California's total student population. A total of 44,989 California community college students transferred to California State University system. This system enrolls 336,803 students, so 13% of its students transferred from California community colleges.

These figures are tabulated below.

TABLE 7.3: PROPORTION OF STUDENTS AT THE HIGHLY SELECTIVE UNIVERSITY OF CALIFORNIA AND THE MODERATELY SELECTIVE CALIFORNIA STATE UNIVERSITY WHO TRANSFERRED FROM A COMMUNITY COLLEGE, 1998-99

Segment	Number of transfers	Total u/grad enrolments	% of u/grad enrolments who are transfers
University of California	10,161	155,412	6.5%
California State University	44,989	336,803	13%
Total	59,906	492,215	12%

Source: California Postsecondary Education Commission (1998) Factsheet 98-1

Community college transfer students were 6.5% of students at the highly selective University of California but were 13% of students at the moderately selective California State University, giving a ratio of 1:2 between the two segments.

Colorado

Some 59% of Colorado's higher education students start in four-year institutions, much higher than the US average (45%) and very much higher than in California (34%), so there are fewer students in two-year institutions seeking to transfer to four-year institutions in Colorado. Overall transfer student admission rates are therefore lower in

Colorado than in California, and they are even lower than in Australia. Colorado did not formally designate four-year institutions by selectivity of admissions at the time the data for this study was collected. However, the Colorado Commission on Higher Education (2003a, p 10) analysed institutions' selectivity to inform a new admissions standards policy from which it was possible to identify Colorado's highly selective four-year colleges as the Colorado School of Mines, the University of Colorado – Boulder and Colorado State University. Transfers were 3% of enrolments at the highly selective institutions and 6% of students at the moderately selective institutions.

TABLE 7.4: PROPORTION OF STUDENTS AT THE HIGHLY SELECTIVE AND THE MODERATELY SELECTIVE FOUR-YEAR PUBLIC INSTITUTIONS WHO TRANSFERRED FROM A TWO-YEAR INSTITUTION, COLORADO, 2001

Institution	Number of transfers	Total u/grad enrolments	% of u/grad enrols who are transfers
Sub total highly selective institutions	1,192	45,559	3%
Sub total moderately selective institutions	1,399	21,584	6%
Total	2,591	67,143	4%

Source: Jacobs, Jim (2002) Colorado Commission on Higher Education, Data file.

Transfer students were 3% of students at the highly selective Colorado institutions and were 6% of students at the moderately selective Colorado institutions, giving a ratio of 1:2 between the two types of institutions.

Texas

Texas has a very strong transfer policy and consequently its four-year institutions have twice the proportion of transfer students as California. Texas does not formally distinguish between its institutions by selectivity of admission. However, for some purposes the State's admissions policies consider the proportion of an institution's commencing students who were ranked in the top 10% of their high school class. Two

institutions stood out as being highly selective. In 1999 some 39% of the students at Texas A & M University (at College Station) were recruited from the top 10% of their high school class and 31% of the students from the University of Texas at Austin were recruited from the top 10% of their high school class. The next selective institutions on this measure were the University of Texas at Dallas (25%) and Texas A&M University-Corpus Christi (21%). This was consistent with the institutions' applicant acceptance rates. Texas A & M University (College Station) had an acceptance rate of 61% and the University of Texas at Austin had an acceptance rate of 64%. The next most selective institutions were Southwest Texas State University (73%) and the University of Texas at Dallas and the University of Texas at El Paso, both of which had acceptance rates of 78%. Some 15% of undergraduate enrolments at the highly selective institutions were transfer students, not much less than the 26% at the moderately selective institutions.

TABLE 7.5: PROPORTION OF STUDENTS AT THE HIGHLY SELECTIVE AND THE MODERATELY SELECTIVE FOUR-YEAR PUBLIC INSTITUTIONS WHO TRANSFERRED FROM A TWO-YEAR INSTITUTION, TEXAS, 2000

Institution	Number of transfers	Total u/grad enrolments	% of u/grad enrols who are transfers
Sub total highly selective institutions	10,594	73,039	15%
Sub total moderately selective institutions	61,968	237,029	26%
Total	72,562	310,068	23%

Source: Texas Higher Education Coordinating Board (2001b) Report on the performance of Texas public universities.

Transfer students were 15% of students at the highly selective Texas institutions and were 26% of students at the moderately selective Texas institutions, giving a ratio of 1:1.7 between the two types of institutions.

Scotland

McLaurin & Osborne (2002) matched higher education data for 1999-2000 provided by the Scottish Higher Education Funding Council with further education student enrolment data for the years 1994-95, 1995-96 1996-97, 1997-98 and 1998-99 provided by the Scottish Further Education Funding Council. They matched records by first initial, second initial, surname, date of birth and enrolment number. They found that of the higher education students in 1999-2000 some 18% had studied at a further education college in the previous five years. However, the ancient and old universities enrolled about half the proportion of further education students as new universities.

TABLE 7.6: HIGHER EDUCATION STUDENTS IN 1999-2000 WHO WERE FURTHER EDUCATION STUDENTS IN THE PREVIOUS 5 YEARS, BY TYPE OF UNIVERSITY

Type of higher education institution	Former further education students	Non former further education students	Total students	% former further education students
Ancient	789	5,601	6,390	12%
Old	985	6,200	7,185	14%
New	3,129	9,761	12,890	24%
Other	189	1,028	1,217	16%
Total	5,092	22,590	27,682	18%

Source: McLaurin & Osborne 2002, table 4

The distinctively vocational education and training qualifications are the higher national certificate and the higher national diploma. Some 14% of the former further education students had a higher national certificate or diploma as their highest qualification on entry to the ancient universities compared with 40% at all other higher education institutions. Together 22% of ancient and old former further education students had an HNC/D as their highest qualification, compared with 45% at all other institutions.

TABLE 7.7: HIGHEST QUALIFICATION ON ENTRY OF ALL FORMER FURTHER EDUCATION STUDENTS BY TYPE OF UNIVERSITY

Type of institution	GCE A level or similar		HNC/HNDs		Access program		Other		TOTAL
	No.	%	No.	%	No.	%	No.	%	
Ancient	1,577	57%	402	14%	404	14%	165	6%	2,787
Old	1,316	38%	966	28%	420	12%	225	6%	3,470
New	2,227	29%	3,649	47%	343	4%	514	7%	7,753
Other	379	63%	118	20%	20	3%	63	10%	604
Total	5,499	38%	5,135	35%	1,187	8%	967	7%	14,614

Source: McLaurin & Osborne 2002, table 6

McLaurin & Osborne (2002) also found that 56% of former further education students attended a higher education in the same region as their former further education college and 18% of students attended a higher education institution within what they judged to be commutable distance of their former college.

TABLE 7.8: COMPARISON OF REGION OF HIGHER EDUCATION INSTITUTION AND REGION OF FORMER FURTHER EDUCATION STUDENTS' COLLEGES

Locality	Count	Percent
Commutable	2,590	18%
Same region	8,208	56%
Not in same region	3,719	26%
Missing	96	< 1%
Total	14,614	100%

Source: McLaurin & Osborne 2002, table 12

Gallacher (2003, p 12) reports the numbers and percentages of students entering higher education institutions in Scotland for whom the higher national certificate or diploma or similar further education qualification was the highest on entry. He reports those for ancient universities (3%), 1960s universities (8%), post '92 universities (25%) and art/music colleges (13%). Gallacher (2003, p 11) refers to MacLennan and colleagues' (2000, p 12) distinction between selecting and recruiting universities. MacLennan and colleagues (2000, p 12) observe that 'Post-1992 HEIs often adopt a more promotion-based approach, consistent with a "recruiting" model. In contrast, pre-1992 HEIs have traditionally followed a softer approach, relying more on liaison activities with schools, and in certain cases, with FECs'. Table 7.9 was therefore calculated by classifying the ancient and 1960s universities as highly selective universities and the post '92 universities and art/music colleges as recruiting universities, or moderately selective institutions in this study.

TABLE 7.9: STUDENTS TRANSFERRING FROM FURTHER EDUCATION PROGRAMS TO HIGHER EDUCATION INSTITUTIONS, SCOTLAND, 2000

Highly selective institutions	Moderately selective institutions	Ratio of highly selective to moderately selective
5%	24%	1:5

Source: Gallacher (2003), table 7, p 12.

Summary of transfer student admission rates

These results are summarised in the next table. They show that the differences in transfer student admission of the highly selective and moderately selective higher education institutions in Australia are twice that for the three US States examined, even in Colorado which has a lower overall transfer rate than Australia. The differences in Scotland are comparable to those in Australia in the figures reported by McLaurin & Osborne (2002) and are even greater in Gallacher's (2003) figures.

TABLE 7.10: STUDENTS TRANSFERRING FROM NON BACCALAUREATE PROGRAMS TO PUBLIC BACCALAUREATE GRANTING INSTITUTIONS, AUSTRALIA, SCOTLAND AND 3 US STATES, BY SELECTIVITY OF RECEIVING INSTITUTION

Jurisdiction	Highly selective institutions	Moderately selective institutions	Ratio of highly selective to moderately selective
Australia	2%	8%	1:4
California	6.5%	13%	1:2
Colorado	3%	6%	1:2
Texas	15%	26%	1:1.7
Scotland	5%	24%	1:5

This finding is particularly striking when one notes that the difference in transfer student admission rate is lower in California, which formally segments its highly selective and not so selective higher education sectors, than in Australia which has a formally unified national system of higher education and in Scotland which does not formally segment its universities.

Clark's (1983, p 52) explanation for these highly differentiated transfer student admission rates is that the lack of formal segmentation by tier drives systems to greater internal stratification, which at least in Australia and Scotland is by status which in turn is strongly related to institutional age.

Reverse transfer²

This chapter has followed the literature in considering student transfer first as an upward progression (Kintzer 1989) from a lower to a higher level of education. Just as one transfers from primary to secondary to tertiary education, so within tertiary education one transfers from diploma to baccalaureate to masters to doctoral programs. In most Canadian provinces, in the UK and in the US vocational education and training not only prepares students for work, but also prepares them for further study and transfer to baccalaureate programs. This is such an important role that the dominant understanding of student transfer is from a sub baccalaureate program, institution or sector to a baccalaureate program, institution or sector (Furth 1973; Clark 1983).

A number of people have argued against considering student transfer as an upward linear process (Ignash & Townsend 2000), as progression from ‘less noble’ to ‘noble’ (Furth 1973) institutions. Clark (1960) first identified in 1960 the transfer of students from baccalaureate to sub baccalaureate programs, what he called ‘reverse-flow students’ but who are now more commonly known as reverse transfer students. The OECD (1991, p 76) noted in 1991 in many countries an increase in reverse transfer, which it described as university students and graduates, mainly from academic disciplines, seeking a vocational qualification from non university institutions. Kajstura & Keim (1992, p 39) described two subgroups of reverse transfer students: ‘1) non-completers, who attended a four-year institution, but did not complete a degree before enrolling at a two-year college; and 2) graduates, who earned at least an undergraduate

² I thank my partner Leesa Wheelahan then of Southern Cross University and now of Griffith University for encouraging me to undertake this study and for providing valuable advice and critical comments throughout; Khin Thin Aye of the Department of Education, Science and Training’s University Statistics Unit for providing tables from universities’ enrolment submissions; James Ashburner of the Australian Bureau of Statistics for constructing and providing tables from the survey of education and work; Lorraine Edmunds also of the Australian Bureau of Statistics for constructing tables from the survey of education, training and information technology and for checking my interpretation of the survey of education and work tables; Dr Andrew R Giles-Peters of the Australian National Training Authority for his expert comments on an earlier version of this chapter which saved it from serious mistakes and for his contribution of data from internal reports which unfortunately have not been published; Dr Tom Karmel, managing director of the National Centre for Vocational Education Research for his helpful comments and suggestions for further work; and I thank 2 anonymous referees for the *International Journal of Training Research* who provided extensive and constructive criticisms of an earlier version of the paper upon which this section is based.

degree prior to enrolling at a two-year college'. Townsend (1999) elaborated upon different types of reverse transfer students. As Hagedorn & Castro (1999, p 2) recounted, Heinze & Daniels (1970) found that 9.44% of community college students nationwide were reverse transfer students. Kuznik, Maxey & Anderson (1974) reported that community colleges in their study receive as many reverse transfer students from 4-year institutions as they transfer to them. Kissler (1980) reported that in 1979 a larger number of students transferred from the University of California to community colleges than in the other direction. Mitchell & Grafton (1985) found that reverse transfer students were 20% of students of the Los Rios Community College District of Northern California. Reverse transfer in the US has also been studied by Hudak (1983), Townsend & Dever (1999), Winter & Harris (1999) and Bryant (2001). In contrast, MacLennan and colleagues (2000, p 16) report that there appears to be very little evidence of flow from higher education to further education in Scotland.

In Australia Golding (1995a, p38; 1995b, p 30) estimated that what he called 'reverse articulation' – the transfer of students from the baccalaureate-granting sector to vocational education and training – is about 5 times more common than upward tertiary transfer. Doughney (now Wheelahan) (2000) argues that the data Golding used is not sufficiently robust to support the conclusions he drew, let alone the more extravagant claims of subsequent vocational education and training advocates. Millican (1995) supporting Golding's conclusion was based on a survey of only 568 students enrolled in Queensland technical and further education institutes in 1993 from a response rate of 31%. Werner (1998) also supporting Golding was based on a survey of 1,544 students (1,215 useable responses) enrolled in South Australia TAFE institutes in 1995 from a response rate of 41%. Golding & Vallence (1999, p 9) compared the prior educational history of all vocational education and training students with the prior history of only students commencing a bachelor level program or below, leaving out continuing students and postgraduate students, which as we shall see understates the number of students in the baccalaureate-granting sector with a vocational education and training qualification by about half. Carnegie (2000, p 26) made the same mistake of comparing all vocational education and training students with only students commencing a bachelor program or below.

More recent studies have found that students have multiple enrolments in higher education and vocational education and training – some sequential and others concurrent. Hagedorn & Castro (1999, p 13) identify ‘summer sessioners’ who study at California Community Colleges to supplement credits or coursework at their 4-year institution, which presumably does not offer an extensive summer program for credit or which may be distant from the student’s home or other location over summer. De los Santos & Wright (1990) report that in 1989 almost 16% of students in the Maricopa County Community College District had attended another college in the district, 3,426 were concurrently studying at Arizona State University, and 7,408 had transferred from the university. They argued that ‘The movement of students should not be seen as only a straight line; progression for many can better be described as “swirling” between and among community colleges and four-year institutions on the way to a baccalaureate’ (de los Santos & Wright 1990, p 32). Maxwell and colleagues (2002, p 4) report that almost half of the students in their sample of urban community colleges report having attending 2 or more colleges, over a quarter had taken subjects at other community colleges, and over a tenth had taken subjects at a 4-year college. They (Maxwell et al 2002, p 5) further report that from 10% to 15% of students in their sample were concurrently studying at another post compulsory educational institution and that 9% of students were reverse transfers. Maxwell and colleagues (2002, p 1) called their report ‘the community college shuffle’ and argued that ‘Educational enrollment patterns can be likened to a series of playing cards. For many students the path through college is sequential, orderly and similar to a hand that progresses from deuce to ace. Other student patterns are jumbled much like a hand that results from a shuffled deck.’ Piland (1995) and McCormick & Carroll (1997) observe ‘multiple tracks’ enrolment and Adelman (1999) observes ‘alternating/simultaneous attendance’. Townsend (2000) reported that only 36% of her study of 614 transfer students in one State fitted the stereotypical profile of ‘traditional’ transfer students who progress directly from high school to a 2-year college and attend for 2 years before transferring to a 4-year college, usually with an associate’s degree. Only 52% of the transfers in the same study were upward transfers – students who moved upwards to the 4-year school by using the 2-year school as the first rung on their educational ladder – and 45% were multiple-transfer students who had attended two or more colleges or universities before enrolling at their current institution. The Community College Survey of Student Engagement (2004) reports that 35% of community college students in their survey say that they

began their studies at another college, 16% say they already have a degree, and many are returning to get specialised training or take courses that interest them. Some 6% say they're concurrently enrolled in another college. Karmel & Nguyen (2003, pp 10-11) reported that in 2001 just over 7% of Australian vocational education and training graduates aged from 35 to 54 also had a higher education degree and that just over 11% of university graduates in the same age group also had a vet qualification, indicating extensive swirling in Australia as well as the US.

While swirling is probably the best metaphor to describe transfers between sectors, particularly where lifelong learning (Faure 1972) is pervasive, vocational education advocates invest considerable rhetorical significance in reverse transfer as an indicator of the limitations of universities and conversely of the strengths of vocational education and training. Some advocates for vocational education see reverse transfer as an opportunity to redress vocational education's low status (Golding & Vallence 1999, p 19; Harris et al 2004, p 9). But most commentary is based on limited surveys and isolated institutional studies which have little if any application to national policy. This section discusses national data on reverse student transfer in Aotearoa New Zealand, Canada and the USA and reports the rather better although still limited national data on reverse student transfer in Australia.

Reverse student transfer in New Zealand

Tertiary education in New Zealand comprises colleges of education, polytechnics, private training establishments, universities and Wānanga. Colleges of education offer teacher education. Polytechnics have significant enrolments in baccalaureates, but the Government wants polytechnics to concentrate on applied, vocationally-orientated sub degree programs (Tertiary Education Commission 2004, p 17). Most private training establishments are small and offer sub baccalaureate programs. Wānanga are 'characterised by teaching and research that maintains, advances, and disseminates knowledge and develops intellectual independence, and assists the application of knowledge regarding ahuatanga Maori (Maori tradition) according to tikanga Maori (Maori custom) (*Education Acts 1964-1995*, paragraph 162(2)(b)(iv)).

TABLE 7.11: EQUIVALENT FULL-TIME STUDENTS BY PROVIDER TYPE AND LEVEL, 2003

Provider type	Post-Graduate	Bachelors	Diploma	Certificate	Total
Colleges of Education	164	4,595	3,047	706	8,512
Polytechnics	339	14,842	17,249	60,478	92,909
Private training establishments	285	1,336	11,190	25,188	37,999
Universities	13,238	84,706	13,614	11,308	122,865
Wānanga	71	949	3,070	34,349	38,438
Total	14,097	106,429	48,170	132,028	300,724

Source: Scott, David (2005) 'Comments', personal communication 2 May 2005.

Scott's (2004) detailed *Pathways in tertiary education 1998-2002* tracked the enrolment of tertiary education students who commenced study in 1998 over the four subsequent years. He used a sophisticated matching algorithm to track students who changed institutions and therefore sectors. He checked his matching algorithm with a unique student identifier introduced in 2003 and found that it identified students correctly in 93.6% of the cases (Scott 2005). Scott (2005) provided the following table on transfers between level and sector between 1999 and 2003 for students starting tertiary education for the first time in 1999. Scott says that 'The 1999 data has the advantage of including students in private training establishments, which wasn't collected in 1998.' Scott (2005) observes of the data –

Upward transfers of 4.7% are a little higher than reverse transfers 3.6%, and there is slightly higher transfer from university to the non-university sector than vice-versa. What's fascinating for me, are the differences for the different subgroups. This reflects to a degree the fact that around 50% of starters have dropped out by 2003, and so this

large group in the denominator acts to lower transfer rates. For those subgroups with less attrition, transfer rates are quite a bit higher.

* * *

From our earlier progression work, we know that progression to a higher level qualification in the year following completion is around 16%, while progression to lower level qualification for those completing is around 6%, while around 17% reenrol in a qualification at the *same* level as the one completed.

TABLE 7.12: TRANSFERS BETWEEN LEVEL AND SECTOR BETWEEN 1999 AND 2003 FOR STUDENTS STARTING TERTIARY EDUCATION FOR THE FIRST TIME IN 1999

First-year enrolment	Number of first year students	Upward transfers between 1999 and 2003	Reverse transfers between 1999 and 2003	Non-uni to uni transfers between 1999 and 2003	Uni to non-uni transfers between 1999 and 2003
Sub-degree at a non-university provider	53,845	5.2%		3.3%	
Degree or higher at a university	15,787		14.1%		14.5%
Sub-degree at a university	4,221	18.2%			14.7%
Degree at a non-university provider	2,688		19.0%	11.6%	
Both sub-degree and degree level at a non-university provider	256			15.2%	
Both sub-degree and degree level at both university and non-university providers	246				
Degree or higher at both university and non-	154		22.1%		

university providers					
Both sub-degree and degree level at a university	122				16.4%
Sub-degree at both university and non-university providers	97	24.7%			
Total	77,416	4.7%	3.6%	2.7%	3.8%

Source: Scott, David (2005) 'Comments', personal communication 2 May 2005.

One may thus conclude that intersectoral transfer is not high in New Zealand, and further that reverse transfer is about the same size as upward transfer. There are three possible explanations. Until recently the Government offered loans for tuition fees to as many students an institution enrolled, so any quota or enrolment limit was imposed by institutions rather than by Government, and all institutions including universities had a financial incentive to enrol as many students as had a reasonable prospect of success. Secondly, there is considerable overlap between the sectors in New Zealand: both university and non university providers offer both degrees and sub degree programs. Students may be more likely to gain admission to their preferred institution and program upon their initial entry to higher education, reducing the need to transfer later to another institution or program. Scott (2005) adds that 'around 40-50% of starters dropout, and so this large group in the denominator acts to lower transfer rates. For those subgroups with less attrition (eg degree and above, or in unis), transfer rates are quite a bit higher (eg between 10% and 30%). "Progression rate" data also show higher transfer rates if you complete (16% upward and 6% reverse).' New Zealand drop-out rates are not much higher than those in Australia and may be even less than those in the US (the UK has comparatively low drop-out rates). However, Scott's data for New Zealand is more robust than the data available for other countries, and this may depress apparent transfer rates.

Reverse student transfer in Canada

Canada's national graduates survey interviews a large structured sample of graduates from programs offered by Canadian public universities, community colleges and trade-vocational colleges two and five years after graduation. The survey found that 23% of the graduates in 1990 had completed a second qualification by 1995. As Finnie (2004, p 44) observes, a relatively high proportion of graduates who complete a second qualification complete one at the same or at a lower level than their initial qualification. Thus, of the 24% of bachelor graduates in 1990 who completed a second qualification by 1995, some 44% completed another bachelor, and 18% completed a diploma.

TABLE 7.13: CANADIAN HIGHER EDUCATION GRADUATES IN 1990 WHO HAD COMPLETED ANOTHER QUALIFICATION BY 1995, BY LEVEL OF INITIAL AND SUBSEQUENT QUALIFICATION

Initial qualification	Completed another qualification	Subsequent qualification			
		Diploma	Bachelor	Masters	Doctorate
Diploma	24%	58%	39%	1%	1%
Bachelor	24%	18%	44%	36%	1%
Masters	16%	20%	32%	21%	28%

Source: adapted from Finnie (2004) tables 3 and 4, pages 43 & 45.

These data are reported as percentages and not as numbers because they are from a survey of a sample rather than a survey of the whole population of graduates. The percentages may disguise the number of graduates who complete another qualification. This is considered in the next table. I took Statistics Canada's estimates of the underlying national population of the graduates from whom it constructed its survey and applied the percentages found in the national graduates survey to estimate the number of graduates who completed another qualification at each level. The numbers are estimates and rounded since they are derived from the percentages shown in the previous table. They show that about 4,600 bachelor graduates in 1990 completed a diploma by 1995, while approximately 5,200 diploma graduates subsequently

completed a bachelor degree. That is, while Canadian graduates' reverse transfer is sizeable, it is still not as large as upward transfer.

TABLE 7.14: ESTIMATED NUMBER OF CANADIAN GRADUATES IN 1990 WHO COMPLETED A SUBSEQUENT QUALIFICATION BY 1995 BY LEVEL OF INITIAL AND SUBSEQUENT QUALIFICATION

Initial qualification	Graduates	Completed another qualification	Subsequent qualification			
			Diploma	Bachelor	Masters	Doctorate
Diploma	56,170	13,200	7,700	5,200	154	80
Bachelors	104,642	25,000	4,600	11,000	8,900	231
Masters	15,405	2,390	480	760	490	660
Total	176,217	40,590	12,780	16,960	9,544	971

Source: adapted from Finnie (2004) tables 1, 3 and 4, pages 40-1, 45.

Reverse student transfer in the US

McCormick & Carroll (1997) examined the US federal Department of Education's longitudinal study of students who entered college for the first time during the 1989-90 academic year. This structured sample was interviewed by phone two and four years after entering college. The study counted as transfer any enrolment in one institution followed by enrolment in another that was not followed by a return to the first institution. Also counted as transfer was any enrolment in a less-than-four-year institution followed by enrolment in a four-year institution and a subsequent reenrollment at the first institution. Unfortunately the study excluded from the data students who completed a bachelor's degree at their first institution, even if they subsequently enrolled elsewhere. This means that only 'non-completers' (Kajstura & Keim 1992, p 39) or 'drop downs' (Kintzer 1983, p 1) are included as reverse transfers; not included are completers or what might be called reverse transfer augmenters.

Table 7.15 shows the transfer status by 1994 of US students who began their studies four years earlier in 1989-90, excluding students who had completed a baccalaureate. It shows that 15.6% of students who enrolled in a 4-year institution for the first time in 1989-90 who had not completed a baccalaureate had transferred to another four-year institution, but only 11.6% had transferred to a two-year institution. In contrast, 21.8% of students who first enrolled in a two-year institution had transferred to a four-year institution and only 14.6% transferred to another two-year institution.

TABLE 7.15: PROPORTION OF US STUDENTS WHO COMMENCED COLLEGE FOR THE FIRST TIME IN 1989-90 AND WHO HAD NOT COMPLETED A BACCALAUREATE, BY TRANSFER STATUS AND DESTINATION BY 1989

Level of 1st institution	Did not transfer	Transferred to 4-year	Transferred to 2-year	Transferred to less-than-2-year	Transfer destination unknown
4-year	71.7%	15.6%	11.6%	1.0%	0.1%
2-year	57.5%	21.8%	14.6%	5.6%	0.8%
Total	64.6%	18.7%	13.1%	3.3%	0.5%

Source: McCormick & Carroll (1997) table 4, page 7.

I applied McCormick & Carroll's percentages to the US Department of Education National Center for Education Statistics' (1991, p 176) report of students enrolled in 2-year and 4-year institutions in Fall 1989 to estimate student numbers. Because the numbers are estimates the rows do not sum exactly. It will be noted that while 136,068 students of a four-year institution who did not attain a baccalaureate transferred to a two-year institution, 257,458 or almost twice as many students of a two-year institution transferred to a two-year institution. That is, in the US drop down reverse transfer is about half the volume of all upward transfer.

TABLE 7.16: ESTIMATED NUMBER OF US STUDENTS WHO COMMENCED COLLEGE FOR THE FIRST TIME IN 1989-90 AND WHO HAD NOT COMPLETED A BACCALAUREATE, BY TRANSFER STATUS AND DESTINATION BY 1989

Level of 1st institution	Enrolled	Did not transfer	Transferred to 4-year	Transferred to 2-year	Transferred to less-than-2-year	Transfer destination unknown
4-year	1,173,000	841,041	182,988	136,068	11,730	1,173
2-year	1,181,000	679,075	257,458	172,426	66,136	9,448
Total	2,354,000	1,520,116	440,446	308,494	77,866	10,621

Source: McCormick & Carroll (1997) table 4, page 7; US Department of Education National Center for Education Statistics (1991) table 169, page 176.

The most recent US national data on student and transfer is Peter & Cataldi (2005) analysis of the US 1996/01 beginning postsecondary students longitudinal study of students who entered college for the first time during the 1995-96 academic year. Students were surveyed in 1998 and 2001, which was six years after they began their postsecondary education. Peter & Cataldi's study is more informative than the earlier study. Some 40% of students who began their postsecondary study in 1995-96 studies at more than one institution, and 11% 'co-enrolled', by which Peter & Cataldi mean enrolled in more than one institution for more than one month during an academic year. Almost one third of students transferred, and both upward and lateral transfer rates are just over double the downward transfer rate.

TABLE 7.17: PERCENTAGE DISTRIBUTION (BY COLUMNS) OF 1995–96 BEGINNING POSTSECONDARY STUDENTS BY THE LEVEL OF THE FIRST INSTITUTION ATTENDED, ACCORDING TO MULTIPLE INSTITUTION ATTENDANCE PATTERNS

	Level of 1 st institution		
	2-year	4-year	Total
Enrolled	1,018,000	1,151,000	2,169,000
Number of institutions attended			
1	54.3%	61.8%	59.7%
> 1	45.7%	38.2%	40.4%
2	34.4%	27.9%	30.1%
> = 3	11.3%	10.2%	10.2%
Co-enrolled			
Never	89.1%	87.4%	89.2%
Sometimes	10.9%	12.6%	10.9%
Transferred			
Never	59.8%	74.2%	67.9%
Transferred	40.2%	25.8%	32.1%
Number of times transferred			
1	33.3%	19.7%	25.9%
2	6.7%	5.3%	5.7%
3	0.2%	0.8%	0.5%
First transfer direction			
Upward	23.9%	n.a.	13.0%
Lateral	13.3%	14.7%	13.0%
Downward	3.1%	11.1%	6.1%

Source: Peter & Cataldi (2005) table 2, page 11

I applied Peter & Cataldi's percentages to the US Department of Education National Center for Education Statistics' (1998, table 181) table of total first-time freshmen enrolled in institutions of higher education and degree-granting institutions in Fall 1995 to estimate student numbers. It will be noted that while almost 282,000 of commencing students' first transfer was upward, only 132,000 or less than half commencing students' first transfer was downward. Of course students' subsequent transfers may have been in the opposite direction, but 81% of transfer students transferred only once, so the direction of subsequent transfers would not change the broad trend for the volume of upward transfers to be about twice than of downward transfers.

TABLE 7.18: ESTIMATED NUMBER OF FIRST-TIME FRESHMEN IN FALL 1995 BY THE LEVEL OF THE FIRST INSTITUTION ATTENDED AND MULTIPLE INSTITUTION ATTENDANCE PATTERNS

	Level of 1 st institution		
	2-year	4-year	Total
Enrolled	1,018,000	1,151,000	2,169,000
Number of institutions attended			
1	552,774	711,318	1,294,893
> 1	465,226	439,682	876,276
2	350,192	321,129	652,869
> = 3	115,034	117,402	221,238
Co-enrolled			
Never	907,038	1,005,974	1,934,748
Sometimes	110,962	145,026	236,421
Transferred			
Never	608,764	854,042	1,472,751
Transferred	409,236	296,958	696,249
Number of times transferred			
1	338,994	226,747	561,771
2	68,206	61,003	123,633
3	2,036	9,208	10,845

	Level of 1 st institution		
	2-year	4-year	Total
First transfer direction			
Upward	243,302	n.a.	281,970
Lateral	135,394	169,197	281,970
Downward	31,558	127,761	132,309

Source: Peter & Cataldi (2005) table 2, page 11 and US Department of Education National Center for Education Statistics (1998) table 181.

Australian higher education enrolment data

Before considering reverse transfer in Australia it is necessary to consider the accuracy of Australian higher education enrolment data. The selected higher education student statistics reported by the Australian Government include two elements of data on transfer to higher education institutions: highest prior qualification attained, and basis of admission. Doughney (2000) and Wheelahan (2002) argue that these data are flawed, for different reasons.

Universities are required to report of all their domestic students commencing a program at bachelor level or below the highest qualification they attained before beginning their current program. All institutions are members of State tertiary admission centres and all admission centres collect understandably good data on applicants' previous qualifications. These data are transferred to institutions and some institutions use the data transferred from their State tertiary admission centre as the source for this part of their statistical report on students who they admitted through the State centre. Most of these institutions require students not admitted through their State admissions centre to provide this information in the application and enrolment process, and this involves variable proportions of the intake and is of variable quality. Other institutions do not report data transferred from their State tertiary admissions centre and require students to provide this information again in the enrolment process. Golding (1995a, p 37) reported a study by Burns and colleagues (1992) who manually checked information provided at

enrolment and found that the data reported on technical and further education background was only 50% reliable due to both inappropriate inclusions and omissions. This data is inaccurate, not because students don't know how to respond to the question, but because it is one of numerous questions irrelevant to students' direct interests and thus they take little care to provide accurate information. This data is not used in universities' operations and is of little use to them otherwise so they make little effort to check the data beyond satisfying the national reporting system's format and validity checks. This data is therefore not accurate.

As Golding & Vallence (1999, p 14), Doughney (2000) and Wheelahan (2002) argue, even were this data accurate, they would still under report student transfer since they do not take account of the 'swirling' identified by de los Santos & Wright (1990). A student who completed a vocational education and training qualification and a baccalaureate and subsequently commenced another baccalaureate would correctly report their highest prior qualification as a bachelor degree, although depending or not on the order in which these qualifications were completed the student would be considered to have transferred from vocational education and training.

The second element of data on transfers to baccalaureate programs reported nationally is institutions' report of the basis upon which they admitted their domestic students commencing a program at bachelor level or below. All State tertiary admission centres categorise applicants by their previous educational experience. An applicant may satisfy the criteria for inclusion in multiple categories. For example, an applicant who had completed the final year of secondary education, a vocational education and training diploma and a baccalaureate would satisfy the criteria for inclusion in 3 applicant categories. There are rules for placing applicants uniquely in one applicant category, but these are inconsistent between State centres and in some States they are inconsistent between institutions and there are even inconsistencies between programs within the same institution. Nonetheless, it is possible to map admission centres' applicant categories to basis for admission and some institutions report these mappings in their institution's statistical returns.

However, in other States institutions may and sometimes do admit students on the basis of a qualification other than the one upon which their admission category was

determined. For example, an applicant who had good senior secondary results but poor results in the first year of one program may be selected into another program on the basis of their senior secondary results even though they may be categorised as an applicant with previous incomplete baccalaureate studies. Furthermore, institutions admit many students from direct application rather than through their State admissions centre and so these students are not categorised by the State admissions centre. As a result, probably for most students ‘basis of admission’ is not derived from State admissions centres’ categorisations, but from data collected during the admission and enrolment process. Typically the data is collected not from the admissions process where it is used and thus most likely to be accurate, but from the subsequent enrolment process. Furthermore, an enrolment officer is not necessarily the admissions officer and so is unlikely to have definite knowledge of the actual basis of admission. It is therefore often inferred – guessed – from the student’s apparent characteristics. For these reasons institutions’ data on transfer to the baccalaureate granting sector is not very good.

The results of these data collections are set out in table 7.18. It shows that of the domestic students commencing a bachelor level program or below 19,570 students or 11% had a TAFE award as their highest prior educational qualification in 2000, and that this increased to 25,348 students or 13% of the intake in 2002. As will be seen below, about another third would have partly completed TAFE studies. However, only 7% to 8% were admitted on the basis of a complete or incomplete TAFE program.

TABLE 7.19: DOMESTIC STUDENTS COMMENCING A PROGRAM AT BACHELOR LEVEL OR BELOW WHOSE HIGHEST PRIOR QUALIFICATION ATTAINED IS A TAFE AWARD AND WHOSE BASIS FOR ADMISSION TO THEIR CURRENT PROGRAM IS A COMPLETE OR INCOMPLETE TAFE PROGRAM

Measure	2000		2001		2002	
	%	No.	%	No.	%	No.
Highest prior qualification is a TAFE award	11%	19,570	11%	20,803	13%	25,348
Basis for admission is TAFE study	7%	11,690	7%	12,916	8%	16,013

Source: Department of Education, Science and Training (2003, 2002, 2001) Students: selected higher education statistics,
<http://www.detya.gov.au/highered/statpubs.htm#studpubs>

This suggests that from 4% to 5% of students were admitted on the basis of a qualification other than their highest qualification, which is counter intuitive. Two explanations seem possible. It may reflect university selection officers' tendency or even bias against TAFE qualifications notwithstanding that their students consider them their highest qualification. Alternatively, it may simply reflect the poor quality of the data described above.

The next table estimates the number of all students (and not just commencing students) in the baccalaureate granting sector who are from TAFE. Applying the percentages in table 7.18 to all students enrolled in a program at bachelor level or below gives an estimate of 67,000 bachelor students whose highest prior qualification is a TAFE award.

TABLE 7.20: ESTIMATED NUMBER OF STUDENTS ENROLLED IN A PROGRAM AT BACHELOR LEVEL OR BELOW WHOSE HIGHEST PRIOR QUALIFICATION ATTAINED IS A TAFE AWARD AND WHOSE BASIS FOR ADMISSION TO THEIR CURRENT PROGRAM IS A COMPLETE OR INCOMPLETE TAFE PROGRAM

Measure	2000	2001	2002
All students enrolled in bachelor program or below	516,320	589,083	614,512
Estimated highest prior qualification is a TAFE award	56,795	64,799	79,887
Estimated basis for admission is TAFE study	36,142	41,236	49,161

Cummins, Rutten & Wagstaff (1999, tables 2.1 and 2.2) reported that from 1989 to 1997 some 16% of students admitted to higher education on the basis of TAFE qualifications were admitted to programs other than bachelor programs, although this had fallen to 9% by 1997. So TAFE is likely to be the highest qualification of some students in other programs such as graduate certificates and graduate diplomas. If 11% of the graduate certificate, graduate diploma and non award students had TAFE as their highest qualification, another 9,500 would be TAFE qualified, giving an estimated total of 89,000 students in the baccalaureate granting sector in 2002 whose highest prior qualification was a TAFE award.

In addition to the data reported nationally in selected student statistics, higher education institutions collect three elements that inform reverse transfer. Institutions ask students:

What education have you commenced or completed before enrolling in this program?

A post graduate program of any type?

A bachelors degree program of any type?

A diploma or associate diploma at an institution other than a TAFE college?

A diploma or associate diploma program at a TAFE college?

A TAFE award program other than the above? (Don't count secondary education, or hobby/recreational/leisure or personal enrichment programs)

Final year of secondary education at a high school, technical high school, secondary school or secondary college?

Final year of secondary education at another institution? Eg TAFE

Some other qualification or certificate of attainment which may be recognised for tertiary entrance?

No other qualification/certificate

Institutions further ask students the year they last enrolled in the previous qualification and whether they completed it. I requested from the Department of Education, Science and Training data on domestic university students' prior TAFE study for 1994, 1999 and 2003, the latest year for which data were available at the time I made the request. Prior TAFE study was divided into two levels: associate degree, advanced diploma or diploma; and other TAFE award program. Most higher level TAFE qualifications are diplomas and advanced diplomas and most lower level qualifications are certificates. Results are summarised in the next table.

It will be noted first that in 2003 some 12,083 students commencing an undergraduate program had completed a TAFE diploma level program and that a further 18,024 had completed a certificate level program, giving 30,107 commencing undergraduates with a completed TAFE qualification. It will be recalled from the table above that 25,348 domestic students commencing a bachelor level program in 2002 had a TAFE

qualification as their highest prior qualification. The data are from different years, but it is reasonable to estimate that of the students commencing undergraduate programs who have a TAFE qualification about 15% have a higher qualification. Or to express the same point differently, the domestic students commencing an undergraduate program with TAFE as their highest prior qualification are about 85% of all the students in the group with a prior TAFE qualification.

Some 30,107 domestic students commencing an undergraduate program in 2003 had completed a TAFE program and 40,839 students had some prior completed or incomplete TAFE study. Commencing students are 32% of all undergraduates, so some 95,000 undergraduates had completed a TAFE program and 130,000 undergraduates had some prior TAFE study. Some 12,170 domestic students commencing a postgraduate program in 2003 had completed a TAFE program and 14,759 some prior TAFE study whether completed or not. Commencing students are 45% of all postgraduate students so about 27,000 of all postgraduates had completed a TAFE program and 32,500 students had some prior TAFE study. Thus about 122,000 university students had completed a TAFE program and a total of about 162,500 university students had some prior TAFE study.

The proportion of commencing undergraduates with any prior TAFE study has increased from 16% in 1994 to 25% in 2003. Interestingly, the level of prior TAFE study is not as strongly associated with commencing an undergraduate program as whether the prior TAFE study was completed. Thus students with incomplete diplomas were 3% of the undergraduate intake in 2003, the same proportion as those with incomplete certificates. However, completing a TAFE qualification doubled the likelihood of commencing an undergraduate program, irrespective of whether it was a certificate or diploma level.

It is also interesting that students with a completed certificate were a higher proportion of the undergraduate intake than students with a completed diploma. This is consistent for the 3 years for which data was obtained. There are 2 possible explanations for this, which on its face is unexpected. One possibility is that the advanced diploma and diploma is a career entry qualification: students with these qualifications do not need to undertake a degree to gain entry to their desired vocation. However, the certificate does

not gain entry to as many vocations and these graduates may be more likely to upgrade their qualification, including to a degree. A second possibility is that a certificate gains transfer students entry to most undergraduate programs. Most transfer students would prefer to gain entry to their degree program as soon as possible and therefore students who can transfer after completing their certificate would not stay in TAFE to complete a diploma.

The proportion of domestic students with prior TAFE study commencing a postgraduate program has also grown strongly, although not as strongly those commencing undergraduate programs. The other patterns observed in the undergraduate intake appear in the postgraduate intake: a low proportion of students with incomplete TAFE qualifications are admitted to postgraduate programs, and certificate holders are a higher proportion of the postgraduate student intake than diplomates. Note, however, that the proportion of commencing postgraduate students for whom no information on prior TAFE study was reported, which is about 8%, is about the same and in some cases bigger than the cells for which data is reported. It is likely that these students had no prior study, but the high proportion of missing data nonetheless suggests that the cells with lower values should be interpreted cautiously.

TABLE 7.21: DOMESTIC STUDENTS COMMENCING HIGHER EDUCATION PROGRAMS WITH PRIOR TAFE STUDY BY LEVEL OF PRIOR TAFE STUDY AND WHETHER COMPLETED, FOR SELECTED YEARS

Commencing students	1994		1999		2003	
	Enrs	%	Enrs	%	Enrs	%
<i>Undergraduates</i>	146,968		168,069		166,499	
Completed diploma, etc	5,884	4%	9,218	5%	12,083	7%
Completed certificate, etc	10,120	7%	15,295	9%	18,024	11%
Incomplete diploma, etc	5,115	3%	6,527	4%	5,660	3%
Incomplete certificate, etc	2,805	2%	4,608	3%	5,072	3%
Total with prior TAFE study	23,924	16%	35,648	21%	40,839	25%
No information on prior TAFE study	4,199	3%	3,368	2%	7,164	4%

<i>Post graduates</i>	52,993		55,699		77,367	
Completed diploma, etc	1,891	4%	3,306	6%	5,416	7%
Completed certificate, etc	3,391	6%	4,513	8%	6,754	9%
Incomplete diploma, etc	810	2%	1,168	2%	1,523	2%
Incomplete certificate, etc	713	1%	821	1%	1,066	1%
Total with prior TAFE study	6,805	13%	9,808	18%	14,759	19%
No information on prior TAFE study	4,201	8%	2,702	5%	6,218	8%

Source: Khin Thin Aye, University Statistics Unit, Department of Education, Science and Training, 09 Sep 2004, source: OZUE(1989-1999) ENROL(2003) RFI No.: 04-483.

In view of the salience of selectivity of receiving institution to upward student transfer noted above I obtained data on prior TAFE study for all institutions and aggregated these by the highly selective group of eight and other universities. The results are aggregated in the table below. First, it will be noted that the highly selective institutions admit from a half to a third of the proportion of domestic undergraduate students with prior TAFE study as the moderately selective institutions. This is somewhat less than the fourfold difference observed with basis of admission. Secondly, it will be noted that the highly selective institutions increased the proportion of domestic undergraduate students they admitted with prior TAFE study rather slowly, from 9% in 1994 to 11% in 2003. In contrast the moderately selective institutions increased the proportion of domestic undergraduate students they admitted with prior TAFE study strongly from 19% in 1994 to 29% in 2003. Thus, the difference between the treatment of students with prior TAFE study by the highly selective and moderately selective institutions is increasing. However, the types of institutions are alike in apparently placing much more emphasis in their selection decisions on whether a prior TAFE award is completed than on its level.

These patterns are repeated for domestic commencing postgraduate students, although somewhat less dramatically. Again, the cells with smaller values need to be interpreted cautiously in view of the proportion of missing data.

TABLE 7.22: DOMESTIC STUDENTS COMMENCING HIGHER EDUCATION PROGRAMS WITH PRIOR TAFE STUDY BY LEVEL OF PRIOR TAFE STUDY, WHETHER COMPLETED AND BY SELECTIVITY OF RECEIVING INSTITUTION, FOR SELECTED YEARS

Commencing students	1994		1999		2003	
	Enrs	%	Enrs	%	Enrs	%
<i>Go8: undergraduates</i>	40,536		43,290		41,966	
<i>Other: undergraduate</i>	109,758		124,779		124,533	
Go8: completed diploma, etc	790	2%	1,118	3%	1,603	4%
Other: completed diploma, etc	5,094	5%	8,100	6%	10,480	8%
Go8: completed certificate, etc	1,593	4%	1,861	4%	1,811	4%
Other: completed certificate, etc	8,527	8%	13,434	11%	16,213	13%
Go8: incomplete diploma, etc	724	2%	910	2%	759	2%
Other: incomplete diploma, etc	4,391	4%	5,617	5%	4,901	4%
Go8: incomplete certificate, etc	422	1%	514	1%	499	1%
Other: incomplete certificate, etc	2,383	2%	4,094	3%	4,573	4%
Go8: total with prior TAFE study	3,529	9%	4,403	10%	4,672	11%
Other: total with prior TAFE study	20,395	19%	31,245	25%	36,167	29%
G08: no information on prior TAFE study	746	4%	241	1%	206	< 1%
Other: no information on prior TAFE study	3,220	2%	2,451	2%	5,847	5%
<i>Go8: post graduates</i>	18,501		18,222		25,452	
<i>Other: postgraduates</i>	34,942		37,477		51,915	
Go8: completed diploma, etc	590	3%	994	5%	1,419	6%
Other: completed diploma, etc	1,301	4%	2,312	6%	3,997	8%
Go8: completed certificate, etc	677	4%	908	5%	1,258	5%
Other: completed certificate, etc	2,714	8%	3,605	10%	5,496	11%

Go8: incomplete diploma, etc	191	1%	251	1%	347	1%
Other: incomplete diploma, etc	619	2%	917	2%	1,176	2%
Go8: incomplete certificate, etc	144	1%	146	1%	222	1%
Other: incomplete certificate, etc	569	2%	675	2%	844	2%
Go8: total with prior TAFE study	1,602	9%	2,299	13%	3,246	13%
Other: total with prior TAFE study	5,203	15%	7,509	20%	11,513	22%
G08: no information on prior TAFE study	2,092	11%	604	3%	1,300	5%
Other: no information on prior TAFE study	2,081	6%	2,061	5%	4,749	9%

Source: Khin Thin Aye, University Statistics Unit, Department of Education, Science and Training, 09 Sep 2004, source: OZUE(1989-1999) ENROL(2003) RFI No.: 04-483.

Australian universities might have admitted large numbers of students with prior TAFE study to enabling and bridging programs which prepare students for university study or to non-award programs many of which are also used to support students' transition to award programs. This is not the case, as is shown in the table below.

TABLE 7.23: DOMESTIC STUDENTS COMMENCING ENABLING AND NON AWARD PROGRAMS WITH PRIOR TAFE STUDY, FOR SELECTED YEARS

	1994	1999	2003
Enabling programs	293	613	1,589
Non award programs	658	894	2,433

Source: Khin Thin Aye, University Statistics Unit, Department of Education, Science and Training, 09 Sep 2004, source: OZUE(1989-1999) ENROL(2003) RFI No.: 04-483.

It is therefore possible to conclude that about 162,500 university students enrolled in 2003 had prior TAFE study. To determine the relative scale of reverse transfer it is necessary to find the number of vocational education and training students with prior university study. The data are not good so different data sources are used. These give

very different numbers of vocational education and training students, so there is a prior step of determining how many vocational education and training students there may be.

How many Australian vocational education and training students are there?

The data most commonly used by analysts of Australian vocational education and training are enrolments reported by the National Centre for Vocational Education Research. The national centre collects reports of enrolments from State and Territory vocational education and training authorities which in turn collect enrolment reports from vocational education and training providers. The national centre reported that 1,224,900 students were enrolled in a publicly funded vocational education and training program of certificate level I or higher in 2001.

A second source of data on vocational education and training participation is the national census. However, the 2001 census reports that only 664,400 people attended a technical and further education institute in 2001, only 40% of the enrolments reported by the national centre. A third source of data on vocational education and training participation in 2001 is the Australian Bureau of Statistics' survey of education, training and information technology conducted from April to August 2001. This estimated that 664,400 students were undertaking technical and further education qualifications at the time of the survey, rather more than the attendance reported in the census but still only 54% of the enrolments reported by the national centre.

While the national census and ABS survey data differ radically from national reports of enrolments in vocational education and training, they are reasonably close to national reports of enrolment in higher education. This is shown in table 7:23.

TABLE 7.24: COMPARISON OF REPORTS OF ATTENDANCE AT TAFE INSTITUTES AND UNIVERSITIES IN THE CENSUS AND IN AN ABS SURVEY AND NCVER'S AND DEST'S REPORTS OF ENROLMENTS, 2001

Source	TAFE	University
ABS 2001 census, catalogue no. 2001.0	493,924	722,125

ABS 2001 survey of education, training and information technology, cat 6278.0	664,400	859,800
NCVER <i>Australian vocational education and training statistics 2001</i> – enrolled in AQF certificate I or higher	1,224,900	
DEST <i>Students 2001: selected higher education statistics</i>		726,418

There are six possible explanations for these major inconsistencies in the number of vocational education and training students. First, the Australian Bureau of Statistics collects ‘snapshot’ data by the census date method which counts attendance at a specified point of time whereas vocational education and training collects continuous data by the turnstile method which counts enrolments throughout the whole year. Thus the 2001 census asked respondents ‘Is the person attending a school or any other educational institution?’ (question 22) and ‘What type of educational institution is the person attending?’ (question 23) as at the census night, 7 August 2001. This is similar to the way universities counted enrolments until 2003. It counted enrolments as at 2 reference dates (31 March and 31 August). In contrast vocational education and training counted all students who ever enrolled during 2001. Since about half of all vocational education and training students undertake relatively short programs (NCVER 2002, p 3), there could have been many people who studied in vocational education and training at some time during 2001 but not on the census night or at the survey date for the survey of education, training and information technology. The survey of education, training and information technology asked respondents ‘Are you currently enrolled in any course of study?’ If they answer ‘No’, they are asked ‘Did you enrol in any course of study at any time in 2001, that is, this year? Please exclude any course of study that you deferred this year’. The survey therefore asks whether the respondent studied at any time in the current year up to the survey date, which covers up to 7 months. It therefore finds rather higher numbers of vocational education and training students, 54% of the enrolments reported by the NCVER for the whole year. Since 7 months is 58% of the year, this seems a likely explanation for the differences in student numbers. Golding & Vallence (1999, p 15) make the same point but reach the opposite conclusion, that vocational education and training statistics are likely to be over estimates. (Universities changed to a combination of census date and turnstile methods for counting enrolments in 2003.)

Secondly, the Australian Bureau of Statistics distinguishes between enrolment in a qualification and participation in a training course. I have tried to correct for that by considering in the table above the national centre's reports only of enrolments in Australian qualifications framework qualifications of certificate I and above, but the distinction may have led many respondents to the Australian Bureau of Statistics surveys to report a vocational education and training program as a training course and thus understate TAFE enrolments. Thirdly, many people may have taken a short program which the provider reported as vocational education and training but which the student did not identify as vocational education and training, perhaps because they considered it part of work or of a community activity.

Fourthly, Golding, Marginson & Pascoe (1996, p 70) found that many students in their survey in 1995 and particularly students enrolled in dual sector institutions were confused by the sectoral status not only of their current program but also of their previous program. So some respondents to the ABS survey may have reported as a higher education attendance what was reported as a vet enrolment. But even if 100,000 of the people who reported attending a university were enrolled in a vocational education and training program in a dual sector university, the estimated total vocational education and training attendance would still be significantly less than the national centre's enrolment report.

A fifth possible explanation is that the Australian Bureau of Statistics collected data on attendance at a technical and further education institution, whereas the NCVER collected enrolments in publicly funded vocational education and training. Within the sector TAFE is understood to be offered by a public provider whereas vocational education and training is offered by private as well as public providers and adult and community education providers, agricultural colleges, the vet operations of some universities, schools and industry skill centres (Knight & Nestor 2000). The NCVER reports that enrolments in just technical and further education and other government institutes are 77% of all of vocational education and training enrolments, and this could explain part of the lower TAFE attendance reported in the census and ABS surveys. However, the distinction between TAFE and vocational education and training is not well understood outside the sector and it is not clear that it would be made by

respondents. This view is supported by the director of the National Centre for Vocational Education Research (Karmel 2004).

A sixth possibility is that vocational education and training enrolment reports are inaccurate. Werner's (1998, p 27) survey of 1,544 South Australian TAFE enrolments in 1996 found that 11% of respondents said that they had not enrolled in TAFE or had not completed a higher education program contrary to the department's records. Some of the difference between the department's record and respondents' reporting of TAFE enrolment was due to respondents not being aware that programs they participated in were TAFE, typically short programs of a half to 2 days conducted in the workplace (Werner 1998, p 30). However, other differences were due to misreporting by TAFE institutes, for example, by TAFE institutes reporting as enrolments people who had only applied for admission or became members of the institute's library (Werner 1998, p 28). Vocational education and training providers are funded for the number of training hours they provide and so there is considerable financial incentive to over-report provision. Each State and Territory audits institutes' enrolment reports and Giles-Peters (2004) reports that auditors find relatively few invalid enrolments in TAFE. Harris and colleagues (2004, p 18) describes vocational education and training's national data verification procedures as 'stringent' and Giles-Peters says that while non-TAFE invalid enrolment rates are much higher they provide a much lower proportion of total vocational education and training provision and thus wouldn't affect total figures much. While this may be acknowledged, it is at least possible that the audits don't detect all major over reporting of vocational education and training enrolments. The director of the National Centre for Vocational Education Research concedes that the centre's data 'have a bit of double counting' but believes that most of the discrepancies come from respondents not understanding programs and sectors in the same way as the designers of survey and enrolment forms (Karmel 2004). Universities have the same incentive to over report enrolments, but with minor exceptions, for every year's enrolment a baccalaureate student incurs a debt or tax liability of from \$3,500 to \$6,000 or a pro rata amount for a part time enrolment. Each student therefore checks their enrolment very carefully. Universities have over 700,000 auditors, so their enrolment counts are accurate.

Giles-Peters (2004) says that accounting for all these factors leaves a discrepancy of about 200,000 between the enrolment reports of the national centre for vocational

education research and the survey reports of the Australian Bureau of Statistics. While this is much less than the discrepancies of 560,500 and 730,976 in the uncorrected figures shown in the table above, the remaining inconsistency in the number of vocational education and training students at least casts doubt on the results now to be considered.

Australian vocational education and training enrolment data

Publicly funded vocational education and training institutes ask students to state on their enrolment form their highest prior educational level. The results are shown in table 21: some 80,000 to 90,000 publicly funded vocational education and training students had a degree or postgraduate diploma.

TABLE 7.25: PUBLICLY FUNDED VOCATIONAL EDUCATION AND TRAINING STUDENTS' HIGHEST PRIOR EDUCATIONAL LEVEL

Measure	2000		2001		2002	
	%	No.	%	No.	%	No.
Students' highest prior educational level is a degree or postgraduate diploma	4.6	79,800	4.8%	83,900	5.2%	88,500

Source: National Centre for Vocational Education Research (2003, 2002, 2001)

Australian Vocational Education and Training statistics: students and courses - in detail, table 11/12 students by highest prior educational level and sex;

<http://www.ncver.edu.au/statistic/21053.html>

Giles-Peters (2004) notes that while some 434,300 students or 25.6% of the total don't answer this question most of the non responses are by students who are enrolled in studies not leading to a qualification, and so need not be considered for the purposes of this study. However, Pitt (2001, p122) questions the accuracy of the data even for the students who respond to the question. She compared answers on enrolment forms with enrolment histories for 100 students at a technical and further education institute. She

found that of 39 students who reported that they had completed a degree only 11 or 28% had in fact done so. Pitt suggested that this misreporting might be caused partly by the layout and wording of the enrolment form and that these factors may affect the quality of the data for the whole sector.

Above it was concluded above that about 122,000 university students had completed a TAFE program, which is 38% more than the 88,500 publicly funded vocational education and training students in the same year shown in table 21 whose highest prior educational level is a degree or postgraduate diploma. This would suggest that reverse transfer is rather less than upward transfer. However, account needs to be taken of the different lengths of programs in vocational education and training and higher education since this affects these results. This is explained in the next section.

Stocks and flows

Consider a simplified case where each year vocational education and training admits 100 students, 50 of whom have a higher education qualification. Assume that all vocational education and training students enrol for one year, so that at any time there are 100 vocational education and training students, 50 of whom have a higher education qualification. Also assume that each year higher education admits 100 students of whom 50 have a vocational education and training qualification, but assume that all higher education students enrol for three years. In the first year there would be 50 higher education students with a vocational education and training qualification. These would continue their enrolment in year two when another 50 students with vocational education and training qualifications are admitted, giving a total of 100 higher education students with a vocational education and training qualification. In year three there would be 150 higher education students with a vocational education and training qualification. By year 4 the 100 students admitted in year 1 would discontinue, giving a 'steady state' of 300 higher education students, 150 of whom have vocational education and training qualifications. This is illustrated in table 7.25.

TABLE 7.26: SHORT PROGRAMS HAVE LESSER STOCKS OF STUDENTS THAN LONG PROGRAMS WITH THE SAME FLOW OF STUDENTS

	Year 1	Year 2	Year 3	Year 4
Number of vet admissions	100	100	100	100
Number of vet admissions with a higher ed qual	50	50	50	50
Number of vet students	100	100	100	100
Number of vet students with a higher ed qual	50	50	50	50
Percentage of vet students with a higher ed qual	50%	50%	50%	50%
Number of higher ed admissions	100	100	100	100
Number of higher ed admissions with a vet qual	50	50	50	50
Number of higher ed students	100	200	300	300
Number of higher ed students with a vet qual	50	100	150	150
Percentage of higher ed students with a vet qual	50%	50%	50%	50%

This illustrates that while the flow of higher education students to vocational education and training may be the same as the flow of vocational education and training students to higher education, the stock or total enrolment count of higher education students with a vocational education and training qualification is higher than the stock of vocational education and training students with a higher education qualification by the greater duration of higher education enrolments. This is corrected if one examines percentages rather than absolute counts of total enrolments, but this disguises the volume of transfers.

Unfortunately the National Centre for Vocational Education Research doesn't report highest prior educational level of students commencing a vocational education and training program. This is because the centre collects program commencements but not unduplicated student commencements. So if a student began two programs in a year they would be counted twice in the centre's reports (Karmel, 2004). However, Giles-Peters (2004) reports that in 2001 some 71,922 commencing vocational education and training students had previously completed higher education qualifications whereas in 2003 only 42,277 commencing higher education students had completed a TAFE qualification, suggesting that reverse transfer is much greater than upward transfer. Giles-Peters

suggests that this may be at least partly because higher education has grown faster than vocational education and training recently and that therefore these rates would balance out were vocational education and training and higher education to grow at the same rate.

It would be possible to compare stocks or total enrolment counts in each sector if one knew the average length of enrolment in each sector, but this is not reported and in any case it seems possible that vocational education and training students with a higher education qualification may not have the same average length of enrolment as the much greater number of vocational education and training students without a higher education qualification. It is therefore necessary to consider other sources of data.

VET student outcomes survey

A valuable source of data on Australian publicly funded vocational education and training is the student outcomes survey. This is a survey of a structured sample of students who completed a vocational education and training award or a module (subject) funded by the public. Table 7.26 shows the recent results for graduates. The apparent increase in graduates from 2001 to 2002 is probably because for the first time in 2002 module completers who were also graduates were included in the report and counted as graduates. It will be noted that in 2002 some 6,193 vocational education and training graduates had studied at a university 6 months before starting their vocational education and training program, while 13,415 – over twice as many – were attending a university for further study about 6 months after graduating from their vocational education and training program.

TABLE 7.27: SELECTED CHARACTERISTICS OF GRADUATES OF PUBLICLY FUNDED VOCATIONAL EDUCATION AND TRAINING PROGRAMS, 2001 AND 2002

Graduates	2001		2002	
	%	No.	%	No.
Had a bachelor degree or higher before starting the course	9.3%	12,405	9.2%	21,986
Had studied at university 6 months before the course	2.6%	3,479	2.6%	6,193
Was attending a university for further study after graduation	8.5%	11,444	8.8%	13,415
Was studying a bachelor's degree or higher after graduation	7.7%	10,392	8.0%	12,137

Source: National Centre for Vocational Education Research Ltd. (2003, 2004) Student outcomes survey, frequency counts,
<http://www.ncver.edu.au/statistic/publications/1498.html>

On its face table 7.26 suggests that upward transfer from vocational education and training is about twice reverse transfer to vocational education and training. However, it seems at least possible if not probable that the time lag between vocational education and training enrolment and subsequent higher education enrolment may be generally less than the lag between higher education enrolment and subsequent vocational education and training enrolment (Giles-Peters 2004). One may hypothesise that many students progress directly from a vocational education and training diploma to a baccalaureate program while many higher education students start a vocational education and training program after some time in the workforce or raising a family. This would be disguised by the data reported in table 23 since it reports students' origin 6 months before they started their vocational education and training program and destination about six months after they completed their program.

The data for vocational education and training students who completed modules or subjects (and not a whole qualification) set out in the next table are similar to those for graduates in 2001. For 2002 somewhat higher proportions of module completers than graduates had a baccalaureate background.

TABLE 7.28: SELECTED CHARACTERISTICS OF STUDENTS WHO COMPLETED PUBLICLY FUNDED VOCATIONAL EDUCATION AND TRAINING MODULES (SUBJECTS), 2001 AND 2002

Module completers	2001		2002	
	%	No.	%	No.
Had a bachelor degree or higher before starting course	9.7%	18,854	11.0%	16,672
Had studied at university 6 months before course	2.7%	5,305	3.0%	4,610

Source: National Centre for Vocational Education Research Ltd. (2003, 2004) Student outcomes survey, frequency counts,
<http://www.ncver.edu.au/statistic/publications/1498.html>.

Note that while only some 5% of all vocational education and training students reported a degree or postgraduate diploma as their highest prior educational level, some 9% of vocational education and training graduates and 10% of module completers reported having a bachelor degree or higher before starting their program. The data come from different collections and so may not be comparable. But if they are comparable one may infer that students who have already completed a baccalaureate are more likely to complete their vet module or award, which would be expected.

Australian Bureau of Statistics' survey of education, training and information technology

The discussion of Australian tertiary education student transfer so far has compared data collected in one sector with data collected by very different methods in the other sector. This makes comparisons risky and at best approximate. No such difficulty arises with the Australian Bureau of Statistics' survey of education, training and information technology. This survey was conducted over 14 weeks, from the end of April to the start of August 2001. Information was collected by personal interviews conducted by trained interviewers. The initial sample size for the survey was approximately 18,000 dwellings, from which approximately 13,200 households were selected and 12,100 (92%) were fully responding. In total, 24,377 people responded fully to the survey (ABS 2002, p 2).

The survey collected respondents' enrolment in a tertiary program in the current year, whether they were enrolled in a different program in the previous year, and whether they completed their previous year's program. The survey found that of the students enrolled in university in 2001 a total of 32,700 had enrolled in a different TAFE qualification in 2000. Two-thirds of these students had completed their previous TAFE qualification, which is expected from the higher education enrolment data considered earlier.

TABLE 7.29: STUDENTS ENROLLED IN UNIVERSITY IN 2001 WHO ENROLLED IN TAFE IN 2000 BY WHETHER COMPLETED TAFE QUALIFICATION

	Enrolled in university in 2001	
	Number	%
Completed TAFE qualification in 2000	20,500	63%
Incomplete TAFE qualification in 2000	10,200	31%
Total	30,700	100%

Source: Australian Bureau of Statistics Survey of Education and Training, 2001, table provided by Ms Lorraine Edmunds, National Centre for Education & Training Statistics, Australian Bureau of Statistics, 21 September 2004.

Next it will be observed that of the students enrolled in TAFE in 2001 only 13,200 had enrolled in university in the previous year: that is, that direct reverse transfer is less than half that of direct upward transfer. Interestingly, almost 80% of reverse transfer students had not completed their university program.

TABLE 7.30: STUDENTS ENROLLED IN TAFE IN 2001 WHO ENROLLED IN UNIVERSITY IN 2000 BY WHETHER COMPLETED UNIVERSITY QUALIFICATION

	Enrolled in TAFE in 2001	
	Number	%
Completed university qualification in 2000	2,800	21%
Incomplete university qualification in 2000	10,400	79%
Total	13,200	100%

Source: Australian Bureau of Statistics Survey of Education and Training, 2001, table provided by Ms Lorraine Edmunds, National Centre for Education & Training Statistics, Australian Bureau of Statistics, 21 September 2004.

Earlier it was suggested that while students might typically transfer directly from TAFE to university, they might enrol in a TAFE program several years after they enrol in a university program. The survey of education, training and information technology asked respondents for their most recent qualification and up to 3 other non school qualifications they completed. The survey found that of the respondents whose most recent qualification is from TAFE 104,300 had a university qualification. However, of the respondents whose most recent qualification is from university 170,400 had a TAFE qualification. This suggests that upward transfer is about 50% higher than reverse transfer.

TABLE 7.31: NUMBER OF PEOPLE WHO HAVE A QUALIFICATION FROM THE SECTOR OTHER THAN THAT OF THEIR MOST RECENT QUALIFICATION

Tafe is most recent qualification and has a university qualification	104,300
University is most recent qualification and has a TAFE qualification	170,400

Source: Australian Bureau of Statistics Survey of Education and Training, 2001, table provided by Ms Lorraine Edmunds, National Centre for Education & Training Statistics, Australian Bureau of Statistics, 21 September 2004.

The survey of education, training and information technology also asked respondents about their highest, second highest and third highest qualification. The survey found that of the 12,870,600 Australians aged 15-64 years 6,577,600 or 51% had at least one non school qualification. The largest proportion, 23%, had their highest qualification from TAFE; 18% had their highest qualification from university; and 11% had their highest qualification from another provider such as a private provider. Some 35% of the people with one post school qualification had a second qualification and 12% had a third qualification. Because non school qualification is collected hierarchically (highest, second highest and third highest) rather than sequentially (most recent, second most recent, third most recent) it is not possible to draw many conclusions about the direction or even extent of student transfer between the sectors. However, 1,224,000 or 52% of university graduates and 1,034,200 or 31% of TAFE graduates had multiple qualifications. Some 269,300 graduates or 11% of university graduates and 8% of TAFE graduate had a qualification from the other sector. This is consistent with other findings that participation in lifelong learning is directly related to level of educational qualification: graduates with higher qualifications participate in lifelong learning more than people with lower qualifications. It is also consistent with other findings that most graduates gain subsequent qualifications from the sector from which they gained their initial qualification: few gain a subsequent qualification from the other tertiary education sector.

TABLE 7.32: AUSTRALIANS' 3 HIGHEST POST SCHOOL QUALIFICATIONS, 2001

Highest	2nd highest	3rd highest		
University 2,269,000 18%	University 843,300 37%	University	231,400	27%
		Tafe	53,100	6%
		Other	43,600	5%

Highest	2 nd highest	3 rd highest
	Tafe 8% 183,700	None 515,100 61%
		University 10,300 6%
		Tafe 39,000 21%
		Other 6,000 3%
		None 128,400 70%
	Other 5% 118,400	University 24,700 21%
		Tafe 8,300 7%
		Other 18,300 15%
		None 67,200 57%
	None 50% 1,123,700	University 0 0%
		Tafe 0 0%
		Other 0 0%
		None 1,123,700 100%
Tafe 23% 2,924,000	University 1% 16,100	University 2,800 17%
		Tafe 3,400 21%
		Other 0 0%
		None 9,900 62%
	Tafe 20% 588,200	University 3,900 1%
		Tafe 141,700 24%
		Other 29,600 5%
		None 413,000 70%
	Other 4% 112,800	University 400 0%
		Tafe 14,500 13%
		Other 16,800 15%
		None 81,000 72%
	None 75% 2,206,900	University 0 0%
		Tafe 0 0%
		Other 0 0%
		None 2,206,900 100%
Other 11% 1,384,500	University 3% 44,200	University 8,200 19%
		Tafe 1,700 4%
		Other 7,400 17%

Highest	2 nd highest	3 rd highest	
	Tafe 8% 107,400	None	26,900 61%
		University	2,000 2%
		Tafe	16,000 15%
		Other	16,300 15%
		None	73,100 68%
	Other 22% 308,800	University	12,000 4%
		Tafe	16,000 5%
		Other	82,600 27%
		None	198,100 64%
	None 67% 924,000	University	0 0%
		Tafe	0 0%
		Other	0 0%
		None	924,000 100%
None 49% 6,293,000			

Source: Australian Bureau of Statistics Survey of Education and Training, 2001, table provided by Ms Lorraine Edmunds, National Centre for Education & Training Statistics, Australian Bureau of Statistics, 21 September 2004.

Australian Bureau of Statistics' survey of education and work

Useful information on reverse transfer is also available from the Australian Bureau of Statistics' survey of education and work. The bureau conducted its most recent survey of education and work in May 2003. It was based on a multi-stage area sample of about 30,000 private dwellings and a list sample of non-private dwellings such as hotels and motels. The survey collected data on some 44,200 persons aged 15 to 64 years. Each person in the sample is weighted by the probability of their being selected in the sample to ensure that results reflect an unbiased distribution of the population (ABS 2001).

However, it has been noted that the bureau's survey reports a much lower number of people attending a TAFE institution than the NCVER enrolment reports. The ABS calculates from the results collected in its survey that 901,300 people attended a university in 2003, which is close to the 929,952 enrolments reported by the Department of Education, Science and Training. However, the ABS calculates that 577,100 people attended a TAFE institution in 2003, which is only half of the 1,155,900 enrolments in certificate I level programs or higher that the NCVER reports from its collections. Giles-Peters (2004) advises that the Australian bureau of statistics' 'snapshot' count in the survey of education and work is about 75% of the estimated count of enrolments throughout a whole year. Even so, the ABS survey estimate of TAFE attendance is some 290,000 less than the NCVER enrolment count.

TABLE 7.33: COMPARISON OF ABS' SURVEY OF ATTENDANCE AT TAFE INSTITUTES AND UNIVERSITIES WITH NCVER'S AND DEST'S REPORTS OF ENROLMENTS, 2002 AND 2003

Source	Tafe	University
ABS (2004) <i>Survey of education and work, 2003</i>	577,100	901,300
NCVER (2003) <i>Students and courses 2002: in detail, table 13</i>	1,155,900	
DEST (2004) <i>Students 2003: selected higher education statistics</i>		929,952

The survey found that while 25,300 people who attended TAFE in 2002 were attending higher education in May 2003, only 15,800 who attended higher education in 2002 were attending TAFE in May 2003. That is, direct reverse transfer is 62% of direct upward transfer. This is somewhat higher than the finding from the Australian Bureau of Statistics' survey of education, training and information technology reported above that direct reverse transfer is half that of direct upward transfer.

TABLE 7.34: DIRECT STUDENT TRANSFER IN 2003

Attended TAFE in 2002 and higher education in May 2003	25,300
Attended higher education in 2002 and TAFE in May 2003	15,800

Source: Australian Bureau of Statistics Survey of Education and Work, 2003, table provided by Ms Lorraine Edmunds, National Centre for Education & Training Statistics, Australian Bureau of Statistics, 20 September, 2004.

Finally, the ABS survey of education and work asks respondents whether they completed their previous year's qualification. This is reported in the following table, in which the numbers have been rounded. While 74% of upward transfer completed their TAFE qualification 65% of reverse transfer did not complete their higher education qualification, which is consistent with previous tables.

TABLE 7.35: DIRECT STUDENT TRANSFER IN 2003 BY WHETHER COMPLETED PREVIOUS QUALIFICATION

	Attended higher education in May in 2003	
	Number	%
Did not complete TAFE in 2002	6,600	26%
Completed TAFE in 2002	18,700	74%
Attended TAFE in 2002	25,300	100%
	Attended TAFE in May 2003	
	Number	%
Did not complete higher ed in 2002	10,200	65%
Completed higher ed in 2002	5,600	35%
Attended higher education in 2002	15,800	100%

Source: Australian Bureau of Statistics Survey of Education and Work, 2003, table provided by Mr James Ashburner, Senior Research Officer, National Centre for Education and Training Statistics, Australian Bureau of Statistics, 12 May 2004.

Reverse transfer summed up

The first finding of this study is that the relative size of upward and reverse transfer depends on the concept or measure of transfer used. Intersectoral transfer is not high in New Zealand, but reverse transfer is about the same size as upward transfer. The national data for Canada suggests that reverse transfer is about the same size or probably smaller than upward transfer. National US data reports that reverse transfer is half upward transfer. At most the national enrolment counts for Australia suggest that reverse transfer is about the same size as upward transfer, but most data suggests that reverse transfer is about half that of upward transfer. If one examines enrolments or stocks of students, and considers students enrolled in one sector who had previously completed a qualification in the other sector, reverse transfer is about 40% less than upward transfer. The contrary findings for Australia of Golding & Vallence (1999), Carnegie (2000) and others compare all vocational education and training students who had a higher education degree with students commencing a bachelor level program or below who had a TAFE award. This overlooks continuing students and postgraduate students with a TAFE qualification, understating the number of higher education students with a completed TAFE award by over 90,000 students or 400%.

However, a different result is found if one examines the flows of students, or just commencing rather than all students who had completed a qualification in the other sector. From Giles-Peters' (2004) internal unpublished report I have calculated that the flow of reverse transfer graduates in Australia is about 40% more than upward transfer graduates. Yet other results would be given if one considered the stocks or flows of students who have previously studied in the other sector but did not complete a qualification in the other sector. The number of commencing higher education students with previous although incomplete TAFE study is known and it is possible to make a good estimate of the total enrolment of higher education students with previous although incomplete TAFE study. Unfortunately the corresponding data for vocational

education and training students are not available. However, from Australian Bureau of Statistics survey data one may conclude that the number of higher education students who subsequently enrol in vocational education and training without completing their higher education award is much higher than the number who transfer with a completed higher education award. Non graduate reverse transfer student flow is probably at least 50% higher than non graduate upward transfer student flow, but it could be higher still. This would be worth investigating further.

The Australian Bureau of Statistics' 2001 survey of education, training and information technology found that reverse transfer directly upon leaving higher education is less than half that of direct upward transfer, while the bureau's 2003 survey of education and work found that direct reverse transfer is 62% of direct upward transfer. This may be because most reverse transfer students do not transfer directly upon leaving higher education but after a delay of a year or more. Both surveys confirm the enrolment data that about three-quarters of upward transfer students complete their TAFE award while about three-quarters of reverse transfer students do not complete their higher education award. However, there is some doubt about the Australian Bureau of Statistics' data since it reports only students enrolled at TAFE institutes up to its reference date which is from one third to half the number of students reported by the NCVER as having been enrolled throughout the year.

TABLE 7.36: SUMMARY OF FINDINGS ON STUDENT TRANSFER IN AUSTRALIA

Source of data	Upward	Reverse	All transfers
National enrolment reports	58%	42%	100%
ABS survey of education, training and information technology	62%	38%	100%
ABS survey of education and work	62%	38%	100%

In summary, then, the national Australian enrolment and survey data report that reverse transfer is from 42% to 38% of all transfers. Taking into account all the other factors discussed, the fairest conclusion is that reverse transfer is from 50% less to 50% more than upward transfer depending on the concept and measure of transfer used.

Secondly, as other writers have observed, the metaphors of both upward and reverse transfer posit a linear progression from one program, institution or sector to another. However, institutional studies show that at least some students have studied in multiple programs, institutions or sectors, usually not following a ‘pathway’ defined by institutions, and sometimes with multiple enrolments concurrently. This suggests that the better metaphor is of ‘swirling’ (de los Santos & Wright 1990, p 32) or ‘shuffling’ the deck of study options (Maxwell and colleagues 2002, p 1). As Golding (1995a, b), Doughney (2000) and Wheelahan (2002) observe, the national data for Australia disguises multiple enrolments, but the national US enrolment data report that 11% of students ‘co-enrolled’, that is, enrolled in more than one institution for more than one month during an academic year.

The third finding is that the national data on tertiary education student transfer in all of the jurisdictions studied isn’t good enough to support many conclusions about the direction or even prevalence of student transfer. The same conclusion is reached by most studies of student transfer. For example, Osborne (2002, p 2) concluded for Scotland that ‘the present quantitative data on progression from FE-based HE to further HE in HEIs was limited, due to the lack of a unique identifier for students across the sector’. The UK’s Dearing report (1997, para 7.44) proposed a unique student record number to follow students’ progress from school to further education and higher education. Similar recommendations have been made for international students studying in Australia (PhillipsKPA & LifeLong Learning Associates 2005: 196), Queensland (Gardner 2002, recommendation 8), Australian vocational education and training (ANTA 2003b, p 16) and Scotland (Osborne 2002, p 69; Scottish Parliament enterprise and lifelong learning committee 2002, para 126).

Some 33 US states specifically collect data on student transfers (The Education Commission of the States 2001, quoted in Wellman 2002, p 15), and many of these require institutions to report students’ social security number. This not only helps to protect the integrity of the student support and reporting systems, but also allows the State to calculate accurate retention and transfer rates taking into account all transfers between institutions and sectors. It also allows the State to collect other longitudinal data on student flows more useful for planning and policy analysis than the snapshot

data commonly available. The US federal Department of Education is considering the feasibility of requiring all colleges report each of their student's social security number and key enrolment information (Gidjunis 2004, p A22).

Following a recommendation of the Aotearoa New Zealand Ministry of Education Te Tāhuhu o te Mātauranga (2001, p 8), the Government is introducing the national student index, a system that assigns a unique lifetime identifier to each tertiary student which will be used to collect and combine data for policy and analysis (Ministry of Education 2002). In 2005 the Australian Government introduced a Commonwealth higher education student support number to track students receiving a loan or other financial support from the Australian Government (Department of Education, Science and Training 2005), but the number will not be allocated to students not receiving Government support, it will not be allocated to students in sectors other than higher education, and there is no suggestion that the data will be used for any purpose other than protecting Government revenue. The next section considers whether the different transfer rates that have been observed may be influenced by institutions' transfer policies.

Student transfer policies compared

The different transfer patterns observed are partly the result of the different structures and circumstances of tertiary education in the jurisdiction we are considering, but are also the result of different government policies. This section describes each jurisdiction's student transfer policy.

Australia

Since the Australian 'unified national system of higher education' is not formally segmented its internal stratification is tacit, and therefore there is no problem articulated which requires a response from government. While the Australian Government issued general guidelines for the transfer of credit from the former advanced education sector to universities in the 1980s, there is no such provision now for transfer from vocational education and training to higher education (Murphy 2002, p 18). Support for student

transfer thus rests on the voluntary and largely individual action of each institution. The Australian Vice-Chancellors' Committee (no date) has established voluntary guidelines on cross-sector qualification links and gives a list of the programs and institutions covered by the policy (AVCC 2003). Most institutions participate, but list on average only 6 programs covered by the guidelines, which are a small minority of the several hundred undergraduate programs that each institution offers. Keating & colleagues (2002, p 169) add other possible responses as introducing short-cycle tertiary courses, dual qualifications, and links between training awards (and apprenticeships) and degrees and higher degrees, but imply that an obstacle to governments' action may be that such arrangements would require governments to re-examine their funding arrangements.

On 11 July 2003 the Commonwealth and State ministers for education and training (MCEETA 2003) announced that they –

- i agree to work with the Commonwealth to develop national arrangements for articulation and credit transfer between the higher education sector and the vocational and training sectors;

But the transfer of credit for vocational education and training arises only for students who have been admitted to higher education. Cummins, Rutten & Wagstaff (1999, table 6.1) report that 43% of students admitted to higher education in 1997 on the basis of prior TAFE studies were granted some credit for their previous TAFE studies. However, 4 times as many students with previous TAFE studies were admitted on some other basis and of all students with prior TAFE studies only 17% received credit for their prior TAFE studies (Cummins, Rutten & Wagstaff 1999, tables 4.1 & 4.2).

Unfortunately the amount of credit granted is reported as a proportion of the program which the student is beginning, not of the studies which the student has completed. So it is not possible to estimate how much study may be repeated by students transferring within the same or similar field. Nonetheless, the proportion of transfer students receiving credit of any amount seems rather low. Harris, Sumner, Rainey (2004, p 15) report, 'not all students apply for credit. For those moving in either direction, reasons include a realisation that none of their prior studies are relevant for credit, perhaps because of movement to a different field of study or being prepared to repeat studies. . .

. However, for students moving in either direction, credit transfer may simply not be seen as an important issue as Golding found from his research’.

The Commonwealth education minister Dr Brendan Nelson was recently quoted as reiterating his wish for more credit transfer from vocational education and training to higher education (Maiden 2004), and the minister has frequently sought to persuade prospective students and parents to redirect their preferences from higher education to vocational education and training (Nelson 2002a, c). We may readily agree with Cotgrove (1958 p 193, fn 1) that Banks’ (1955 pp 202, 214) observations about English secondary modern and technical schools apply to vocational education and training –

Nor can we discount the prestige that a school borrows from the range of occupations for which it normally prepares . . . the middle class parent . . . will not accept either the modern or the technical school as equal in status to the grammar school until they offer to their pupils an equal opportunity to reach those occupations of higher social prestige which have always been associated with the grammar school.

Nonetheless, transfer from vocational education and training to higher education will become more important if the Commonwealth diverts students from higher education to vocational education and training by, for example, restricting the supply of higher education places it supports.

Scotland

MacLennan and colleagues (2000, p 2) noted in their review of credit transfer from further education to higher education in Scotland several recent developments that recognised and increased the importance of further education in widening access to higher education, but no Government policy that supported student transfer explicitly. Gallacher (2002, p 12) observed that while further education colleges had considerable success in widening access, routes to progress to higher education are limited. He observed that the introduction of the Scottish credit accumulation and transfer system has not made a major change and that the Scottish credit and qualifications framework is unlikely meet the expectations put on it to facilitate transfer with credit between sectors.

The recent Scottish higher education review (2002, p 18) reported that the number of formal articulation agreements between higher education institutions and further education colleges remains relatively small. Osborne (2002, p 69) concluded from both the literature and his statistical analysis that incentives to support student transfer are not at present sufficient for many older and ancient universities. He (Osborne 2002, p 69) concluded that the imposition of a requirement to accept transfers and respect credit tariffs would be unlikely to improve transfer because of the different traditions of institutions, their autonomy in selecting students and the differential demand for places across the sector. Instead he (Osborne 2002, p 69) suggested incentives in the form of a collaboration incentive grant and strengthening existing regional fora. The Scottish Executive (2002, p 34) proposed that prospective and current students be given better information, advice and guidance; it (2002, p 35) encouraged institutions to collaborate in developing qualifications; and it expected to receive proposals for program mapping and student tracking. Thus Scotland is still at an early stage of developing student transfer policies and programs.

USA

In contrast student transfer has long been problematised in the US and has thus been the subject of Government policy which Clark (1983, p 62) observed to be distinctive of the US. Transfer has also been studied extensively. For example, the California Postsecondary Education Commission (2002, pp 25-7) and its predecessor published 28 papers on student transfer since 1979. In 2001 the Education Commission of the States (2001) found that of the 50 US States, 30 had legislation supporting transfer, 40 had Statewide cooperative transfer agreements, 33 States regularly collected and reported transfer data, 18 States offered incentives and rewards to either transfer students or sending or receiving institutions, and 26 States maintained a statewide guide to transfer.

All US baccalaureates are of four years' equivalent full time study and most have three basic components: general education which typically includes English, quantitative methods, civics, and liberal arts and sciences; major program requirements which comprise the discipline's main studies; and electives. Some 23 States prescribe a common core curriculum and examinations in general studies to maximise the transfer

of credit between institutions, and eight States specify common subject numbering to eliminate ambiguity in which subjects are transferable.

TABLE 7.37: US STATES' INSTRUMENTS TO SUPPORT STUDENT TRANSFER

Types of policies	Number of States
Legislation	30
Statewide cooperative agreements	40
Transfer data reporting	33
Incentives and rewards	18
Statewide transfer guide	26
Common core curriculum	23
Common subject numbering	8

Source: Education Commission of the States (2001) Transfer and articulation policies, <http://www.ecs.org/clearinghouse/23/75/2375.htm>

Some 34 or 79% of the 43 States that participated in Ignash & Townsend's study reported that they had developed statewide articulation agreements (Ignash & Townsend 2000). In addition Florida, Georgia, Illinois, Massachusetts, Nevada, Rhode Island, South Carolina, and Texas have legislated policies that specify curriculums and examinations, including a common subject numbering system and/or a core general education curriculum. The Illinois articulation initiative provides that students who take the specified package of coursework are assured their credits will satisfy the general education requirements at the institution to which they transfer (Rifkin 1998).

Institutions in California, Ohio, New Jersey, and other States have adopted dual admissions programs, which are specialised transfer agreements that guarantee admission and transfer of credits to specific 4-year colleges and universities. Mercer County Community College, for example, has dual admissions agreements with six New Jersey colleges. Each requires completion of a specified program and a minimum grade point average, which varies by institution and program (Rifkin 1998).

These policies can be successful. The Texas Higher Education Coordinating Board (2001, pp 16, 32) reports that the State specifies ('mandates') a common core curriculum and common subject numbering in its legislation and subordinate requirements and that in 2000 Texas community college students presented with an average of 1.7 years' equivalent full time study and were granted credit for 1.2 years equivalent full time study or 70% of the study they had completed. However, much of US States' policies seems to be exhortatory. Of the 30 States with legislation supporting transfer, only 6 States specified minimum conditions for the transfer of students and only 7 other States specified even minimal conditions for the transfer of credit. Ten States required a transfer agreement without specifying what it might contain, 7 States exhorted cooperation in transfer and 2 States stated in legislation broad support for transfer.

Wellman (2002) studied six US States that rely heavily on transfer from two-year colleges to give low-income students access to the baccalaureate degree. Wellman (2002, p vi) selected three States which received high grades and three States which received low grades on retention and degree completion in *Measuring up 2000*, the State-by-State report card for higher education released by the National Center for Public Policy and Higher Education (2000). Wellman (2002, p v) examined the role of State policy in influencing community college–baccalaureate transfer. She (2002, p 38) characterised State policies as structural and academic. Wellman understands structural policies as those that affect the overall approach to postsecondary education: governance, institutional and sector mission and differentiation, statewide information system capacity, funding, planning capacities, and accountability mechanisms. Wellman argues that the preconditions of student transfer are determined by these structural policies and by demography, economic conditions and institutional histories. Wellman understands academic policies as those specific to 2/4 transfer. They are designed to influence the internal alignment of students, programs, and subjects within and across institutions. Academic policies concern admissions standards, curriculum requirements, articulation, and transfer of credit (Wellman 2002, p 38).

Wellman (2002, p vi-vii) found that the key difference between the three high-performing States and the others in her study seems to lie in the Statewide governance structure for higher education. The low performing States construct transfer as mainly an academic and institutional matter and grant institutions considerable autonomy while the high performing States of Florida, New York, and North Carolina have a comprehensive, integrated approach to transfer implemented by stronger State governance or coordinating mechanisms. For example, the 16 public baccalaureate-granting institutions of North Carolina are part of the University of North Carolina and the State's 58 public community colleges form the North Carolina Community College System governed by the State Board of Community Colleges. In New York public community colleges are part of either the State University of New York or the City University of New York and thus report to the same governing board as the 4-year institutions, which Wellman (2002, p 39) says may facilitate transfer within those sectors. However, Prager (1993, p 551) found in her study that transfer within such institutions can be as difficult as transfer between segmented institutions.

Wellman (2002, p vii) also found that all three of the high performing States also use data better to improve transfer performance, including reporting to campuses about their performance relative to others. This echoes Rifkin's (1998, p 6) finding that 'Effective transfer programs benefit from a well-developed technical infrastructure that includes statewide student information and tracking systems, articulation databases and research on transfer. The most effective programs have all three and often are found in states where higher education is closely coordinated at the state agency level . . .' However, the States' 'accountability structures typically focus on two-year college transfer performance instead of also looking at the responsibilities of the four-year institutions' Wellman (2002, p vii).

In contrast to the large differences in structures between the States, Wellman (2002, p 39) found that 'There is a good deal of commonality between the states on the academic policy side of the equation, as they have all adopted similar approaches to core curriculum, transfer of credit, remediation and testing, and statewide articulation agreements and course catalogues.' However, she concluded that academic policy alone is not sufficient to achieve strong transfer.

The next section examines in more detail the student transfer provisions of the States considered in this study, and will observe that while there are differences, all three States have strong Government provisions.

California

Chapter 9.2 of the California education code states the Legislature's intention 'that the transfer function shall be a central institutional priority of all segments of higher education in California, and that the segments shall have as a fundamental policy and practice the maintenance of an effective transfer system' (California Legislative Counsel, 2001).

The California education code makes the governing board of each public postsecondary education segment accountable for the development and implementation of formal systemwide articulation agreements and transfer programs and other procedures to support and enhance the transfer function; it provides for the development of new programs of outreach, recruitment, and cooperation between and among the three segments of public higher education to facilitate the successful transfer of students between the community colleges and the universities; it requires the development, maintenance and dissemination of a common core curriculum in general education courses for the purposes of transfer; it specifies that students who complete the common core curriculum be exempted from all lower division general education requirements; and it requires each university department, school, and major which has lower division prerequisites to develop discipline-specific articulation agreements and transfer program agreements in conjunction with community college faculty (California Legislative Counsel, 2001).

The California Legislature has also mandated a core transfer curriculum at least since 1991 (California Postsecondary Education Commission 2002b, p 10).

66720. The Board of Governors of the California Community Colleges, the Regents of the University of California, and the Trustees of the California State University, with appropriate consultation with the Academic Senates of the respective segments, shall jointly develop, maintain, and disseminate a common core curriculum in

general education courses for the purposes of transfer. Any person who has successfully completed the transfer core curriculum, shall be deemed to have thereby completed all lower division general education requirements for the University of California and the California State University.

(Legislative Council of California 2002)

In 1996 the California Postsecondary Education Commission reported that all of the then 106 community colleges offered ‘an approved list of courses [subjects] from which students may select to meet general education curricular requirements at either the State University or University [of California] campuses of their choice.’ In 1999 the University of California established a partnership with the State to increase community college transfer enrollments by 50%, or 15,300 transfers annually by 2005. The university is seeking to expand its transfers by (1) improving subject articulation procedures, (2) increasing its participation at local community college transfer centers, (3) expanding outreach program activities, (4) providing training to community college counselors who advise transfer students, and (5) expanding part time options at the university for transfer students (California Postsecondary Education Commission 2003, p 9). The Commission believes that a promising statewide initiative is the dual admission program, which was adopted by the UC Board of Regents in 2001 and funded by the State Legislature in 2002. The program will offer admission to high school seniors who place within the top 4 and top 12.5% of their local graduating class provided they fulfill their freshman and sophomore requirements at a community college (California Postsecondary Education Commission 2003, p 9).

Hayward and colleagues (2004, p 35) observed that the community colleges with strong reputations for transfer to 4-year colleges and universities seem to have close relations with the California State University and the University of California. They have transfer guarantees (extensive lists of California articulation numbered subjects that are assured acceptance of credit transfer) and working partnerships with staff at selected senior campuses. Transfer seems to be encouraged by community colleges being sizeable and relatively close to the 4-year college or university campus where they transfers their students. They (Hayward *et al* 2004, p 35) report that ‘These and other factors have resulted in a small number of community colleges in the State accounting

for more than 60% of the state's transfer students.' Hayward and colleagues' (2004, p 36) informants said that an on-line database of articulation agreements among the higher education institutions in California was valuable in providing accurate and accessible articulation information. Most community college campuses have transfer centres which host regular visits from university representatives, schedule visits to colleges and hold 'transfer days' (Hayward *et al* 2004, p 36).

Colorado

The Colorado Commission on Higher Education says that Colorado statute C.R.S. 23-1-108(7) guarantees that all acceptable course work be transferred from one Colorado public college to another. In particular, 4-year schools are obliged to accept the core curriculum completed in a 2-year school as a fulfilment of lower division general education requirements. Students may qualify for transfer in 3 ways: finishing 30 semester units of transferable college credit (GPA 2.0), finishing 12 semester hours of transferable college credits (GPA 2.5), or completing an associate's degree with a greater-than-C average. This last option guarantees students junior class status in a 4-year school. Colorado also has policies for 4-to-4 year transfer including a change of major within a college. Each 4-year college's admissions office has a 4-year transfer plan for each major (Colorado Commission on Higher Education 2001a).

In 2001 the Colorado Legislature observed that each public college and university had adopted different general education core curriculum for its undergraduates which differ in scope, number of subjects and design, ranging from 33 to 49 required general education credits. It concluded that differences in general education requirements create transfer barriers. The Legislature therefore mandated general education requirements for public higher education institutions through the passage of HB 01-1263 and HB 01-1298.

Beginning July 2001, CCHE and the public higher education system will collaborate to create a general education framework and develop common course [subject] numbering for general education courses. A committee, composed of Academic Council, college presidents, academic vice-presidents, and core curriculum chairs, will articulate the state's general education core philosophy to the stakeholders;

define the core framework; set criteria; and evaluate and approve courses that conform to the State's general education core framework. Several working committees, composed of college faculty representing each core area in the framework, will support the committee's agenda.

The project outcomes include:

- 1) Ensuring that Colorado undergraduate students receive a general education experience of consistent and high quality regardless of their major or area of study.
- 2) Protecting students' rights regarding the transfer of general education courses.
- 3) Facilitating transfer from 2- to 4-year institutions, among 4-year institutions, from 4 to 2-year institutions, and within an institution.
- 4) Enhancing academic advising.
- 5) Ensuring quality in curriculum development and consistency in course competencies.
- 6) Providing students on-line information regarding general education course transferability and common course numbers.

(Colorado Commission on Higher Education 2001b)

Texas

The Texas legislature (2002) has adopted a strong prescription of core curriculum.

§ 61.821. Definitions

In this subchapter:

- (1) 'Core curriculum' means the curriculum in liberal arts, humanities, and sciences and political, social, and cultural history that all undergraduate students of an institution of higher education are

required to complete before receiving an academic undergraduate degree.

* * *

§ 61.822. Core Curriculum

(a) The [higher education coordinating] board, with the assistance of advisory committees composed of representatives of institutions of higher education, shall develop a recommended core curriculum of at least 42 semester credit hours, including a statement of the content, component areas, and objectives of the core curriculum. . .

(b) Each institution of higher education shall adopt a core curriculum of no less than 42 semester credit hours, including specific courses comprising the curriculum. The core curriculum shall be consistent with the common course-numbering system and with the statement, recommendations, and rules issued by the board. An institution may have a core curriculum of other than 42 semester credit hours only if approved by the board.

(c) If a student successfully completes the 42-hour core curriculum at an institution of higher education, that block of courses may be transferred to any other institution of higher education and must be substituted for the receiving institution's core curriculum. A student shall receive academic credit for each of the courses transferred and may not be required to take additional core curriculum courses at the receiving institution unless the board has approved a larger core curriculum at the institution.

(Texas Legislative Council 2002)

The Texas Legislature has further directed the State's Higher Education Coordinating Board to support the transfer of students from two-year to four-year colleges. Section 61.823 of the Texas Education Code directs the coordinating board to develop field of study curricula for various academic programs. The statute defines a field of study

curriculum as a ‘set of courses [subjects] that will satisfy the lower-division requirements for a bachelor’s degree in a specific academic area at a general academic teaching institution.’ All public four-year institutions of higher education are required to accept field of study subjects approved by the coordinating board in fulfilment of lower-division requirements for bachelor’s degrees. Receiving institutions may not require incoming transfer students to repeat subjects with the same content as field of study subjects.

The board has approved field of study curricula for child development/ early childhood education (April 1999), middle grade education and business (July 2000), and music (October 2000). The board is further required to evaluate the transfer practices of each higher education institution. The Texas Higher Education Coordinating Board’s rules specifying the framework, ‘exemplary educational objectives’ and content of the core curriculum, and its common course numbering system is given in its lower division academic course guide manual (2001c).

Effect of transfer policies on transfer rates

Higgins & Katsinas (1999) adopt Kintzer’s (1989) taxonomy of policy types graduated from greater to lesser formalisation and specificity. Their (Higgins & Katsinas 1999) categories are: (1) detailed requirements specified in legislation or the State constitution; (2) State policies not imposed by legislation; (3) non binding agreements between institutions or segments; and (4) agreements on vocational-technical course and credit transfer.

In a study of transfer rates of 97 rural two-year colleges Higgins & Katsinas (1999) found that policy (1) colleges had an average transfer rate of 22.95% whereas policy (3) colleges had a transfer rate of 13.87%. Higgins & Katsinas note that while their sample comprised 13% of 736 publicly controlled rural 2-year colleges, a stratified random sample could not be developed from their data set since participants were self-selecting. Furthermore, they did not study any of the 330 publicly controlled suburban and urban two-year institutions which enrol 68% of all community college students. While their conclusion that ‘state policy clearly does matter, and states serious about implementing “seamless” K-16 education systems should seriously re-examine their transfer policies to promote better

interinstitutional articulation and transfer' perhaps goes beyond their data, it provides at least some support for the thesis that differential transfer rates are associated with the existence and strength of formal student transfer policies and mechanisms.

Windham and colleagues (2001, p 39) argued that by having two- and four-year institutions share what they call a 'concurrent use campus' students are able to complete their lower division requirements in a community college setting including any needed remediation and can transfer to a university for the final 2 years without having to change geographical locations. However, Prager (1993, pp 551-2) argues from her study of transfer within US institutions that offer both two-year and four-year programs that the benefits to student transfer of structural alignment can be thwarted by a range of behaviours within institutions.

To the extent that closely articulated two- to four-year programs are an important factor in student transfer outcomes, survey data suggest that more than a few colleges and universities with two- and four-year programs display some of the same characteristics inhibiting transfer within their institutions more typically described by those writing about transfer between unrelated sets of institutions, namely community and senior colleges. These include elitist judgements degrading two-year students and programs, enrolment caps favouring baccalaureate track students, arbitrary rulings confusing curriculum parallelism and comparability, and archaic notions about program terminality inconsistent with the educational aspirations of occupational-technical students.

The data also indicate that some baccalaureate programs and providers tacitly endorse transfer-inhibiting practices peculiar to articulation issues within four-year institutions. These include the failure of those in authority to enforce articulation policies on the books, where such policies exist. These also include, as well, alienating policies such as those that force subbaccalaureate students wishing to pursue the baccalaureate to reapply for admission as if foreign to the institution or that penalise them for following comparable but not identical

curriculum sequences to those in the first two years of a university's four-year track. For those who seriously propose that aligning community colleges structurally to universities can cure the transfer malaise, the evidence presented here suggests that institutions offering both four-year and two-year education under the same umbrella do not do so *de facto* under prevailing conditions that assure continuity to the baccalaureate.

(Prager 1993, pp 551-2)

Conclusion

This chapter has shown that significant numbers of students transfer between baccalaureate and non baccalaureate granting institutions in Australia, Canada, Scotland and the US. This may be considered a strength or a weakness of the system, depending on one's perspective. Since at least the 1960s the US has constructed the non baccalaureate granting sector as both a screen and a route to access the upper levels (Clark 1983, p 51). Significant upward transfer may therefore be interpreted as a success for the US system since it demonstrates that it does indeed provide the upward academic and social mobility that it promises. In contrast, since 1992 Australia has constructed the non baccalaureate granting sector as training for work and therefore distinctively different from the baccalaureate granting sector which includes cultural transmission and education for life amongst its core roles. At least in theory, prospective Australian tertiary students are expected to choose the non baccalaureate granting sector for a direct vocational outcome and the baccalaureate granting sector for more general education. In this system significant transfer is thus evidence not of the strength of the system, but of its failure to differentiate the roles of its parts sufficiently clearly, at least to prospective students. High student transfer is also evidence of the failure of the system's sorting-selecting mechanism to direct students to the part that best suits them. But whether upward student transfer is considered a strength or a weakness of a division of roles or functions within a system, it constitutes considerable interaction between its parts.

While this study has found that reverse student transfer has been overstated, it is nonetheless significant. Most reverse student transfer seems to be ‘drop down’ – students who do not complete their baccalaureate transferring to a sub baccalaureate program. This can be fitted readily into tertiary education’s sorting role. However, reverse transfer augmenters – students who enrol in a sub baccalaureate program after completing a baccalaureate – cannot be fitted into the traditional understanding of a segmented higher education system. This phenomenon is most commonly explained – and lauded – as an aspect of lifelong learning (Faure 1972; Delors 1996). The chapter found that neither upward nor reverse transfer is adequate to explain students’ enrolment practices which are not confined to a linear progression from one sector to another. Students have multiple enrolments in higher education and vocational education and training – some sequential and others concurrent. ‘Swirling’ (de los Santos & Wright 1990, p 32) is a better metaphor to explain this practice, which is also understood to exemplify lifelong learning. It isn’t possible to determine the extent of swirling from the national data currently available. However, the study found from an Australian national survey that about half of university graduates and almost one third of TAFE graduates had multiple qualifications, but only about 10% had qualifications from both sectors.

Many students seem to transfer between sectors despite rather than because of their system’s policy and processes. Furthermore, student transfer is at least evidence of an informal and tacit structuring of some systems. Thus, the chapter found that Australia’s formally unified national system of higher education and Scotland’s undifferentiated higher education system had greater differences in transfer student acceptance ratios than California’s formally segmented system. Even if one considered enrolment with prior TAFE study rather than basis of admission, the informal segmentation within Australian and Scottish higher education is at least as great as the formal segmentation of California. Student transfer thus minimally reveals a structure not established by explicit policy. But arguably it does more. Student selection is a significant marker of institutional differentiation, as is evident from the attention given to application and rejection rates and mean entry and cut-off scores. It is influenced by and influences students’ applications. So arguably student transfer constructs as well as reflects a system’s tacit structuring: it is a process of structuration (Giddens 1976, p 120).

8 Innovation¹

In many countries the early separation of vocational and general education was formalised into a segmentation into different sectors to handle a new function, mass participation in tertiary education. But as was noted in chapter 6 on sectors, Scott (2000, p 198) observed that the initial differentiation of the sectors by program type (vocational or general) was transformed to a new or at least an additional differentiation of sectors by the extent and breadth of their research. This chapter considers the implications of the segmentation of tertiary education into tertiary type A and tertiary type B sectors, and the further segmentation of tertiary type A institutions into research intensive and comprehensive universities for tertiary education's contribution to Australia's innovation. The chapter starts by reviewing Australian national policy on tertiary education relevant to innovation and considering Australian innovation policy. It then considers options for structuring higher education to maximise its contribution to innovation.

Objectives for Australian tertiary education

Australia does not have a national policy for tertiary education: policy is set and normally considered separately for higher education (tertiary type A) and vocational education and training (tertiary type B). Contributing to national innovation is only one of several purposes of Australian higher education. In its *Higher education report for*

¹ An earlier and briefer version of this chapter was published in MOODIE, GAVIN (2004) 'Optimising tertiary education for innovating Australia' in Marsh, Ian (ed) *Innovating Australia*, Committee for the Economic Development of Australia, Melbourne, pp 92-108. I thank my co authors for their insights and constructive comments in two authors' conferences on a formative version of the chapter.

I have changed the argument significantly in response to a communication from Dr Martin Trow of the University of California Berkeley's Goldman School of Public Policy (28.3.2005). I am grateful to Dr Trow for his generous remarks and contribution of time in commenting on an earlier abstract of this thesis.

the 2003 to 2005 triennium the Australian Department of Education, Science and Training (2003b, p 1) says that the Government regards higher education as contributing to the fulfilment of human and social potential and to the advancement of knowledge and social and economic progress. Of the five purposes of higher education stated by the department, three are to develop individuals, one is to advance knowledge and understanding and one is to aid the application of knowledge and understanding to the benefit of the economy and society. The department (DEST 2003b, p 1) states the Government's objectives for higher education somewhat more precisely. Of the five objectives the fifth is to 'advance the knowledge base and university contributions to national innovation (DEST 2003b, p 1).

These objectives are relatively recent, having been first stated in 1999 when the department first published in its current form its annual report on funding and other developments for the forthcoming triennium. They were somewhat restated in the Commonwealth's *Higher Education Support Act 2003* passed by Parliament late in 2003. One of the four objects of the Act is '(c) to strengthen Australia's knowledge base, and enhance the contribution of Australia's research capabilities to national economic development, international competitiveness and the attainment of social goals'. Contributing to national innovation is therefore not the dominant or even always an explicit Government objective for higher education.

The Australian National Training Authority (ANTA) (2003a, p 1) specifies four objectives for vocational education and training in its *National strategy for vocational education and training 2004 – 2010*. The only object even indirectly relevant is the third: 'Communities and regions will be strengthened economically and socially through learning and employment'. However, innovation appears in one of 12 strategies, contributing to the first goal of training industry's workforce (ANTA 2003a, p 9). The authority (ANTA 2003c, p 2) complains that Australian innovation policy concentrates on 'high-end' research and development, leaving out vocational education and training. Ferrier, Trood & Whittingham (2003, p 16) report that vocational education and training has been involved only marginally if at all in Australia's cooperative research centres, which they say are a small but crucial element in the national innovation system in their strong commitment to applied research and to the

implementation and/or commercialisation of research. However, the authority (ANTA 2003c, p 6) acknowledges that vocational education and training is still at the early stages of engaging with the issues and the national innovation system. It is therefore worth considering how one might optimise Australian tertiary education sectors to contribute to national innovation and assess the extent to which this may be compatible with other objectives for the sector.

Innovation is mainly about improving general productivity, not university research

Australian public policy has had an early if initially faltering interest in innovation. Interest was first stimulated by Barry Jones (1982), a sometime Commonwealth minister for science, who first published his influential *Sleepers, wake!: technology and the future of work* in 1982. This book, which had its fourth edition in 1995, did much to promote thinking about the implications of the knowledge economy for Australia. By 1987 Australian public policy on innovation was still rudimentary, fragmented and ineffectual. This is illustrated by Australia's mishandling of the proposal of the Japanese Ministry for International Trade and Industry to establish in Australia a multi-function polis. The multi-function polis was to be a high-tech manufacturing and residential development, but Australia failed to take advantage of the opportunity through a lack of vision (Baines 2000) and 'political incompetence, self-seeking and cupidity' (Sorensen 1998).

By the early 1990s innovation had become a political slogan with the then prime minister Bob Hawke's vision of establishing Australia as a 'clever country'. However, by the end of the decade the Business Council of Australia, which is an association of the chief executives of most of Australia's biggest companies, was concerned that Australia has allowed its commitment to innovation to slip. Its solution was to engage the Commonwealth Government in mounting an innovation summit in February 2000.

The background paper for the innovation summit prepared by the Department of Industry, Science and Resources (1999, p 9) defined innovation as 'the process that incorporates knowledge into economic activity'. It (Department of Industry, Science and Resources

1999, p 9) argued that ‘Innovation covers “the million little things” which improve the operation of firms or other institutions (Romer 1992). It is a much broader concept than research and development (R&D), although the outcomes of R&D are among its most powerful expressions.’ The Department’s position is supported by Lundvall & Borrás (1997, p 133) who observe that ‘Incremental technical innovation based on learning, diffusion of technology and organisational change are certainly more important for the performance of any single national or regional economy than major innovations’.

Notwithstanding the insistence in the innovation background paper that innovation is not just about research and development, the recommendations in the final report of the innovation summit implementation group concentrated heavily on research and development. Of the summit’s key recommendations costed by the group, 78% of additional expenditure was recommended on research and development – 60% on increased funding for research in higher education and 18% to support industry research and development through increased tax concessions. The Government’s response *Backing Australia’s ability - an innovation action plan for the future* concentrated even more heavily on research and development, almost all in higher education institutions. Of the \$2.8 billion committed over 5 years, 91% was for higher education, 4% for research and development tax concessions and 5% to compensate somewhat for the transfer of Commonwealth funding from public to private schools (Commonwealth of Australia 2001). Higher education’s capture of innovation policy was complete in May 2003 when the Minister for Education, Science and Training Dr Brendan Nelson (Commonwealth of Australia 2003, p 33) issued *Our universities: backing Australia’s future* announcing that ‘A comprehensive evaluation of the effectiveness of the Knowledge and Innovation reforms’ would consider only the operation of the main university research block grant schemes.

Committing almost all of the Commonwealth’s innovation effort to higher education research fails to redress what seems to be a structural problem in Australia’s national innovation system. It will be noted from the table below that while Australian governments provide 17% more of the country’s funding for research and development than the average for members of the Organisation for Economic Co-operation and Development, Australian business contributes 18% less than the OECD average.

Australian higher education does 10% more of the country's research and development than the OECD average but Australian business does 23% less than the OECD average. As a consequence Australia has an extraordinary 40.7 higher education researchers per 10,000 members of the labour force, 2.5 times the OECD average. Of the other OECD countries only Finland (41.9 higher education researchers per 10,000 workers) exceeds Australia and only Sweden (35.5) otherwise comes close. Australian business researchers are less than half the OECD average representation per 10,000 workers and are growing slower than the OECD average. It seems that this is not entirely a failure of business. Australian governments' direct investment in business research and development is 4.6 less than the OECD average, and its indirect investment (including tax expenditures) is almost 3 times less the OECD average.

TABLE 8.1: R & D BY BUSINESS AND HIGHER EDUCATION, AUSTRALIA AND SELECTED OECD COMPARATORS, 2001

Measure	Australia	Canada	EU	OECD	UK	US
R & D spend as % of GDP	1.53%	1.94%	1.93%	2.33%	1.90%	2.82%
% R&D funds from govt	46%	31%	35%	29%	30%	27%
% R & D funds from bus.	46%	42%	56%	64%	46%	68%
% R&D done by higher ed	27%	30%	21%	17%	21%	14%
% R & D done by business	47%	57%	64%	70%	67%	74%
Higher ed researchers per 10,000 workers	40.7	21.1	18.3	16.5	17.0	13.2
Business researchers per 10,000 workers	1.7	3.3	2.9	4.1	3.2	6.9
Growth of business researchers 1991-2001	2.09	6.41	2.91	3.62	1.54	3.27
Direct govt funding of bus. R & D as % of GDP	0.03%	0.04%	0.10%	0.14%	0.13%	0.25%
% of business R&D financed by government	3%	4%	8%	8%	10%	11%

Source: OECD (2003), OECD (2002) figure 3.8 p 115, figure 310, p 117.

While there isn't necessarily any virtue in being at or above the OECD average on every indicator, being so skewed from OECD averages as is Australian higher education and business research and development at least raise questions. And it suggests that if, possibly for very good reasons, Australia decides to continue concentrating its research and development so heavily in universities, that special measures may be desirable to ensure that at least some of this effort is devoted to business' direct interests.

Clusters

Porter & Ketels (2003, p 19) depict the business environment as four interrelated areas: production factor or input conditions, firm strategy and rivalry, local demand, and the presence of related and supporting industries. The last area they call clusters –

Clusters are geographically proximate groups of interconnected companies, suppliers, service providers, and associated institutions in a particular field, linked by commonalities and complementarities. Clusters such as IT in Silicon Valley or high performance cars in Southern Germany can be concentrated in a particular region within a larger nation, and sometimes in a single town. Other clusters are national and sometimes stretch across borders into adjacent countries, such as Southern Germany and German-speaking Switzerland. Proximity must be sufficient to allow efficient interaction and flow of goods, services, ideas, and skills across the cluster.

(Porter & Ketels 2003, p 27)

Porter (1998) and Porter & Ketels (2003, p 27) argue that 'clusters affect competitiveness in three broad ways: First, clusters increase the *level of productivity* at which constituent firms can operate. . . .Second, clusters increase the capacity for *innovation and productivity growth*. . . . Third, clusters stimulate and enable *new business formation* that further supports innovation and expands the cluster' (emphasis in the original). However, –

Only a small number of clusters tend to be true innovation centers. Others may tend to specialise in producing products aimed at particular market segments, or be manufacturing centers. Still other clusters can be regional assembly and service centers. Firms based in the most advanced clusters often seed or enhance clusters in other locations as they disperse some activities to reduce risk, access cheaper inputs, or seek to better serve particular regional markets. The challenge for an economy is to move first from isolated firms to an array of clusters, and then *to upgrade the sophistication of clusters to more advanced activities*.

(Porter & Ketels 2003, p 28. Emphasis in original.)

Clusters aren't a recent phenomenon. Adams & Smith (2004, p 24) note that 'Many authors have drawn attention to the early origins of the concept that like minded individuals and companies benefit from working together. It seems probable that the earliest considered reference is by Adam Smith, who noted how inter-relatedness of trade brings businessmen together; "artificers, too, stand occasionally in need of the assistance of one another . . . they naturally settled in the neighbourhood of one another"'. Berg (1993) describes Birmingham's metal trades and Sheffield's cutlery trades which grew rapidly in the 18th century as workshop economies 'built on specialisation and the division of labour, on dispersed units concentrated in specific locations, and on close networking among these units'. Hobsbawm (1999 [1968], pp 42-3) describes the British cotton industry in the 19th century which 'emerged as, and it largely remained, a complex of highly specialised firms of medium size (often highly localised) – merchants of various kinds, spinners, weavers, dyers, finishers, bleachers, printers, and so on, often specialised even within their branches, linked with each other by a complex web of individual business transactions in "the market"'. In the late 19th century Alfred Marshall (1890) noted that firms benefit from being located in industrial districts of firms in the same industry in the supply of skilled labour, the development of specialised industries supplying intermediate goods, and knowledge spillovers among the firms in the industry (Berg 1993; Jaffe, Trajtenberg & Henderson 1993). In the mid 20th century Florence (1953) described as 'industrial swarming' 'concentrations of skilled labour and of whole complexes of different but related and interdependent industries in specific districts' which 'created external economies sufficient to substitute for the internal economies of large-scale production' resulting in 'plant disintegration but local integration' (Berg 1993).

Lambert (2003, p 12) argued that ‘dynamic networks between academic researchers and their business counterparts’ or networks are critical because –

Innovation processes are complex and non-linear. It is not simply a question of researchers coming up with clever ideas which are passed down a production line to commercial engineers and marketing experts who turn them into winning products. Great ideas emerge out of all kinds of feedback loops, development activities and sheer chance.

(Lambert 2003, p 12)

Nowotny *et al* (2001, p 48) argue that ‘the key to understanding the complex articulations between the social and scientific as a co-evolutionary process . . . is their suggestive clustering and interdependent influence’. They argue further that the potential for this co-evolution is ‘intensified still more by the blurring of distance and its flexibility and the continuous construction and re-construction of the “local”. But “local” knowledge production systems must develop self-organising capacities . . . to link up with other sites of “local” systems’ (Nowotny *et al* 2001, p 48).

Clusters are normally located within a relatively small geographic area, at least in the early stages of innovation. Salter & Martin (2001, p 518) cite studies showing that ‘research collaboration within a country is strongly influenced by geographic[al] proximity; as distance increases, collaboration decreases, suggesting that research collaboration often demands face-to-face interaction.’ This is because innovation relies on tacit knowledge (Polanyi 1967) picked up in the informal sharing of knowledge and ideas in ‘dense’ networks of firms and other relevant institutions such as universities (Salter & Martin 2001, p 524). Rosenfeld (1998, pp 1-2) argues that the close proximity and spatial interdependence of clusters create ‘collective externalities’ that allow participants to transact business more cheaply and easily, achieve a scale that attracts specialised services and resources, resolve problems more quickly and efficiently, and learn sooner and more directly about new technologies and practices.

Geographic proximity may become less important as an industry matures. Salter & Martin (2001, pp 519, 527, 528) postulate that ‘the value of geographic spillovers and untraded interdependencies varies over time’. They may be particularly important when

the direction of technological development is uncertain, increasing the importance of tacit knowledge and of direct interactions in interpreting and applying new information.

Gesling (1992, pp 122-3) distinguishes phase 1A innovation – ‘swarming’, when proximity is important; from phase 1 B innovation – ‘strategic networking’ when proximity is less important and partners are sought from throughout the nation and world.

Universities can be critical to the formation of clusters and the economic and social development of regions (Wolf 2004). Nations and regions are therefore faced with the prospect of establishing and maintaining universities in every cluster and region that aspires to participate intensively in the knowledge economy. The universities should have research depth at least in the fields important to their cluster or region. This could argue for a large number of widely dispersed universities with relevant research intensities, depending on the number and therefore the size of each cluster and knowledge intensive region.

While as will be seen from the next section there have been several studies of the significance of the size of research teams in maximising research quality and productivity, there has been little work on the minimum and optimal size of clusters for fostering innovation (Forsman & Solitander 2003, p 4). The prominent clusters are very large indeed and even the smallest of the existing US biotech clusters is bigger than the whole of Australia’s biotechnology industry (Commonwealth of Australia; Ernst & Young and Freehills 2001). The logical conclusion to establish one big cluster is unlikely in Australia, and in any case it may also be undesirable since it would compromise tertiary education’s other objectives.

Selectivity, scale, concentration and diffusion

Research funding is allocated selectively when choices are made between priorities or between researchers, but this does not necessarily concentrate resources in larger groups. Research funding may be more selectively allocated to active or productive researchers, but they may still work alone or in very small groups, or be widely dispersed amongst departments or institutions. Selectivity is considered desirable in

research funding because less benefit is obtained by allocating resources to research which is less productive, of lower quality or to areas which are less important. The extraordinarily high number of higher education researchers per 10,000 workers in Australia compared with almost every other OECD country may very well be an argument for greater selectivity in allocating research resources (presumably in this case mostly time) but it is not necessarily an argument for greater concentration of research.

The term ‘critical mass’ is used to argue for several quite different outcomes. Its original meaning is in physics: the minimum amount of fissile material needed to maintain a nuclear chain reaction. By analogy it may be extended to the organisation of research as the threshold value for size (Evidence Ltd 2003a, p 21) – the minimum size of a research unit to maintain a viable or good research program. Johnson (1994, p 34) concludes that there is a threshold effect in many fields of the physical sciences below which the amount or quality of the research performance is reduced. He estimates the threshold at from three to five academic researchers plus postdoctoral fellows, postgraduate students and technical staff. Johnson (1994, p 31) further reports evidence ‘that the optimal size of a research group is about six fully qualified scientists working in the same problem area with perhaps another dozen support staff, graduate students and postdoctoral fellows, . . . [and] as many foreign visitors as can be accommodated’, which is supported by von Tunzelmann *et al* (2003, p 11).

While the minimum size of a successful research group may be quite small and the optimal size not much bigger, there may nevertheless be a scale effect. Larger research groups may be more successful or productive per researcher than smaller research groups, and one might expect that this scale effect plateaus or even becomes negative for groups larger and much larger than the optimal size. Evidence Ltd (2003b) tested the existence of a scale effect by examining data from the UK’s research assessment exercise for 2001. Evidence Ltd (2003a, p 22) notes that the unit of analysis ‘is . . . not necessarily an academic department but is the group of staff submitted by a university to an RAE Unit of Assessment. These will usually be from one academic resource centre (department or school) but they may include cognate researchers from other schools and one school may be split into two or more units of assessment’.

Evidence Ltd (2003a, p 23) found that big units on average perform more effectively in research than small units, but there is great variation in the performance of small units. Many small units perform worse than large units but some perform at a standard comparable with the largest. This pattern produced a statistically significant correlation between unit size and research income per full time equivalent staff, PhD awards per full time equivalent staff, publication output per full time equivalent staff and research performance or impact measured by average citations per paper (Evidence Ltd 2003a, p 23). However, Evidence Ltd (2003b, p 63) reports a very large amount of residual variance even where there is a strong correlation, indicating many exceptions to the otherwise strong pattern.

Evidence Ltd found this broad pattern across a wide range of disciplines not only in the sciences but also in the arts and humanities. Evidence Ltd (2003a, p 23) concludes that ‘there are size factors associated with research performance and they evidently occur across many disciplines but causation, correlation or consequence cannot be determined at this stage.’ This is because ‘small units that become good at research acquire the resources to become large units. Conversely, large units that do badly at research lose resources and decline in size as well’ (Evidence Ltd, 2003a, p 24). vonTunzelmann and colleagues (2003, p 5) argue that there may be a problem with inferring causation, but somewhat differently. They suggest that it is quite possible that the very existence of larger universities or departments may disproportionately attract grants: ‘If so, we have the econometric problem of “*simultaneity*”, and the coefficients thus estimated will be biased and inconsistent unless they can be “identified” in some other independent way’ (vonTunzelmann *et al*, 2003, p 5).

Evidence Ltd (2003b) cites several earlier studies which found no clear evidence that unit size contributes to research achievement –

Johnston notably comments that ‘the widespread introduction of policies of resource concentration around the world are found to have been based on little examined assumptions and in operation to be at times counter-productive’. Cohen argued that the size of groups and their productivity simply increased proportionally and that there was no reliable evidence for the existence of a size or a range of sizes for

research group that maximized output per unit of size. Seglen found no correlation between group size and productivity for Norwegian microbiologists. Rey-Rocha similarly concluded that team size among Spanish geologists did not appear to be as important for scientific productivity as the status of team members.

(Evidence Ltd 2003b, p 50)

Evidence Ltd's finding of a scale effect for research may reflect assessment panels' being unduly influenced by the size of units in judging 'quality' (von Tunzelmann *et al* 2003, p 4), the particular dynamics of the UK's research assessment exercise – its reward for a particular construction of research establishing path dependence (Geuna 1999, p 171) or its construction of data that generates a scale effect. Alternatively it may reflect the particular way the research assessment exercise constructs units of assessment, which don't necessarily correspond to actual research teams. Evidence Ltd (2003a, p 22) notes that 'research units may be teams, laboratories, departments, schools or institutions. Because these different kinds of units may bring research together in different ways their scale relationship with research performance should be studied separately. For example, a team is made up of various numbers of individuals, a department consists of individuals in one or more teams and a university is home to many people in a smaller or larger number of departments. If we considered scale factors solely in relation to staff FTE across these different organisational layers then we would be obscuring essential structural information.'

Evidence of a general scale effect for research would be an argument for concentrating research until each research unit were of the optimum size. But notwithstanding a common misapprehension, a scale effect for research would not be an argument for concentrating research by institution. There is little evidence of an economy of scope in research production – that a research team in one field benefits by being organisationally linked to teams in other fields, or even that research benefits from being produced jointly with teaching (Geuna 1999, p 27). (There is, however, evidence of an economy of scope in the production of the knowledge that results in US patents. Jaffe *et al* (1993) found that approximately 40% of patents' citations of other patents are from another of about 400 technical classes and that from 12% to 25% of citations are from another of five broad

technological fields.) So research units of appropriate size and great quality may be located within universities which do not have many other such units. Some 54 units with the highest ratings of 5 or 5* in the UK's 2001 research assessment exercise were in institutions with three or fewer units rated so highly (HERO 2001). Conversely, universities which have numerous research units of appropriate size and high quality also support research units of indifferent quality and sub optimal size. Morgan (2004, p468) observes 'that the old adage that "all universities are good at something and none is best at everything" is also confirmed. So, despite some careful selectivity, 9% of the Loxbridge ratings fall below level 5; and 91% of new universities have at least one [unit] attaining level 4 or 5'.

Concentrating research resources in units of appropriate size and of the highest quality may maximise research productivity and quality on the criteria normally used to assess research performance, but it may reduce the community's benefit from research. This is because research has to be incorporated in the productive process to generate economic benefits. As Salter & Martin (2001, p 512) observe paraphrasing the OECD, 'knowledge and information abound, it is the *capacity* to use them in meaningful ways that is in scarce supply' (emphasis in the original). Lundvall & Borrás (1997, p 154) argue that knowledge production at universities needs to be integrated more closely with the innovation process since much innovation depends on tacit knowledge (Polanyi 1967) which is socially embedded in organisational networks as Lundvall (1992, pp 8-9) had earlier observed. They (Lundvall & Borrás 1997, p 154) argue that innovation blurs the conceptually distinct but in practice continuous stages of invention, innovation and diffusion. Concentrating research expertise distant from their sites of potential use may inhibit the diffusion of research as quickly and as thoroughly as desirable. This is supported by Moussouris (1998, pp 93-4) who argues that there is too much concentration on research 'breakthroughs' and too little attention to the importance of research diffusion in generating economic development.

So part of the explanation for the high efficiency of much of Australian agriculture, which is in stark contrast to many other OECD countries, may be the broad diffusion of research and innovation through the applied research laboratories, demonstration farms and extension and outreach activities of State departments of agriculture that operated during most of the 20th century. Australian rural research and development was

restructured in 1989 into 14 national rural research and development corporations funded by industry levies and matching Government funds (Roberts 2005, p 61) which are strongly committed to the uptake and adoption of research (Enright no date). One such corporation is the Grape and Wine Research and Development Corporation which plays an important role in the Australian wine cluster described by Porter (2002). In contrast there is no comparable applied research laboratories and diffusion, demonstration and outreach for secondary industries in which Australia's performance has generally been much weaker.

Gibbons and colleagues (1994, p 87) argue that for industry to access knowledge generated in universities geographical proximity is important since it facilitates information exchanges and informal contacts necessary to build and maintain the trust needed for collaboration. The UK's Lambert review of business university collaboration (2003, p 6) accepted that public funding should be concentrated on 'world class' research, but argued against increased selectivity of research funding because not all research valuable to business is assessed by peers as world class. The review (Lambert 2003, p 13) said that 'a less research-intensive university can play an extraordinarily valuable role in working with local business in a way that might make no sense to one of the big research universities'. The review (Lambert 2003, p 70) cited Little (2001) 'Physical proximity is important in scientific collaboration. The era of the Internet does not remove the need to build relationships by personal contact, even if they can then be sustained through electronic means. Indeed ... the importance of proximity is growing, because of an increasing need for companies to look outside for technology, ideas and co-operation'. Lambert (2003, p 71) also cited a community innovation survey which asked firms which universities they collaborated with. Results were analysed by type of the firm's main market and location of their collaborating universities. The survey found that firms with local markets overwhelmingly collaborated with local universities, but even 37% of firms with national markets collaborated with local universities.

TABLE 8.2: LOCATION OF UK FIRMS' COLLABORATING UNIVERSITIES, BY TYPE OF FIRM'S LARGEST MARKET

Type of firm's largest market	Location of collaborating university		
	Local	National	Overseas
Local	88%	12%	0%
Regional	47%	53%	0%
National	37%	47%	16%
International	26%	48%	26%
All	36%	46%	18%

Source: Lambert (2003, p 71) from Community Innovation Survey, (UK), DTI/ONS, 2001.

This echoes the much earlier finding by Jaffe *et al* (1993) that knowledge flows from universities to firms are highly localised and that US patent citations including self citations of other patents (the transfer of knowledge from one application to another) are from five to ten times more likely to come from the city in which the inventor is located than from elsewhere. Lambert (2003, p 13) concluded that 'proximity matters when it comes to business-university collaboration. SMEs, in particular, find it difficult to work with research departments on the other side of the country. If resources are increasingly concentrated on a small number of world-class research departments, there is likely to be a negative impact on the level of business-university collaboration in the UK.' 'Even large companies may find it more efficient to work with research departments in their own locality' since 'Personal contact is the best form of communication' (Lambert 2003, p 70) and 'Informal networks cannot easily be sustained over long distances' (Lambert 2003, p 13) or as a much cited phrase of Glaeser *et al* (1992, p.1127) says, 'intellectual breakthroughs must cross hallways and streets more easily than oceans and continents'.

Some argue that proximity may not matter so much for modern research collaborations. Adams & Smith (2004, p 38) referred to a study by Katz which found that 'the median distance for research collaboration (the distance within which 50% of collaborators may be found) tended to increase between 1981 and 1994'. Outside London, the pairs of collaborations that occurred within 20 kilometres decreased from 39% to 19% of all

collaborations. Adams & Smith (2004, p 43) suggest that proximity may still be important for companies that are not intensively involved in research and development, and it may be important for innovations not directly stimulated by major new research findings. However Nowotny and colleagues (2001, pp 41-2) argue that the new forms of knowledge production are locally embedded, and therefore that ‘locality’ is still important in how research operates. Hence ‘the imperatives of innovation generally are local, even if the competitive thrust has acquired global dimensions. This is why contextualised knowledge is increasingly produced in, and perhaps primarily relevant to, particular and localised environments and the problems generated within those sites’ (Nowotny 2001, p 109).

The new production of knowledge

Gibbons and colleagues (1994) posit two types of knowledge production –

By contrast with traditional knowledge, which we will call mode 1, generated within a disciplinary, primarily cognitive, context, mode 2 knowledge is created in broader, transdisciplinary social and economic contexts . . . The emergence of mode 2 . . . is profound and calls into question the adequacy of familiar knowledge producing institutions, whether universities, government research establishments, or corporate laboratories.

(Gibbons, Limoges, Nowotny, Schwartzman, Scott & Trow 1994, p 1)

Gibbons *et al* (1994) and Gibbons (1997) describe a number of attributes of these types of knowledge production which may be tabulated and contrasted this way.

TABLE 8.3: CHARACTERISTICS OF MODE 1 AND MODE 2 KNOWLEDGE PRODUCTION

Characteristic	Mode 1	mode 2
Problems	Academic	Contextual
Focus	Discipline	Problem
Knowledge production	Discipline-based	Transdisciplinary
Location	Academy	Application

Characteristic	Mode 1	mode 2
Practitioners	Specialists	wider group
Skills	Homogeneous	Heterogeneous
Groups	Continuous	Transient
Organisation	Hierarchical	Heterarchical
Form	Stable	Transient
Structure	Uni-form	Diverse
Feedback	Stakeholders	Reflexive
Accountability	Government	Social
Quality control	Peer	broad-based

Source: after Gibbons et al (1994) and Gibbons (1997).

Limoges (1996, cited in Gouvernement du Québec 1998) refers to ““context-driven” research, meaning “research carried out in a context of application, arising from the very work of problem solving and not governed by the paradigms of traditional disciplines of knowledge.”” So we may state the distinction epigrammatically as between mode 1 knowledge production which is academic, investigator-initiated and discipline-based and mode 2 knowledge production which is context-driven, problem-focussed and interdisciplinary.

It is arguable that traditional sectoral distinctions, at least those between tertiary type A and B education, are founded on mode 1 knowledge production. Certainly, many of the arguments for a research-intensive tertiary type A-1 sector are founded on maximising mode 1 knowledge production. However, Scott (2000, p 200) notes that ‘it has proved difficult to contain research within the emergent elite sector; it has spread into other, newer and more open, sectors of higher education’. While the spread of research beyond designated institutions may be a problem for mode 1 research, it is a success for mode 2 research. Scott (2000, pp 200-1) says that ‘mode 2 expands the number of research, or knowledge, actors. . . . Other actors, once dismissed as mere “disseminators”, “brokers” or “users” of research results, are now actively involved in their “production” (which itself has become a more capacious, and ambiguous, category)’.

Since a country normally wants to foster innovation more widely than it can afford to maintain research-intensive universities and institutes, more widely dispersed bodies may have a role in knowledge production or reproduction. Nowotny *et al* (2001, p 90) argue that since the knowledge economy depends on the dissemination of research ‘the small number of universities which are research-led rather than access-orientated . . . no longer occup[y] such a central role in this new economy. . . . Indeed, it is possible to argue that non-elite universities [and other institutions] may be better placed to play these “knowledge games”, because they have more experience of – and less distaste for – training and building up “knowledgeable” communities.’

Shapiro (1993, p 60) argues that ‘It will, in the final analysis, be the quality of the mediating social, political and cultural institutions that enable a society to actually benefit from the value of its investments in higher education.’ Edquist and colleagues (2001, p 17) argue that organisational learning is important for gaining benefit from the knowledge economy and that this is developed by interaction with a range of organisations, presumably not just research-intensive universities and institutes. Rosenfeld (1998, p 4) argues that in the US ‘community colleges are particularly helpful to small and mid-sized enterprises, since they are better positioned to reach them than universities, consultants, and service agencies, many of which prefer not to bother with “know-how” needs that may not be technologically challenging or of a scale that can be sufficiently profitable’. Wolfe (2002, p 22) argues that the highly decentralised nature of the US’s post-secondary education is, amongst other factors, ‘absolutely central’ to the formation and success of Silicon Valley and many other innovative clusters studied in the US.

Grubb (2004) elaborates that Canadian and US ‘community colleges carry out a variety of activities intended to enhance the local community, including advice to local firms (especially small- and medium-size enterprises) about new technologies, convening industry clusters and groups of local employers around common needs, identifying the education and technology needs of local employers, surveying the business environment for new developments and technologies, and helping attract new employers by providing customised training’. Grubb (2004, para 17) adds that various research and development roles, particularly for their regions, are carried out by Finnish

polytechnics, French *instituts universitaires de technologie*, ‘German *Fachhochschulen*, which are responsible for research transfer into smaller and medium sized enterprises and for working with public administration’ and Norwegian state colleges.

Perhaps the strongest role of tertiary type B institutions in knowledge (re)production is in the German *Land* or State of Baden-Württemberg, which produces cars and commercial vehicles (DaimlerChrysler), sports cars (Porsche), electrical products (Bosch, Boss), software (SAP) and printing presses (Heidelberg) amongst other high quality products (Teufel 2005). Baden-Württemberg coordinates and supports its vocational education through local chambers of industry and commerce and company levies in the standard arrangement in the German coordinated market economy described in chapter 6. The universities have their own technology transfer advice services, there are public research centres and inventors’ advice services, and Fraunhofer institutes provide specific contract-based technology transfer and development services, mainly to large companies (Yusuf & Evenett 2002, p 52). In addition The Steinbeis Foundation for Economic Promotion has established over 300 specialised technology transfer centres at the region’s universities (European Communities 2003), mostly at *Fachhochschulreife* (universities of applied sciences) and ‘often in cooperation with a nearby technical college’ (Yusuf & Evenett 2002, p 52). Baden-Württemberg is also distinctive in Germany in having ten vocational academies, or *Berufsakademie*, that offer ‘premium apprenticeships’ mostly in the field of commerce and technology/engineering (Deissinger 2005, p 102). Technical schools (*Berufsschulen*) are linked to between 10 and 20 firms closely associated with the universities.

Structuring tertiary education

Most contemporary discussions of the structure of tertiary education consider the separation of a select group of research intensive universities from comprehensive universities, and this section opens by also discussing this structure. However, this is not the only possible structure and others are suggested in increasing order of sophistication, complexity, and therefore difficulty of implementation.

Research-intensive university sector

The thesis has described California's segmentation of its tertiary education into the research intensive University of California, the comprehensive California State University and the open access California Community College System. There has been no formal distinction between research intensive and comprehensive higher education institutions in Australia since 1988 and in the UK since 1994, but the universities with the biggest research incomes have formed self-selected informal groups – the group of eight in Australia and the Russell group in the UK. These groups argue for increased concentration of research funding in their institutions, which on some arguments amounts to a reintroduction of a formal distinction or 'binary divide' between a research intensive and a comprehensive higher education sector. These claims are marked by a dotted line in figure 8.1, which probably reflects the big research universities' aspirations more than reality but nonetheless does not concede them the formal distinction they seek.

FIGURE 8.1: FORMAL (———) AND INFORMAL (- - - -) DESIGNATION OF TERTIARY EDUCATION SECTORS IN CALIFORNIA, THE UK AND AUSTRALIA

Distinctive feature	California	UK	Australia
Research intensive	University of California	Russell group	Group of 8
Comprehensive baccalaureate-granting	California State University	Other universities	Other universities
Open access	California Community College System	Further education colleges	Vocational education and training providers

One big centre

A common progression from promoting the formal designation of research intensive universities is to advocate the concentration of research funding in an even more select group of high performing research universities. This seems to be the natural outcome of competition, including competition for a significant proportion of research funding (Geuna 1999). However, it is now being proposed as explicit government policy. The recommendations of the UK's Roberts review (2003) of the future for research assessment would lead to the further concentration of research funding in the 'research intensive' institutions. The then UK minister for higher education, Margaret Hodge, suggested that research might be limited to a group of elite universities, perhaps not going much beyond the 'golden triangle' of Oxford, Cambridge, and the London institutions (MacLeod 2003a) although the new minister Alan Johnson may be rethinking this policy (MacLeod 2003b).

In Australia the attention of big business and other elite opinion has been attracted by the observation of the then vice chancellor of the university with the biggest research funding, the University of Melbourne, that Australia probably does not currently have a university that ranks in the top 100 in the world (Gilbert 2001). However, the aspiration for Australia to have one or two universities in the world top 100 seems unrealistic when one notes that to fund just the University of Melbourne at the same rate as Harvard University would require the Commonwealth to almost double its current allocation to higher education (Griffith University 2002, p 3).

Both proposals are not for a new form of tertiary education, but for the establishment of an even more select group of super research intensive universities within the existing organisational form. The limit to these proposals is the concentration of research in one big centre or 'flagship' institution as it is commonly expressed in the US. As the Australian National University (2002, p 6) pointed out in its submission to the recent Commonwealth review of higher education, this was the initial rationale for the establishment of the ANU in 1957 (Foster & Varghese 1996). In those days the existing Australian universities conducted little or no research and did not award the PhD, then

regarded as a dangerous German innovation all the more suspicious since it had been adopted in the US.

As has been noted, there is no evidence of an economy of scale or scope for research at the institutional level, and concentrating research in one or perhaps a select few institutions would limit research diffusion to the immediate locale of the centre and it would relegate the rest of Australia to provincial status, which is unlikely to be acceptable in a federation. What may be acceptable is concentrating research in each broadly defined field in a national centre but dispersing centres geographically. This would gain the benefits of scale in each field but would locate each centre throughout the country so that each jurisdiction can be the centre of something. Two possibilities for combining concentration and dispersal are considered: matrix and hub-and-spoke.

Matrix

Davis (Griffith University 2002, pp 36-7) proposes that institutions be encouraged to develop new institutional types through multiple contestable funding. This would be achieved by establishing an institutional teaching performance fund of \$271 million and an institutional community service and equity performance fund of \$271 million to complement the institutional grants scheme of \$271 million, which would be renamed the institutional research performance fund.

In Davis' scheme institutions would be allowed to compete for two but not three performance funds, thereby requiring them to choose one of three options to maximise their institutional performance: research and teaching, research and community service, or teaching and community service (Griffith University 2002, p 37). Davis' scheme, which has universities concentrating on two of their three broad roles, may be generalised as a matrix where the selection may be made by field of research, innovation cluster or indeed any other salient characteristic. This is illustrated in figure 8.2.

FIGURE 8.2: MATRIX ORGANISATION OF TERTIARY EDUCATION

	Activity A	Activity B	Activity C
Institution A	✓	✓	
Institution B	✓		✓
Institution C		✓	✓

The matrix form is more sophisticated than most other proposals to structure Australian tertiary education, but is probably still too crude to optimise the sector's contribution to innovation. This is because it would require a dichotomous decision whether an institution should participate seriously or not in an activity such as a research field or cluster. While its implementation would probably be more nuanced, at least diagrammatically the matrix doesn't allow for institutions to be moderately involved in an activity, or involved in only part of an activity.

Hub and spoke

A more sophisticated elaboration of the matrix is the hub and spoke. In this form one institution would be designated the hub of an activity such as research in a specified field but other institutions and their staff and students would be able to apply for support to access the hub's facilities and other fixed resources. While the hub of each activity would be unambiguously located at just one institution, the extent of other institutions' participation may range from partnership to perfunctory, and that may change over time. It would also be possible to make the hub of each activity a different size depending on its importance, and to vary that from time to time.

With these flexibilities it would be possible to construct the allocation of hubs (whether by competition or otherwise) so that each university had a reasonable prospect of hosting at least one hub, while one would expect that the institutions with considerable accumulations of academic capital would host a disproportionate number of hubs. It would also allow institutions to be spokes to as many hubs as they could attract funding or fund from their internal resources. The current organisational form in Australian

higher education closest to the hub and spoke is cooperative research centres. However, these centres coordinate research programs, whereas research hubs in this model would be mainly concerned with developing facilities and coordinating access to them.

It would also be possible to give hubs a broader role than just supporting research to support research diffusion and innovation generally. This would open the possibility for businesses, trade associations, vocational education and training institutions and others to participate either as hubs or spokes.

Coordination

Karmel (2001) argues for the re-establishment of ‘an independent statutory body standing between the universities and the government along the lines of the commissions which operated successfully from 1959 to 1987’. Karmel argues that such a body is needed to protect intellectual freedom by insulating universities from direct government control or influence and to inform public policy on higher education by undertaking ‘objective analysis’ unaffected by political/electoral considerations. Such a body would also at least be highly desirable to coordinate any more sophisticated organisation of higher education such as the matrix and hub and spoke forms described above.

But the need for national coordination extends well beyond higher education. The early part of this chapter noted that vocational education has not been included in the national innovation policy nor in cooperative research centres, one of the Commonwealth government’s only mechanisms to engage higher education research with its end users. This is but one manifestation of the divide between higher education and vocational education and training (Wheelahan 2000) which is unusually deep in Australia (Moodie 2003, p 55). Balaguer and colleagues (2003) argue that Australia’s innovation systems are highly dispersed geographically, sectorally and organisationally. They argue that this limits potential economies of scale in innovation and production and risks fragmentation – the sub-critical concentration of knowledge production resources. They add that ‘the demand for new knowledge is also dispersed, which may impede the development of effective link[]s between potential suppliers and users of knowledge’ (Balaguer *et al* 2003, p17). Audretsch & Thurik (2001, p 31) observe that ‘The well-

documented high technology clusters of the world have not been created in a vacuum' and argue for governments to help shape such innovative clusters in 'the entrepreneurial economy' by 'increasing the skills and human capital of workers, and facilitating the mobility of workers and their ability to start new firms'.

There are a number of ways this could be done. Innovation could be coordinated nationally by sector. Separate bodies could be established to coordinate tertiary education type A or all of tertiary education and a mechanism could be established to foster the agglomeration and coordination of elements of the national innovation system, say by industry sector or cluster. Alternatively the basic unit of coordination could be geographic. The Victorian and UK governments propose to coordinate tertiary education and industry development through local learning and employment networks (State of Victoria 2002) and regional development agencies (Secretary of State for Education and Skills 2003a; 2003b). In Australia this would build on an earlier attempt to coordinate national development through regional development councils. Some still exist and are useful for regional consultation, but they have never been given a coordinating role.

Like much of northern continental Europe, Germany has a coordinated market economy in contrast to the liberal market economies of wealthy Anglo countries (Hall & Soskice 2001). Nonetheless, its trade associations may be a useful model. These comprise business, employees and government and are organised as national bodies with regional chapters. They share information and coordinate investment in and the provision of research, training and other pre-competitive and shared infrastructure (Culpepper 2001). This close coordination produces a generally high alignment of higher education, training and employment, but it makes changing any part of the system difficult, slow and uncertain. As a consequence Germany's higher education and training is considered inflexible and resistant to change (Huisman & Kaiser 2001, p 63). This would fail to meet Whitley's (2003, p 1017) preference for a system that can focus research but flexibly change its focus: 'Systems that are able to mobilise large numbers of specialists to deal with new intellectual goals and problems, and to train researchers in new techniques and ideas at relatively short notice, seem likely to produce a wide variety of knowledge and skills that could be useful to firms dealing with high levels of technical uncertainty.'

Discussion

This chapter has shown that Australia's national innovation policy has become preoccupied almost exclusively with research, and particularly with research in universities. This is part of a long and general practice of Australian governments to concentrate research policy on universities and major publicly funded research agencies (the Australian Institute of Marine Science, the Australian Nuclear Science and Technology Organisation, the Commonwealth Scientific and Industrial Research Organisation and the Defence Science and Technology Organisation) to the relative neglect of research in industry. When Australian governments have considered industrial research it has been at the prompting of public research figures to increase the tax concession for expenditure on research, much of which is spent in universities and other public research agencies.

This distortion in public policy has concentrated Australia's research funding and activity heavily in the public sector in comparison with the US and OECD and European Union averages. There may be good reasons for maintaining the heavy concentration of Australian research in universities, but if Australia is to have a strong national innovation system special measures will be needed to direct at least some of this effort to business' direct interests. In its background for the innovation summit the Department of Industry, Science and Resources (1999, p 7) argued that Australia's history, geography and its federal government structure have resulted in a national innovation system that is highly fragmented and frequently operates at a sub-optimal scale. The department argued that the innovation system exhibits too few links and/or active coordination across all the players, despite the best intentions of the recent past. The department's (1999, p 8) first recommendation to the summit therefore was to encourage greater interaction among the players in the system.

Of the ways of organising tertiary education considered in this chapter, only the matrix and the hubs and spokes forms are likely to provide the scale and interaction that the Department of Industry, Science and Resources believes is desirable to contribute to the

national innovation system. The matrix is more readily implementable but would make a lesser contribution to national innovation. The hubs and spokes would make a greater contribution but would be correspondingly harder to implement. A cautious approach would be to implement a matrix initially with a view to evolving it to the greater sophistication of hubs and spokes.

Whatever form is chosen it seems likely that some coordinating mechanism would be needed to manage the transition to the new form and to coordinate the several participants in a national innovation system. As Karmel has argued, an independent statutory body is needed in higher education to implement government policy but filter out party and electoral interests. A higher education statutory body could be part of a larger coordinating mechanism as the Higher Education Council was part of the National Board of Employment, Education and Training (Dawkins 1988, p 12). Alternatively a higher education statutory body could be organisationally separate from the mechanism that coordinates the national innovation system, although of course one would expect them to pursue complementary and mutually reinforcing policies.

9 Discussion and conclusion

This recapitulates the main points of the thesis so far and then attempts the fourth and final step in the method outlined in chapter 2 on comparing education systems, generalisation. The chapter seeks to identify patterns, trends or principles of education (Trethewey 1976, p 57) and from this develop options for structuring relations between tertiary education sectors.

Review of findings so far

The thesis was structured in four stages derived from the comparative education literature: (1) state an issue; (2) identify identity to ensure that like is being compared with like; (3) classify the phenomena observed, first as a way of summarising data but also an analytical tool; and finally (4) generalisation, the identification of patterns, trends or principles of education. However, the different stages of the thesis ‘to some extent overlap and are interdependent’ (King 1967, p 59), which in this thesis meant that the initial question was refined and redefined throughout the thesis.

First step: initial statement of the issue (chapter 1)

The thesis was motivated by the question: why have sectors? This led to subsidiary questions: why are systems of higher education divided into sectors; does each sector and the system overall meet its goals; and is the current division of higher education into sectors adaptable to meet emerging goals or may some other arrangement be preferable? A critical feature of segmented systems of the type investigated in this thesis is the ability of students to transfer between programs, institutions and sectors to study in the sector most suited to their ability and need at any time. So student transfer

was investigated in some detail as one indication of the success of the current segmented systems in meeting their goals. Research transfer, or at least the potential of the current Australian system to contribute to national innovation, was investigated as an indication of ability of the system to meet emerging goals.

Method: comparing education systems (chapter 2)

The thesis therefore used the method of comparative education, and in particular the most similar systems design (Przeworski & Teune 1970, p 33) which seeks to compare systems as similar as possible in as many features as possible so that different outcomes can be attributed to a relatively small number of distinctive features. The most similar systems design was derived from (Durkheim's (1938 [1895], p 125) indirect experiment or comparative method which in turn was derived from Mill's (1925) method of agreement.

Second step: identify identity (chapter 3)

One of the most common segmentations of tertiary education is into a university sector and what was called in this thesis vocational education. While there is broad agreement on the nature of higher education there is no uniform understanding of vocational education (Cantor 1989). So chapter 3 sought to found vocational education's nature on a distinctive epistemology or purpose (Aristotle; Newman, 1959 [1853]), on a distinctive level (Plato) or on pragmatic grounds. It found that no single characteristic consistently identifies vocational education. The thesis used the four general characteristics reviewed – epistemological, teleological, hierarchical and pragmatic – to pose a new compound description of vocational education as the development and application of knowledge and skills for middle level occupations needed by society from time to time. It argued this is adequate to identify the 'family resemblance' (Wittgenstein 1968) of vocational education and its cognates.

Jurisdictions compared (chapters 4 and 5)

Since the most similar systems design was adopted for the thesis chapter 4 compared the structuring of higher education in Australia with tertiary education systems that are similar, but which nevertheless have different characteristics which were the key points compared. The comparators were wealthy Anglo countries: Canada, the UK and the US. Arrangements in these jurisdictions were described in sufficient detail to support the comparative study.

Arrangements in each US state are summarised in an appendix which demonstrates that while there are patterns in higher education provision and participation, it is not possible to generalise from a few US States to a US ‘system’ of tertiary education. Any detailed study of tertiary education in the US must therefore be of the States because of the very considerable variations between them. States were chosen for detailed study by a combination of negative and positive criteria and by a mixture of design and circumstance. While the thesis doesn’t claim that the States studied – California, Colorado and Texas – represent the US, it does claim that they make some informative comparisons with Australia.

Third step: analyse and classify (chapter 6)

The review of arrangements in each jurisdiction studied showed a variety of arrangements and terminologies which were analysed and classified in chapter 6. The study adopted Skilbeck, Wagner, & Esnault’s (1998) understanding of ‘tertiary education’ as a general progression beyond secondary level. The study further adopted UNESCO’s (1997) distinction between tertiary type A programs and tertiary type B programs. The definition of vocational education developed from first principles in chapter 3 was mapped to UNESCO’s description of tertiary type B programs, and the distinction between tertiary type A and B programs coincides with several differences that emerged from the detailed study of jurisdictions in chapters 4 and 5. So chapter 6 aligned UNESCO’s typology with the level of awards, duration of programs, status of institutions and selectivity of student admissions of the vocational education and higher education sectors in Australia, the UK and the US.

Student transfer (chapter 7)

The analysis in chapter 6 allowed the central issue of the thesis to be restated more precisely and to consider a specific issue in chapter 7, the different rates of transfer from tertiary type B to different types of tertiary type A institutions in Australia and three US States. Student transfer is considered important by both the advocates of segmented systems (Clark 1983, p 51) and advocates of unitary systems (Furth 1973, p 24), it is central to achieving equity in segmented systems, and it is an important aspect of the relations and interactions between sectors and institutions, thus following the injunction to study systems as dynamic environments rather than as static structures (Spicker 1996, p 68). The thesis considered student transfer not as an indicator of the success of sending institutions, but as an indicator of the behaviour of receiving institutions and of the dynamics of the system as a whole. The thesis compared the proportions of students from tertiary type B institutions admitted by highly selective and moderately selective tertiary type A institutions.

The thesis found that the group of eight highly selective Australian universities admitted a far lower proportion of students transferring from vocational education and training institutions than comparable institutions in California, Colorado and Texas. Even Colorado which has a lower overall transfer student admission rate than Australia had half the difference in transfer student admission rates between highly selective and moderately selective receiving institutions. The thesis compared these findings with Gallacher's (2003, p 12) finding that the highly selective Scottish universities admitted an even lower proportion of transfers from tertiary type B programs. These findings are summarised again in table 9.1.

TABLE 9.1: STUDENTS TRANSFERRING FROM TERTIARY TYPE B TO TERTIARY TYPE A
PUBLIC HIGHER EDUCATION INSTITUTIONS, AUSTRALIA, SCOTLAND AND
THREE US STATES, BY SELECTIVITY OF RECEIVING INSTITUTION

Jurisdiction	Highly selective institutions	Moderately selective institutions	Ratio of highly selective to moderately selective
Australia	2%	8%	1:4
California	6.5%	13%	1:2
Colorado	3%	6%	1:2
Texas	15%	26%	1:1.7
Scotland	5%	24%	1:5

This finding is particularly striking when one recalls that the difference in transfer student admission rates is lower in California, which formally segments its highly selective and moderately selective higher education sectors, than in Australia and Scotland which has a formally unified national system of higher education. The thesis adopted Burton Clark's (1983, p 52) explanation that the lack of formal segmentation by tier drives systems to greater internal stratification, which at least in Australia and Scotland is by status which in turn is strongly related to institutional age. The thesis further hypothesised that the lack of a formal student transfer policies and mechanisms in Australia and Scotland results in less consistent student transfer and less transfer overall than in the jurisdictions with formal transfer policies and mechanisms.

The thesis also found that transfer student admission rates are no higher than average in Australia's dual sector universities which comprise substantial student load in both vocational education and training and higher education programs. This replicated for Australia Prager's (1993, p 551) finding for the US 'that problems with internal student transfer and program articulation may be as pervasive within some institutions sharing a common institutional identity as external ones are for some from different sectors, such as community and senior colleges, that do not'.

The thesis also investigated ‘reverse transfer’, the transfer of students from tertiary type A to type B sectors. The thesis considered several measures of transfer and concluded that the relative size of upward and reverse transfer depends on the concept or measure of transfer used. Intersectoral transfer is not high in New Zealand, but reverse transfer is about the same size as upward transfer. The national data for Canada suggests that reverse transfer is about the same size or probably smaller than upward transfer. National US data is unfortunately limited, but as far as it goes it does not suggest that reverse transfer is bigger than upward transfer. The national Australian enrolment and survey data report that reverse transfer is about 40% of all transfers. Taking into account all the methodological limitations discussed, the fairest conclusion is that in Australia reverse transfer is from 50% less to 50% more than upward transfer depending on the concept and measure of transfer used. This finding contradicts the claims of several Australian writers. But there is general agreement that the metaphors of both upward and reverse transfer are too simplistic in positing a linear progression from one program, institution or sector to another.

Innovation (chapter 8)

Unlike student transfer, there is very little direct data on research transfer, so this issue was considered indirectly by investigating higher education’s contribution to national innovation. Research transfer was considered in Australia only, although it was informed by some of the international literature and by studies of the UK. The thesis found that as with student transfer, innovation processes are complex and not linear. Indeed, the chapter argued that it is probably more accurate to refer to the production and exchange of knowledge rather than the transfer of research. The chapter therefore posited that simple linear hierarchies within higher education and its relations to society may not be best suited to knowledge production and exchange and thus may not best support national innovation. The chapter considered four ways of structuring higher education and concluded that only two are likely to meet the conditions the Australian Department of Industry, Science and Resources believes is desirable to contribute to the national innovation system.

Fourth step: generalise (chapter 9)

The findings of the thesis are used first to consider six options for structuring the relations between sectors in Australia: segregation, duplication, integration, systematise cross-sectoral enrolments, establish an intermediate sector, and ‘masterly inactivity’. Each is discussed in turn.

Segregation

The peak body for Australian universities, the Australian Vice-Chancellors’ Committee (2002) argues for complete segregation of awards by sector but opportunities to transfer between them. The committee (AVCC 2002, p 57) says that the Australian Qualifications Framework should be ‘re-formulated so that each award can be accredited through one sector only. This will provide a clearer delineation between the sectors based on the qualifications offered.’ The committee (AVCC 2002, p 57) added that the so-called ‘dual sector awards’ of diplomas and advanced diplomas which are accredited in both sectors should be changed into vocational education awards only ‘To improve clarity concerning which awards are approved through which sector’. While there is an attractive neatness in the committee’s proposal, the establishment of new award titles as proposed by the committee would further duplicate qualifications and undermine one of the key objectives of the Australian qualifications framework to ‘integrate and streamline the requirements of participating providers . . .’ (AQFAB 2002). Qualifications are segregated between two-year and community colleges and four-year institutions in many tightly regulated Canadian provinces and US states.

Duplication

The Australian National Training Authority, which acts as the peak body for vocational education and training, argues for the duplication of awards in sectors. It describes diplomas and advanced diplomas as ‘dual sector’ qualifications, which it considers an ‘important innovation’ (ANTA 2002a, p 9). The authority (ANTA 2002b, p 5) says that

since these qualifications ‘have a common set of learning outcomes’ there is no need to ‘discriminate against students who gained their award’ in vocational education. The authority (ANTA 2002a, p 10) opposed establishing associate degrees as a specifically higher education qualification and suggested in the alternative replacing the current advanced diploma or diploma in both sectors with the associate degree. This may have some rationale were programs substantially different in each sector, but as the authority notes, diplomas and advanced diplomas are described almost identically in the Australian qualifications framework (AQFAB 2002, p 37), and prospective students are unlikely to recognise any difference between the sectors’ diplomas and advanced diplomas except by extension from the differences they perceive in the institutions offering them. There is very considerable overlap and at least some duplication of awards between polytechnics and universities in New Zealand and less but still some overlap between colleges of further education and universities in England.

Integration

Another option would be to harmonise the financing, coordination and other arrangements for vocational education and training and higher education, and this is argued by Wheelahan (2000). This would require both a restructuring of federal responsibilities for tertiary education comparable to the Commonwealth’s assumption of full responsibility for financing the advanced education and university sectors in 1974, and at the same time a recasting of the sectors which would be more extensive than the abolition of the higher education binary divide in 1988. Such an undertaking would be too ambitious to attempt in one step, even were the sectoral divide such a major problem as to require fundamental reform, and even were it the highest priority in Australian tertiary education.

Systematise cross-sectoral enrolments

A fourth option would be to follow North America and Scotland in systematising cross-sectoral enrolments by designating diplomas and advanced diplomas as short-cycle higher education, but leave them as the main responsibility of the non baccalaureate granting institutions, vocational education and training institutions in Australia. This

would require Australia to decouple the institutional and programmatic designations of the sectors (Moodie 2002c), but as has been noted, they were joined only relatively recently in Australia. This option would also require vocational education and training to manage higher education's student fees and financing arrangements for short-cycle higher education, but this is not as radical a change from vocational education and training's current practices as may at first seem. Australian vocational education and training already manages multiple student fee and financing arrangements: for programs sponsored by employers, for apprenticeships financed by government through so-called 'user choice', for students financed through labour market programs, for international students, for domestic fee-paying students, as well as for students funded through the State or Territory government's main student fee and financing arrangements.

Intermediate sector: higher vocational education

A fifth option would be to remove the overlap in the sectors' responsibilities for short cycle higher education. This is rarely if ever done in Anglophone jurisdictions. But it has been achieved in bilingual Quebec, which neatly places its general and vocational colleges (*collège d'enseignement général et professionnel*) distinctively between secondary and higher education. In Quebec it is not possible to proceed from school to university without first completing the CEGEP's diploma of collegial studies (*diplôme d'études collégiales*) which normally takes two years full time after completing the secondary school diploma (Quebec Ministère de l'éducation 2001).

TABLE 9.2: STANDARD PROGRESSION THROUGH QUEBEC'S EDUCATIONAL LEVELS

Qualification	Institution
Doctorate	University
Masters	University
Baccalaureate	University
Diploma of collegial studies	General and vocational college
Secondary school diploma	Secondary school

Such an arrangement could be achieved in Australia by making the intermediate sector the exclusive responsibility of one of the sectors. Alternatively, diplomas and advanced diplomas could be changed from a site of duplication, overlap and competition between sectors and levels of government to a site of shared qualifications, responsibility and financing between the sectors and governments. This could be done by reconceptualising the qualifications as neither specifically vocational education and training nor specifically higher education, but as a new level of higher vocational education shared by both sectors. The new level could have curriculum, financing, fee and administrative arrangements which acted as a bridge to ease transition between the sectors. This option has the disadvantage of establishing yet another set of organisational arrangements, neither specifically vocational education and training nor higher education. A new machinery would have to be established to negotiate and manage the cooperative arrangements, and since it would have to be negotiated by the Commonwealth and all State and Territory governments, it is likely to be complicated and cumbersome.

Masterly inactivity

A final option would be to do nothing – ‘masterly inactivity’ (Mackintosh 1838 [1791], p 14) – or more likely, continue fiddling at the margins. This would be a sensible option notwithstanding the Australian Government’s attempt to problematise the relations between the sectors in its *Crossroads* review of higher education in 2002. Since there is comparatively little overlap at present between the sectors there are few boundary problems and these are readily manageable within current arrangements. While duplication is untidy and appears inefficient, the sectors’ duplication of diplomas and advanced diplomas is well within acceptable or at least tolerable bounds. The boundary problems would multiply were vocational education and training institutions to offer the currently distinctively higher education qualifications of bachelor or graduate certificate or diploma. But these could be managed when and if they emerge as a problem, rather than anticipated in the abstract in advance.

Conclusion

The aims of the thesis were to consider why tertiary education is divided into sectors in many jurisdictions, and whether this is the best arrangements to meet current and future goals. However, the differences in transfer student admission rates between different types of tertiary A institutions suggest that Skilbeck and colleagues (1998, p 104) are right in arguing that structures aren't so important as the relationships between the organisations that form them. Geiger (1992, p 1031) makes a similar point to Skilbeck and colleagues, but believes that institutions are nevertheless important as the tangible arrangements for organising behaviour. Or to apply Geiger's point to the specific interests of the thesis, while structures don't determine student transfer rates, different structures require different mechanisms to optimise student transfer.

The thesis noted two general tendencies in structuring tertiary education. One tendency is to broaden the roles of institutions and sectors to accommodate different needs of different students, employers and the different needs of society generally. Another tendency is to structure sectors and institutions to serve specific needs. A particular instance of the first approach is to have the comprehensive role served by tertiary type A institutions, with student access reasonably open and hence the type A sector comparatively large. In this structure, which may be broadly called Napoleonic or Latin since it is instanced in various ways by France, Italy, Spain, Chile, Brazil and Mexico, tertiary type B institutions have a specialised role which overlaps little with that of type A institutions. In this type of structure transfer from type B to type A institutions is not so important as transfer between and within type A institutions, and in France's case, transfer to the highly selective *Grandes Écoles* which lead to high status and high paying occupations. In the second tendency, instanced prominently by California, the comprehensive role is served by tertiary type B institutions. In this case the facility of transfer from type B to type A institutions is vital to achieve equitable outcomes for the system as a whole. Student transfer is also important in supporting equity where tertiary type A and B institutions serve more complementary roles, such as in New Zealand and the UK.

Since 1988 Australia has followed the continental European tendency of ascribing comprehensive roles to its tertiary type A institutions, leaving its tertiary type B

institutions with a residual role. In such a structure transfer from tertiary type B to type A institutions hasn't been so important as transfer within and between tertiary type A institutions. More recently Australia has not expanded tertiary type A institutions to handle even population growth, let alone any possible increase in participation rates or in the duration of tertiary education, and on the current policy settings the rate of participation in tertiary type A institutions will actually fall to 2006. This limits the comprehensiveness of tertiary type A institutions and increases the reliance on type B institutions to provide any alternative route to type A institutions.

In such circumstances it is important for students to be able to transfer from tertiary type B to tertiary type A institutions. Australia has had a formally unified type A sector since 1988, and the Commonwealth's current policy proposals would maintain this structural unity. Since, as Clark (1983, p 52) argued, the lack of formal segmentation by tier drives systems to greater internal stratification, it is important that student transfer operates effectively to and between all type A institutions. This increases the importance of systematic student transfer and suggests that the current rhetorical encouragement but laissez-faire policy on student transfers will be inadequate to support equitable outcomes in the future. Furthermore, the transfer student admission performance of Australia's dual sector universities and of US institutions that include both two-year and four-year tracks suggest that structural alignment and transfer policies can be thwarted by 'transfer-inhibiting practices' (Prager 1993, p 551) and that therefore structure and formal policy alone are not sufficient to achieve strong student transfer.

Economists have found that knowledge spillovers are important for the development industry clusters and Gibbons and colleagues (1994) have posited a new mode 2 knowledge production which is context-driven, problem-focussed and interdisciplinary. Higher education is clearly important for the development of clusters at least in knowledge-intensive industries and it remains important in mode 2 knowledge production, although less important than in mode 1 knowledge production. But traditional higher education structures are not well suited or adapted to contributing to industry clusters or mode 2 knowledge production, for different reasons. Alternative higher education structures should therefore be considered, and six options were discussed.

Future study

This thesis considered the transfer of students within tertiary education to illuminate at least part of the operation of the system. It could be extended to consider other aspects of tertiary education's internal dynamics. An interesting comparison with the present study would be the movement of staff between institutions and types of institutions. Some Australian studies have observed for the academic staff of each institution the type of institution and location of their undergraduate and doctoral degrees. These studies have found that the highly selectively tertiary type A institutions recruit their staff internally at a higher rate than the moderately selective tertiary type A institutions even correcting for the differences in institutions' age. One would expect a very low level of movement of staff from tertiary type B to type A institutions but perhaps a higher but still low movement of staff from type A to type B institutions. These rates for Australia could be compared with corresponding rates in other jurisdictions. One would expect in the US that a higher proportion of staff of highly selective type A institutions would have started their academic career with an associate degree from a type B institution, but this may still be rather low in contrast with the claims for the opportunity for mobility that two-year colleges are said to offer.

A more adventurous study would venture beyond the internal dynamics of tertiary education to study the system's interactions with other sectors. The closest is secondary education. Chapter 1 noted that in Canada 80% of students in tertiary type B institutions study full time. At the other extreme only 9% of Australian tertiary type B students are full time. This suggests a far higher transition from school to type B institutions in Canada than in Australia. Two-year colleges also seem to be promoted as an acceptable destination for high school graduates in the US. The greater plurality of destinations of high school graduates in North America might explain why tertiary type A institutions seem to have far less control over the senior secondary curriculum in North America than in Australia and the UK.

Moving beyond education, one may consider the interaction between tertiary education and the labour market. This is not just a direct transfer upon graduation from full time study to full time work. Work experience is incorporated within the formal curriculum

in tertiary type A programs such as education and nursing and presumably there is considerable interaction between tertiary education and employment in these fields. While there are internships in liberal arts and sciences programs, a lower proportion of students in these programs incorporate work experience within their formal education than in the explicitly vocational programs. One might expect these patterns to be broadly consistent across the jurisdictions we have been considering. But such consistency may not extend to tertiary type B programs.

First, counter intuitively, tertiary type B programs may not incorporate much more work experience than type A programs. Apprenticeships are the archetypal type B programs, but they are a small and shrinking proportion of tertiary type B enrolments in Anglo countries. Secondly, the very different rates of part and full time study in type B programs across jurisdictions suggest different proportions of students studying to transfer, to enter the skilled work force and to upgrade skills. System-wide data on this is collected in Australia and by several US states and so offers the prospect of some interesting comparisons. One could also investigate the extent of ostensibly full time students' engagement in part time work not directly related to their studies. Although data isn't collected routinely on this there are probably enough studies of the phenomenon to support sensible comparisons between jurisdictions and perhaps over time.

A final line of further work suggested here is the interaction between tertiary education and what is known as the national innovation system (Lundvall 1992). Knowledge creation and transmission is clearly a crucial part of national innovation systems, yet the interaction between education and innovation systems has been studied very little (Hall & Soskice 2001). There have been some interesting analyses of the sources of science cited in patents but this is only a small part of a national innovation system. Chapter 8 argued that simple linear hierarchies within higher education and its relations to society may not be best suited to knowledge production and exchange and thus may not best support national innovation, and that special measures are necessary to promote the transfer of knowledge across sectoral boundaries. This could be studied systematically, say by reanalysing some of the several case studies of industry clusters.

Appendix

Survey of US states

An indication of the variation of arrangements in the US is given by a brief description of each state with material largely from the state's web sites noted. There is considerable variation in the structure of states' administration of higher education, ranging from coordination and governance by one body for all of higher education, such as in Georgia, Maine and Montana; to different coordinating bodies for each sector or segment of higher education and separate governing bodies such as in Michigan, New York and Washington. The Education Commission of the States (1997, pp 16-17) has classified these structures in great detail and depth, propounding an elaborate typology. States also range in the strength of coordination from fairly central management such as in Colorado and Texas; to the state maintaining a laissez faire relationship with its institutions of higher education, such as in Michigan. Massachusetts, New Jersey, Illinois, Maryland and Virginia are often considered examples of states in which decentralisation or deregulation is occurring (NORED 2000, p 81).

All this material was downloaded on 24 and 25 September 2001. Population figures and median household income are taken from the US Census Bureau (2001) and the ratings of college participation rates are taken from *Measuring Up 2000* by the National Centre for Public Policy and Higher Education (2000). College ratings are from the U.S. News & World Report *America's Best Colleges* (2002).

Alabama

Alabama is in the East South Central of the US, on the Gulf of Mexico. It has a population of just over 4 million. It has twice the proportion of African Americans (26%) as the US as a whole (13%).

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Alabama	4,369,862	72%	26%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

The median annual household income in Alabama is \$36,268, one of the lowest of the states and rather less than the median for the US as a whole (\$41,789). The National Center of Public Policy and Higher Education grades college participation in Alabama as C+, just above average (2000).

	Annual median household income	College participation rate grading
Alabama	\$36,268	C+
US	\$41,789	C

Higher education in Alabama is coordinated by the Department of Postsecondary Education, which was established in 1982 (<http://www.acs.cc.al.us/reports/Annu.pdf>). The Alabama College System consists of 19 community, 7 technical, 2 junior colleges, and Athens State University, the system's upper division college with an enrolment of just over 88,000 students (Fall 2000-2001). The state also supports the Alabama Industrial Development Training Institute (<http://www.acs.cc.al.us/>, <http://www.aidt.edu/>). The first state-operated trade school, the Alabama School of Trades, was opened in 1925 and the Alabama College System was created in 1963 (<http://www.acs.cc.al.us/acs/history.htm>). Alabama's Auburn University and the University of Alabama are both ranked in the second tier of national doctoral universities by the *US News & World Report* (2002).

Alaska

Alaska is the north west corner of the North American continent; almost half of the state is in the arctic circle. It has a small population, a high proportion of which is Indigenous.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Alaska	466,041	72%	4%	4%	5%	16%
US	272,690,813	72%	13%	11%	4%	1%

Alaska has the equal highest median household income due to its oil wealth, but a low college participation rate..

	Annual median household income	College participation rate grading
Alaska	\$52,492	D+
US	\$41,789	C

The Alaska Commission on Postsecondary Education coordinates the University of Alaska System and the Alaska Vocational Technical Center (<http://www.state.ak.us/acpe/>).

Arizona

Arizona is a west Rocky Mountain state; it shares its southern border with Mexico. As would be expected, a high proportion of its population – almost a quarter – is Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Arizona	4,778,332	68%	4%	23%	2%	5%
US	272,690,813	72%	13%	11%	4%	1%

Arizona's annual median household income is just below the US average and its college participation rate is average.

	Annual median household income	College participation rate grading
Arizona	\$39,653	C
US	\$41,789	C

Higher education in the state is coordinated by the Arizona Commission for Postsecondary Education (<http://www.acpe.asu.edu/>). The Arizona Board of Regents is the governing body of Arizona's public university system, (http://www.abor.asu.edu/1_the_regents/reports_factbook/brochure.html) and the State Board of Directors for Community Colleges of Arizona is responsible for statewide oversight of Arizona's community colleges. Arizona has 10 community college districts; each district is a county (<http://www.stbd.cc.az.us/>).

Arkansas

Arkansas is a West South Central state. It has a low proportion of Hispanic people and correspondingly high proportions of white non Hispanics and African Americans.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Arkansas	2,551,373	81%	16%	2%	1%	1%
US	272,690,813	72%	13%	11%	4%	1%

Arkansas' median household income is the second lowest in the US and its college participation rate is below average.

	Annual median household income	College participation rate grading
Arkansas	\$30,082	D-
US	\$41,789	C

The Arkansas Board of Higher Education is the state coordinating agency for all public universities, community colleges and technical colleges in Arkansas. Eleven postsecondary vocational-technical schools have been recently redesignated as technical colleges. (<http://www.arkansashighered.com/>) The remaining 13 postsecondary

vocational-technical schools are operated by the State Board of Workforce Education and Career Opportunities (<http://www.work-ed.state.ar.us/about.html>).

California

California runs along the Pacific – western – seaboard of the US. It shares a southern border with Mexico. It has a large population, only half of which is white non Hispanic, and African Americans are also under represented. Hispanics and Asian and Pacific Islanders are heavily over represented in California.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
California	33,145,121	50%	8%	32%	12%	1%
US	272,690,813	72%	13%	11%	4%	1%

California has a high median household income and college participation rate.

	Annual median household income	College participation rate grading
California	\$45,070	B+
US	\$41,789	C

Higher education is coordinated by the California Postsecondary Education Commission. The Commission administers a master plan for Californian higher education enshrined by the Donahoe Act of 1960. This establishes three segments of higher education: the University of California, a highly selective doctoral university system; the California State University, a system of comprehensive universities offering up to masters degrees; and the Californian Community Colleges.

California has 10 colleges ranked in the top 50 national doctoral universities: (the private CalTech, rank 4; the private Stanford, rank =5; and the public University of California at Berkeley, rank 20; UCLA, rank 26; University of California – San Diego, rank 31; the private University of Southern California, rank = 34; the public University of California – Davis rank = 41; and University of California – Irvine, rank = 41; the private Pepperdine University, rank = 48 and the public University of California – Santa Barbara, rank = 48. It also has several highly ranked liberal arts colleges (Pomona College, liberal arts rank =5, Harvey Mudd College, liberal arts rank = 14, Claremont McKenna College, liberal arts rank = 17, Scripps College, liberal arts rank 35 and Occidental College, liberal arts rank = 44).

Colorado

Colorado is in the mid west of the continent, with the Rocky Mountains running through its western half and the great northern plains on the east. It has a very low proportion of African Americans and higher proportions of white non Hispanics and Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Colorado	4,056,133	78%	4%	15%	2%	1%
US	272,690,813	72%	13%	11%	4%	1%

It has rather high median household income and a high college participation rate.

	Annual median household income	College participation rate grading
Colorado	\$49,216	B-
US	\$41,789	C

Higher education in Colorado is coordinated by the Commission on Higher Education. The Commission administers relatively closely defined roles for public higher education institutions which it classifies as research universities, (comprehensive) universities/colleges, specialised medical institutes, community colleges and local district colleges. Colorado College, a private institution, is ranked = 28 of liberal arts colleges.

Connecticut

Connecticut is in New England, on the north of the Atlantic – eastern – seaboard. White non Hispanics are over represented and every other group is under represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Connecticut	3,282,031	80%	9%	9%	3%	0%
US	272,690,813	72%	13%	11%	4%	1%

Connecticut has high median household income and college participation.

	Annual median household income	College participation rate grading
Connecticut	\$50,647	B+
US	\$41,789	C

Connecticut's coordinating agency for higher education is the Board of Governors for Higher Education. The Connecticut Department of Higher Education carries out the Board's administrative responsibilities (www.ctdhe.org). Higher education is managed in 2 segments – the Connecticut State University System (<http://w3.sysoff.ctstateu.edu/web/csuweb.nsf?opendatabase>) and the Connecticut Community College System (<http://www.commnet.edu/colleges.html>).

Connecticut has established a College of Technology, which is a specialised curriculum that allows a student to begin technology or engineering technology studies at any of the state's 12 community colleges with the ultimate goal of achieving a 4-year, baccalaureate degree in engineering or technology at the University of Connecticut, Central Connecticut State University, the University of Hartford, University of New Haven, or Charter Oak State College. Students are able to exit with a two-year associate degree, or continue with junior status without any loss of credit (<http://www.commnet.edu/co/academic/cot/>). Connecticut's private Yale University is ranked =2 of national doctoral institutions, and it has 3 highly ranked liberal arts colleges: Wesleyan College (= 11), Trinity College (= 25) and Connecticut College (= 26).

Delaware

Delaware, the 'first state' of the Union is located on the mid Atlantic coast. It has a relatively large proportion of African Americans and a low proportion of Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Delaware	753,538	75%	20%	4%	2%	0%
US	272,690,813	72%	13%	11%	4%	1%

Delaware's median household income is just above the US average but it has a very high college participation rate.

	Annual median household income	College participation rate grading
Delaware	\$47,438	A
US	\$41,789	C

Higher education in the state is coordinated by the Delaware Higher Education Commission, which was created in 1975 (<http://www.doe.state.de.us/high-ed/about.htm>). The Delaware General Assembly created Delaware Technical & Community College in 1966 (<http://www.dtcc.edu/about/>).

District of Columbia

The District of Columbia is located within Maryland on the mid Atlantic coast. It is unusual in having a very high proportion of African Americans who are a majority of the population and a low proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
District of Columbia	519,000	29%	61%	7%	3%	0%
US	272,690,813	72%	13%	11%	4%	1%

Median household income is just below the US average and the college participation rate is below average.

	Annual median household income	College participation rate grading
District of Columbia	\$38,005	D+
US	\$41,789	C

Georgetown University, which is ranked = 23 of national doctoral universities, is located in DC. There is no coordinating agency (<http://www.dc.gov/citizen/education.htm>).

Florida

Florida is the most south eastern part of the US, having a coast on the Atlantic near the Bahamas and Cuba, and another coast on the Gulf of Mexico. It has somewhat higher proportions of African Americans and Hispanics and therefore a lower proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Florida	15,111,244	68%	15%	15%	2%	0%
US	272,690,813	72%	13%	11%	4%	1%

Florida has a low median household income compared with the rest of the US and a low college participation rate.

	Annual median household income	College participation rate grading
Florida	\$37,305	D+
US	\$41,789	C

In 1998 Florida's education governance reorganisation transition task force abolished the Board of Regents and the State Board of Community Colleges and transferred their responsibilities to the Florida Board of Education. It also abolished the Postsecondary Education Planning Commission and transferred its responsibilities to the Council for Education Policy Research and Improvement, and established the Council for Education Policy

http://www.myflorida.com/myflorida/education/learn/egrt_taskforce/aboutTaskForce.html).

The Florida Board of Education has established a division of colleges and universities (http://www.borfl.org/univ_info/unitour.asp) but during a transition period

responsibilities are still being carried out by the old University Board of trustees (<http://www.flboe.org/trustees/trusteesLinks.asp>) and the Division of Community Colleges (<http://www.dcc.firn.edu/>).

Georgia

Georgia is on the south Atlantic coast. It has more than double the proportion of African Americans, almost one third of the proportion of Hispanics and white non Hispanics are also under represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Georgia	7,788,240	66%	29%	3%	2%	0%
US	272,690,813	72%	13%	11%	4%	1%

Georgia has the US average median household income but one of the lowest college participation rates.

	Annual median household income	College participation rate grading
Georgia	\$41,481	F
US	\$41,789	C

The University System of Georgia's Board of Regents was created in 1931 as a part of a reorganisation of Georgia's state government. The Act establishing the board unified Georgia's public higher education under a single governing and management authority. The board oversees 34 institutions: 4 research universities, 2 regional universities, 13 state universities, 2 state colleges, and 13 two-year colleges (<http://www.usg.edu/admin/regents/index.html>). The Georgia Department of Technical and Adult Education oversees the state's system of technical colleges, the adult literacy program, and a host of economic and workforce development programs. The Office of Technical Education is responsible for the administration of Georgia's technical colleges. There are 34 technical colleges, 17 satellite campuses, as well as technical programs at four university system institutions that provide a broad range of career opportunities. These schools offer a variety of associate degree and diploma programs, continuing education programs, and economic development programs (<http://www.dtae.tec.ga.us/>). Georgia's private Emory University is ranked number 18 and its public Georgia Institute of Technology is ranked = 41 of national doctoral universities.

Hawai'i

Hawai'i is in the North Pacific about 5,500 kms west of Mexico. Most of the population is Asian and Pacific Islanders.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Hawai'i	1,185,497	29%	3%	8%	64%	1%
US	272,690,813	72%	13%	11%	4%	1%

Hawai'i has higher than average income and college participation.

	Annual median household income	College participation rate grading
Hawai'i	\$45,657	B-
US	\$41,789	C

The University of Hawai'i is a post-secondary education system composed of 10 campuses throughout the 50th state, two 4-year campuses (<http://www.hawaii.gov/dbedt/edu/index.html>) and 8 University of Hawai'i Community College campuses (<http://www.hawaii.gov/dbedt/edu/index.html>).

Idaho

Idaho is a west mountain state with a border onto Canada. Its tourist tag is 'great potatoes, tasty destinations' (<http://www.visitid.org/>). The population is overwhelmingly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Idaho	1,251,700	90%	1%	7%	1%	1%
US	272,690,813	72%	13%	11%	4%	1%

Idaho has below average income and college participation.

	Annual median household income	College participation rate grading
Idaho	\$37,760	D
US	\$41,789	C

The State Board of Education and the Board of Regents of the University of Idaho is the designated policy-making body for the Boise State University, Idaho State University, Lewis-Clark State College, University of Idaho and Eastern Idaho Technical College (<http://www.sde.state.id.us/osbe/policy/SectionI.pdf>, <http://www.accessidaho.org/education/suniv.html>).

Illinois

Illinois is an east north central state on the Great Lakes. Its population closely reflects those of the US as a whole.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Illinois	12,128,370	71%	15%	11%	3%	0%
US	272,690,813	72%	13%	11%	4%	1%

Illinois has a higher than average median household income and a high college participation rate.

	Annual median household income	College participation rate grading
Illinois	\$46,649	A
US	\$41,789	C

Higher education in Illinois comprises 9 public universities, with 12 campuses; 39 community college districts, with 48 colleges; 103 independent, not-for-profit institutions; and 20 independent, proprietary institutions. This is coordinated by the Board of Higher Education which sets statewide priorities for higher education, examines the needs of the state and its citizens; approves new programs and review existing programs at all public and some private colleges and universities; administers grant programs; maintains and distributes information about Illinois higher education; and annually recommends higher education's budget to the Governor and General Assembly (<http://www.ibhe.state.il.us/Overview.htm>). The Illinois Community College Board, as the state coordinating board for community colleges, administers the Public Community College Act (<http://www.iccb.state.il.us/>). Illinois' private University of Chicago is ranked = 9 of national doctoral universities, Northwestern University is ranked =12, and the public University of Illinois – Urbana-Champaign is ranked = 36.

Indiana

Indiana is also an east north central state on the Great Lakes. It is a major manufacturer. Its population is largely white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Indiana	5,942,901	88%	8%	3%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Indiana's median household income and college participation rate are just below the US average.

	Annual median household income	College participation rate grading
Indiana	\$41,315	C-
US	\$41,789	C

The Commission for Higher Education was established in 1971 and is responsible for defining the educational missions of public colleges and universities; planning and coordinating Indiana's state-supported system of post-high school education; reviewing budget requests from public institutions and the State Student Assistance Commission; and approving public institutions' establishment of new programs and expansion of campuses (<http://www.che.state.in.us/mission.htm>). The Indiana Commission on Vocational and Technical Education has responsibility for developing, implementing, and overseeing a long-range state plan for vocational and technical education. The Commission is under the Indiana Department of Workforce Development which is the eligible agency for receipt and administration of federal vocational and technical education funds.

School corporations, area vocational schools and postsecondary institutions in Indiana comprise the public vocational and technical education system that prepares youth and adults to enter and advance in the workforce. Students are served through 47 area vocational districts, 294 school corporations with 353 high schools and seven public postsecondary institutions with 51 instructional sites (<http://www.in.gov/dwd/teched/survey/index.html>). Indiana's school to work institute is a broker of technical assistance and professional development expertise in school-to-work system building, school-based learning, work-based learning and connecting activities (<http://www.che.state.in.us/STW/index.htm>). Indiana's strongest institutions are private – the University of Notre Dame is rank 19 amongst national doctoral universities and DePauw is rank 40 and Wabash College is rank = 48 amongst liberal arts colleges.

Iowa

Iowa is a west north central state on the great plains. Its population is almost all white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Iowa	2,869,413	94%	2%	2%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Iowa's median household income is at the US average but it has higher than average college participation.

	Annual median household income	College participation rate grading
Iowa	\$41,560	B
US	\$41,789	C

Higher education in the state is coordinated by the State Board of Regents (<http://www2.state.ia.us/regents/>). Iowa has an interesting cross sectoral higher education center in De Moines (<http://www.dmhec.com/>). Iowa's private Grinnell College is ranked = 11 of liberal arts colleges.

Kansas

Kansas 'the wheat state' (<http://www.accesskansas.org/facts-history/index.html>) is on great plains, in the geographic centre of the US. White non Hispanics are over represented and all other larger racial groups are under represented by half.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Kansas	2,654,052	86%	6%	6%	2%	1%
US	272,690,813	72%	13%	11%	4%	1%

Kansas has less than the US average median household income but high college participation.

	Annual median household income	College participation rate grading
Kansas	\$38,393	A
US	\$41,789	C

The Kansas Board of Regents governs 6 state universities and supervises and coordinates 19 community colleges, 5 technical colleges, 6 technical schools and a municipal university (<http://www.kansasregents.com/students/institutions/index.html>).

Kentucky

Kentucky is in the Appalachian region in the US south east. Its population is overwhelmingly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Kentucky	3,960,825	91%	7%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Kentucky has a low median household income and college participation.

	Annual median household income	College participation rate grading
Kentucky	\$36,826	D
US	\$41,789	C

The Council on Postsecondary Education is responsible for general planning and oversight of a system that includes 8 universities and the Kentucky Community and Technical College System. Each university and the community college system has its own governing board (<http://www.cpe.state.ky.us/>). The State Board for Adult and Technical Education is responsible administering vocational education (<http://www.lrc.state.ky.us/krs/151B00/150.PDF>). The Department for Technical Education's state operated system of Kentucky TECH schools provides technical education through secondary institutions (buildings are locally owned by boards of education and the schools are state-operated by Kentucky TECH), 52 area technology centers and training programs for business and industry designed to meet a company's specific employee training needs (<http://www.state.ky.us/agencies/kytech/overview.htm>). Kentucky's private Centre College is ranked =42 of liberal arts colleges.

Louisiana

Louisiana, noted for the vitality and variety of its popular music (<http://www.state.la.us/visit.htm>), is in the south east, on the Gulf of Mexico. It has almost 3 times the US average African Americans, less than one third of the US average Hispanics and a lower than average proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Louisiana	4,372,035	64%	32%	3%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Louisiana has a very low median household income and college participation rate.

	Annual median household income	College participation rate grading
Louisiana	\$32,500	F
US	\$41,789	C

The Board of Regents plans, coordinates, and has budgetary responsibility for all public higher education (<http://webserv.regents.state.la.us/Board/const8.htm>; <http://www.regents.state.la.us/>) - the University of Louisiana System, Louisiana State University System, Southern University System and the Board of Supervisors of the Louisiana Community and Technical College System (<http://www.lctcs.state.la.us/>). Louisiana's private Tulane University is ranked = 46 of national doctoral universities.

Maine

Maine, ‘famous for its seafood and breathtaking scenery’

(<http://www.me.us/visiting/index.html>) is in New England, the north-eastern most state of the US on the Canadian border and the Atlantic coast. It is almost exclusively white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Maine	1,253,040	98%	0%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Maine has a just lower than average median household income and just higher than average college participation rate.

	Annual median household income	College participation rate grading
Maine	\$39,815	C+
US	\$41,789	C

The Board of Trustees of the University of Maine System has full legal responsibility and authority for the university system. It appoints the chancellor and each university president, approves the establishment and elimination of academic programs, confers tenure on faculty members, sets tuition rates and operating budgets, and more (<http://www.maine.edu/bot3.html>). Lower division institutions are governed by the Maine Technical College System Board of Trustees (<http://www.mtcs.net/>). Maine’s private liberal arts colleges have the highest national rankings –Bowdoin College = 5; Colby College, rank 20; and Bates College, = 22.

Maryland

Maryland is on the mid Atlantic coast. It has twice the US average of African Americans and less than US average Hispanics and white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Maryland	5,171,634	64%	28%	4%	4%	0%
US	272,690,813	72%	13%	11%	4%	1%

Maryland has the equal highest median household income and college participation.

	Annual median household income	College participation rate grading
Maryland	\$52,846	A
US	\$41,789	C

Maryland Higher Education Commission is the State of Maryland's higher education coordinating board responsible for establishing statewide policies for Maryland public and private colleges and universities and for-profit career schools. The commission also administers state financial aid programs that affect students statewide (<http://www.mhec.state.md.us/>). Public participation in policy setting is through the State Board of Education (<http://www.msde.state.md.us/stateboard/boardmembers99%2D2000.html>; <http://www.msde.state.md.us/oldmsdeweb/sco/divisions.html>). Maryland has Johns Hopkins University, a private university ranked = 16 amongst national doctoral universities.

Massachusetts

Massachusetts is in New England on the Atlantic coast. Its white non Hispanics are over represented and African Americans and Hispanics are under represented by half.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Massachusetts	6,175,169	84%	7%	6%	4%	0%
US	272,690,813	72%	13%	11%	4%	1%

Massachusetts has the US average median household income but a high college participation rate.

	Annual median household income	College participation rate grading
Massachusetts	\$41,789	A-
US	\$41,789	C

The Board of Higher Education has 4 main responsibilities: to coordinate the missions, programs, activities and budgets of the 3 segments of public higher education; to ensure that all institutions offering collegiate levels of education meet the highest possible levels of quality and receive resources necessary to support that level of quality; to ensure that the system is accessible to all residents regardless of their economic circumstances or geographical location through a vigorous financial aid program, an effective transfer compact, and active collaboration among institutions; and to ensure that systemwide and institutional policies, practices and programs foster diversity in enrolment, retention, student achievement, and institutional workforce and climate (<http://www.mass.edu/about/response.htm>).

Massachusetts' premier institutions are all private - Harvard, rank 2 of national doctoral universities; MIT, rank 5; Tufts, rank 28; Brandeis University, rank 34; and Boston University rank = 38. Amherst College is the top ranked liberal arts college; Williams College is rank 3; Wellesley College, rank 4; Smith College, rank = 14; Mount Holyoke College, = 24; and the College of the Holy Cross, rank 32.

Michigan

Michigan is on the Great Lakes in the north of the US. It has higher than the US proportion of white non Hispanics and almost a third of the national average of Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Michigan	9,863,775	81%	14%	3%	2%	1%
US	272,690,813	72%	13%	11%	4%	1%

Michigan's median household income and college participation is well above the US average.

	Annual median household income	College participation rate grading
Michigan	\$46,034	B+
US	\$41,789	C

The state has a laissez-faire relationship with its universities; state responsibilities are discharged by the Michigan State Board of Education (http://www.michigan.gov/eMI/CDA/eMI_CDA_Frame/1,1307,,00.html?frameURL=http://www.mde.state.mi.us/school/colleges/community.shtml). The public University of Michigan – Ann Arbor is ranked 25th of national doctoral universities.

Minnesota

Minnesota, the 'land of the sky blue waters' (<http://www.state.mn.us/Minnesota/index.html>) is on the great plains on the Canadian border, a west north central state. Its population is overwhelmingly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Minnesota	4,775,508	91%	3%	2%	3%	1%
US	272,690,813	72%	13%	11%	4%	1%

Minnesota has one of the highest median household incomes of the US and higher than average college participation.

	Annual median household income	College participation rate grading
Minnesota	\$50,088	B-
US	\$41,789	C

Minnesota State Colleges and Universities are a network of 34 two- year and four-year state colleges and universities. The Minnesota State Colleges and Universities network is governed by a Board of Trustees which has policy responsibility for system planning, academic programs, fiscal management, personnel, admissions requirements, tuition and fees, and rules and regulations (<http://www.mnscu.edu/Board/BoardOfTrustees.html>). The board is supported by the Higher Education Services Office (<http://www.mheso.state.mn.us/cfdocs/webdirectory/B/Welc/index.htm>). The University of Minnesota is managed by the Board of Regents of the University of Minnesota (<http://www1.umn.edu/regents/index.html>). Minnesota has the private Carlton College, which is ranked = 5 and Macalester College, which is ranked =26 amongst liberal arts colleges.

Mississippi

Mississippi is in the south on the Gulf of Mexico, an east south central state. It has three times the national average African Americans and is therefore heavily underrepresented in all the other racial groups.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Mississippi	2,768,619	62%	36%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Mississippi has a very low median household income and low college participation.

	Annual median household income	College participation rate grading
Mississippi	\$31,963	D-
US	\$41,789	C

The Mississippi Board of Trustees of Institutions of Higher Learning is the constitutional governing body of the state's public institutions of higher learning. The Board oversees degree-credit courses, research and public service activities and programs at the 8 public universities, including The University of Mississippi Medical Center, Mississippi Cooperative Extension Service, Mississippi agricultural, forestry and veterinary medicine; 10 off-campus centres, and various other locations throughout the state. All 8 universities offer master's level programs, 6 have programs at the education specialist level and 5 offer doctoral-level programs (<http://www.ihl.state.ms.us/>). Community colleges are governed by the Mississippi State Board for Community and Junior colleges (<http://www.sbcjc.cc.ms.us/>).

Missouri

Missouri ‘where the rivers run’ (<http://www.missouritourism.org/>) is in the great plains in the west north central of the US. Its over representation of white non Hispanics is balanced by under representation of Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Missouri	5,468,338	86%	11%	2%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Missouri has a median household income just above average and a college participation rate just below average.

	Annual median household income	College participation rate grading
Missouri	\$44,247	C-
US	\$41,789	C

The Missouri Coordinating Board for Higher Education appoints a commissioner of higher education to carry out the goals and administrative responsibilities for the state system of higher education, which has 13 public four-year college and university campuses, 18 public two-year campuses, 1 public two-year technical college, 25 independent colleges and universities and 120 proprietary schools (<http://www.cbhe.state.mo.us/aboutus.htm>). Missouri’s private Washington University is ranked 14 of national doctoral universities.

Montana

Montana, which ‘some national observers consider . . . a part of America’s “cultural outback”’ (http://www.discoveringmontana.com/css/discover/brief_history.asp) is a west mountain state on the Rockies on the Canadian border. It is overwhelmingly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Montana	882,779	91%	0%	2%	1%	6%
US	272,690,813	72%	13%	11%	4%	1%

Montana has a low median household income and less than average college participation rate.

	Annual median household income	College participation rate grading
Montana	\$32,553	D+
US	\$41,789	C

The government and control of the Montana university system is vested in the Board of Regents of Higher Education which the state constitution invests with full power, responsibility and authority to supervise, coordinate, manage and control the Montana university system, and to supervise and coordinate other public educational institutions including community college districts. The Board appoints a coordinator of community college districts, formulates and implements uniform policies for budgeting, record-keeping and student accounting; establishes minimum entrance requirements and approves curricular offerings for all community colleges; and directs each community college district to seek accreditation from a recognized accrediting association (<http://www.montana.edu/wochelp/borpol/bor200/2091.htm>).

Nebraska

Nebraska ‘the cornhusker state’ (<http://www.unicam.state.ne.us/bluebook/index.htm>) is on the great plains west north central of the US. White non Hispanics are heavily over represented and other groups correspondingly under represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Nebraska	1,666,028	89%	4%	5%	1%	1%
US	272,690,813	72%	13%	11%	4%	1%

Nebraska’s median household income is just below the US average but it has high college participation.

	Annual median household income	College participation rate grading
Nebraska	\$39,029	A
US	\$41,789	C

The Coordinating Commission for Postsecondary Education was created in 1990 by a constitutional amendment approved by the people of Nebraska. The Commission’s primary purposes and responsibilities are to develop a continuing comprehensive statewide plan for the operation of a coordinated system of postsecondary education; identify and recommend or implement policies to meet the state’s needs; and make the best use of available resources through the elimination of ‘unnecessary’ duplication of programs and facilities among Nebraska’s public institutions (<http://www.ccpe.state.ne.us/PublicDoc/CCPE/Default.asp>).

Nevada

Nevada ‘the silver state’ (<http://silver.state.nv.us/>) is a west mountain state. Its over representation of Hispanics is balanced by under representation of African Americans.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Nevada	1,809,253	70%	8%	17%	5%	2%
US	272,690,813	72%	13%	11%	4%	1%

Nebraska has a median household income slightly above average and a college participation rate slightly below average.

	Annual median household income	College participation rate grading
Nevada	\$43,262	D+
US	\$41,789	C

An elected Board of Regents is responsible for the governance of the institutions comprising the University and Community College System of Nevada. The Regents set policies and approve budgets for Nevada’s entire public system of higher education: 4 community colleges, 2 universities and 1 research institute (<http://www.nevada.edu/index2.html>).

New Hampshire

New Hampshire is in New England on both the Atlantic and the Canadian border. It is almost entirely white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
New Hampshire	1,201,134	96%	1%	2%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

New Hampshire has above average median household income and college participation.

	Annual median household income	College participation rate grading
New Hampshire	\$48,029	C+
US	\$41,789	C

The University System of New Hampshire was created in 1963 by incorporating its 5 separate campuses under a single Chancellor and Board of Trustees (<http://usnh.unh.edu/General/Administration.shtml>). The New Hampshire Community Technical College System administers 7 campuses, which offer more than 240 (associate) degree and certificate options (<http://www.nhctcs.tec.nh.us/>). New Hampshire's private Dartmouth College, is ranked =9 of national doctoral universities.

New Jersey

New Jersey is on the mid Atlantic coast. The larger groups are slightly over represented and white non Hispanics are slightly under represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
New Jersey	8,143,412	68%	15%	13%	6%	0%
US	272,690,813	72%	13%	11%	4%	1%

New Jersey has one of the highest median household incomes and well above average college participation.

	Annual median household income	College participation rate grading
New Jersey	\$51,739	B+
US	\$41,789	C

The Higher Education Restructuring Act of 1994 created the New Jersey Commission on Higher Education to coordinate, plan and develop policy for the state's higher education system in collaboration with the New Jersey (university) Presidents' Council. The Commission is the main advocate for an integrated system of higher education. The system includes both public and private institutions. The 31 public colleges and universities comprise Rutgers, The State University of New Jersey; the University of Medicine and Dentistry of New Jersey; the New Jersey Institute of Technology; 4 state colleges and 5 state universities; and 19 community colleges. The 25 private institutions include 14 senior colleges and universities with a public mission (<http://www.state.nj.us/highereducation/cheinfo.htm>). New Jersey's private Princeton University is ranked the top national doctoral university in the US.

New Mexico

New Mexico is in the south west on the Mexico border. Its white non Hispanic and Hispanic populations are almost in balance and it has a high proportion of American Indians.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
New Mexico	1,739,844	47%	3%	41%	2%	10%
US	272,690,813	72%	13%	11%	4%	1%

New Mexico has a low median household income but above average college participation.

	Annual median household income	College participation rate grading
New Mexico	\$34,035	B-
US	\$41,789	C

The New Mexico Commission on Higher Education's mission is to promote and coordinate high quality postsecondary education partnerships that are responsive to changing needs and serve all New Mexicans (<http://www.nmche.org/>).

New York

New York is a north east state on the mid Atlantic coast. Most minorities are over represented and consequently white non Hispanics are under represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
New York	18,196,601	65%	18%	15%	6%	0%
US	272,690,813	72%	13%	11%	4%	1%

New York has a median household income just below average and college participation just above average.

	Annual median household income	College participation rate grading
New York	\$40,822	B-
US	\$41,789	C

The New York state Office of Higher Education is a part of the State Education Department whose purpose is to assure quality and maintain accessibility in higher education and coordinate the state's higher education system which comprises 263 colleges and universities and 246 non-degree proprietary schools. There are 83 public, 145 independent and 35 proprietary degree-granting institutions. The office manages

the licensing and certification of teachers, coordinates the state's efforts to ensure standards for academic excellence and performance in higher education; implements the statutory requirements that protect the educational and financial interest of students attending New York State institutions; and administers a variety of the state's grant programs that provide access to higher education for those individuals who are underrepresented and under-served (<http://www.highered.nysed.gov/aboutus.htm>).

The New York State Higher Education Services Corporation is the state agency that helps people pay for college by administering the tuition assistance program, guaranteeing student loans, offering guidance and administering a 'highly successful' college savings program for students and families (http://www.hesc.state.ny.us/about_hesc.html). New York's private universities Columbia University is ranked 9, Cornell University = 14, New York University = 32, University of Rochester, rank 36, Yeshiva University = 41 and Rensselaer Polytechnic Institute is ranked = 48 amongst national doctoral universities. Its private Vassar College is ranked 14, Colgate University = 17, Hamilton College = 20, Barnard College = 28, Union College = 36, Bard College = 38, Sarah Lawrence College = 40 and Skidmore College is ranked 42 amongst liberal arts colleges.

North Carolina

North Carolina is in the south east on the Atlantic coast. It has a relatively high proportion of African Americans and correspondingly low proportions of Hispanics and Asian and Pacific Islanders.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
North Carolina	7,650,789	73%	22%	2%	1%	1%
US	272,690,813	72%	13%	11%	4%	1%

North Carolina's median household income and college participation rate are somewhat below the US average.

	Annual median household income	College participation rate grading
North Carolina	\$38,413	D
US	\$41,789	C

The UNC-Board of Governors is the policy-making body legally charged with 'the general determination, control, supervision, management, and governance of all affairs of the constituent institutions'" 16 campuses (<http://www.northcarolina.edu/campusesmap.cfm>). The State Board of Community Colleges was established by the 1979 General Assembly to govern the 58 community colleges and one technology center. The State Board of Community Colleges has full

authority to adopt all the policies, regulations and standards it deems necessary to operate the system and the Department of Community Colleges (http://www.ncccs.cc.nc.us/State_Board/index.html). North Carolina's private Duke University is ranked 8, Wake Forrester University = 26 and the University of North Carolina – Chapel Hill = 28 of national doctoral universities. Its Davidson College is ranked 10 amongst liberal arts colleges.

North Dakota

North Dakota is on the great plains on the Canadian border. Its small population is overwhelmingly white non Hispanic although it does have an unusually high proportion of American Indians.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
North Dakota	633,666	93%	1%	1%	1%	5%
US	272,690,813	72%	13%	11%	4%	1%

The state has a low median household income but well above average college participation.

	Annual median household income	College participation rate grading
North Dakota	\$33,769	B
US	\$41,789	C

The North Dakota State Board of Higher Education, established in 1939 by the voters of North Dakota, is the governing body for the state's 11 publicly-funded institutions which comprise the North Dakota University System (<http://www.ndus.nodak.edu/sbhe/default.asp>). The State Board for Vocational and Technical Education is responsible for administering vocational technical education in North Dakota. The State Board does not conduct vocational technical education programs. It works with public school districts, the Bureau of Indian Affairs schools, tribally controlled colleges, junior and state colleges, state universities and other agencies which conduct vocational technical education programs. The State Board's responsibilities to these various educational and other agencies includes assistance in planning, assisting curriculum development and implementation and evaluating their programs. The State Board is responsible for administering federal and state legislation and supervising federal and state funding (<http://www.state.nd.us/vte/about/1999-2004-State-Plan.pdf>, <http://www.state.nd.us/vte/about/about.html>).

Ohio

Ohio is on the Great Lakes on the Canadian border. It has a proportionate population of African Americans but one quarter the proportions of other minorities and thus a higher proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Ohio	11,256,654	86%	12%	2%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Ohio has an average annual median household income and slightly below average college participation.

	Annual median household income	College participation rate grading
Ohio	\$41,972	C-
US	\$41,789	C

The Ohio Board of Regents has a direct, non-governing relationship with all of Ohio's colleges and universities. It works with the State Board of Education through its joint council to develop a seamless primary, secondary and higher education system (http://www.regents.state.oh.us/about_us.htm). It therefore has a comprehensive articulation and transfer policy (<http://www.regents.state.oh.us/transfer/policy.html>).

Ohio's private Case Western Reserve University is ranked 38 of national doctoral universities and Oberlin College is = 22 and Kenyon College =33 of liberal arts colleges.

Oklahoma

Oklahoma is in the south west of the US. It has a very high proportion of American Indians but from half to one quarter the national proportions of other minorities and therefore a high proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Oklahoma	3,358,044	80%	8%	4%	1%	8%
US	272,690,813	72%	13%	11%	4%	1%

Oklahoma has a low median household income but average college participation.

	Annual median household income	College participation rate grading
Oklahoma	\$34,020	C
US	\$41,789	C

The Oklahoma State Regents for Higher Education is the statewide coordinating board of control for the state's 25 colleges and universities, 10 constituent agencies and two higher education programs. The State Regents prescribe academic standards of higher education, determine functions and courses of study at state colleges and universities, grant degrees, recommend to the state Legislature budget allocations for each college and university, and recommend proposed fees within limits set by the Legislature. The State Regents also manage 23 scholarships and special programs. The Regents also operate the Oklahoma Guaranteed Student Loan Program, which guarantees loans made to students by the private sector (<http://www.okhighered.org/stateregents1.html>).

The Oklahoma Department of Career and Technology Education provides leadership, resources, and assures standards of excellence for a comprehensive statewide system of career and technology education. That system offers programs and services in 29 technology center districts operating on 54 campuses, 400 comprehensive school districts, 25 skill centers and three juvenile facilities. The department is governed by the State Board of Career and Technology Education and works closely with the State Department of Education and the State Regents for Higher Education to provide a seamless educational system (<http://www.okcareertech.org/whoweare/whowe.htm>).

Oregon

Oregon 'the "Eden at the end of the Oregon Trail' (<http://www.oregon.gov/index.cfm?CurrPID=501>) is in the north west on the Pacific coast. It has a very low proportion of African Americans and half the national average Hispanic population and therefore a high proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Oregon	3,316,154	88%	2%	6%	3%	1%
US	272,690,813	72%	13%	11%	4%	1%

The state has an average annual median household income but below average college participation.

	Annual median household income	College participation rate grading
Oregon	\$41,915	D
US	\$41,789	C

The Oregon State Board of Higher Education is the statutory governing board of the 7-campus Oregon State System of Higher Education (http://www.ous.edu/state_board_home.html). The Oregon Department of Education's Office of Professional Technical Education provides leadership in coordinating professional technical instruction, academic content, and career-related learning experiences to prepare secondary (grades 9-12) and postsecondary (community college and higher education) students for further education and entrance into the workforce (<http://www.ode.state.or.us/opte/index.htm>). There is a separate apprenticeship and training division (<http://www.boli.state.or.us/apprenticeship/>). The Oregon Legislature created the State Board of Education in 1951. The Board sets educational policies and standards for Oregon's 197 public school districts, 17 community college districts and 21 educational service districts. All of these agencies have separate governing bodies responsible for transacting business within their jurisdiction (<http://www.ode.state.or.us/stateBoard/boardIntro.htm>).

Pennsylvania

Pennsylvania is in the mid east of the US. Its very low proportion of Hispanic and low proportion of Asian and Pacific Islanders are balanced by a high proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Pennsylvania	11,994,016	86%	10%	3%	2%	0%
US	272,690,813	72%	13%	11%	4%	1%

Pennsylvania has average median household income and college participation.

	Annual median household income	College participation rate grading
Pennsylvania	\$41,349	C
US	\$41,789	C

The State Board of Education is required by legislation to adopt a master plan for higher education which defines the role of each type of institution within the Commonwealth System of Higher Education, recommends enrolment levels for each institution, recommends a method of governance of the system, provide formulas for the distribution of state funds among the institutions, and otherwise provides for an orderly development of the system (<http://www.pde.psu.edu/regs/regulations.html>).

These functions are administered by the Office of Postsecondary and Higher Education in the Pennsylvania Department of Education. The department is also responsible for the approval process for the creation of new not-for-profit and for-profit or proprietary colleges, universities and seminaries within the Commonwealth, the review and approval of foreign corporations to operate colleges, universities or seminaries within

the Commonwealth and, depending upon the articles of incorporation, any changes in mission, expansion or dissolution of an institution or its branch campus. It also approves the budgets of community colleges, State-System, state related, and state-aided entities and Thaddeus Stevens College of Technology
(<http://www.pdehighered.state.pa.us/higher/cwp/view.asp?a=6&Q=41051&higherNav=3081&higherNav=19751933>).

There are 4 State-related universities which are defined 'instrumentalities of the Commonwealth' in the Commonwealth System of Higher Education. Thaddeus Stevens College of Technology is the only community college operated by the Commonwealth of Pennsylvania (<http://www.pdehighered.state.pa.us/higher/cwp/view.asp?A=6&Q=41037>). The private University of Pennsylvania is ranked =5 and Carnegie-Mellon University = 23 and the public Pennsylvania State University – University Park is ranked = 46 of national doctoral universities. Swarthmore College is ranked = 1 of liberal arts colleges, Haverford College =5, Bryn Mawr College = 17, Bucknell University rank 28, Lafayette College 33, Franklin and Marshall College = 36, Lehigh University = 38, Dickinson College = 44 and Gettysburg College is ranked = 48 of liberal arts colleges.

Rhode Island

Rhode Island is in New England on the Atlantic coast. Minorities are under represented by about half and consequently white non Hispanics are over represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Rhode Island	990,819	86%	5%	7%	2%	1%
US	272,690,813	72%	13%	11%	4%	1%

Rhode Island has higher than average median household income and the highest college participation rate grading.

	Annual median household income	College participation rate grading
Rhode Island	\$43,428	A
US	\$41,789	C

The Rhode Island Board of Governors for Higher Education is empowered to approve a systematic program of information gathering and analysis to assist in meeting the current and future educational needs of the state, approve a master plan defining broad goals and objectives for the higher education system and use these to evaluate higher education, prepare and maintain a five-year funding plan for higher education, oversee independent institutions of higher education in Rhode Island and regulate proprietary schools, and approve a budget for the three public institutions and for the Office of

Higher Education (<http://www.ribghe.org/power.htm>). The Rhode Island Office of Higher Education, which operates under the direction of the Commissioner of Higher Education, is the administrative and research arm of the Rhode Island Board of Governors for Higher Education (<http://www.ribghe.org/riohe.htm>). Rhode Island's private Brown University is ranked 16 amongst national doctoral universities.

South Carolina

South Carolina is in the south east on the Atlantic coast. It has a very high proportion of African Americans and consequently all other groups are under represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
South Carolina	3,885,736	68%	30%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

South Carolina has a low median household income and college participation.

	Annual median household income	College participation rate grading
South Carolina	\$36,671	D-
US	\$41,789	C

The South Carolina Commission on Higher Education provides information about higher education to parents and students, promotes access to higher education, reviews and approves new degree program proposals and evaluates existing academic programs, develops and maintains a process by which annual appropriation requests are based on institutional performance, administers State, regional, and federal programs affecting South Carolina higher education and maintains a Statewide planning and institutional effectiveness system (<http://www.che400.state.sc.us/web/mission.htm>).

The South Carolina State Board for Technical and Comprehensive Education operates the South Carolina Technical Education System, a statewide system which includes 16 technical colleges, a special schools unit for industry-specific training and a State Tech Board staff. The State Tech Board is responsible for the state-level development, implementation and coordination of postsecondary occupational and technical training and education (<http://www.state.sc.us/teched/stbrd.htm>). South Carolina has extensive transfer and articulation provisions (<http://www.che400.STATE.SC.US/web/academic/transfer/transfer.htm>). South Carolina's Furman College is ranked = 44 amongst liberal arts colleges.

South Dakota

South Dakota is in the great plains, somewhat north west of central US. It has a comparatively high proportion of American Indians but almost no other minorities, so white non Hispanics are heavily over represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
South Dakota	733,133	89%	1%	1%	1%	8%
US	272,690,813	72%	13%	11%	4%	1%

South Dakota has low median household income but average college participation.

	Annual median household income	College participation rate grading
South Dakota	\$35,986	C
US	\$41,789	C

The South Dakota Board of Regents has the constitutional responsibility for governing the unified system of public higher education in South Dakota, which encompasses its supervision, coordination, management, and regulation. The Board sets policy direction for the system, oversees the management of its resources (personnel, facilities, and financial), and establishes and monitors its educational program. The Board executes its authority through the adoption of policies, approval of programs, selection and evaluation of system and institutional executives, and the setting of annual budgets, tuition and fees, and legislative budget requests (<http://www.ris.sdbor.edu/policy/1-toc.htm>).

Tennessee

Tennessee is in Appalachians in the US south east. It has somewhat higher proportion of African Americans than the US average but much lower proportions of other minorities and consequently a higher proportion of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Tennessee	5,483,535	81%	17%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Tennessee has low median household income and college participation.

	Annual median household income	College participation rate grading
Tennessee	\$35,874	D-
US	\$41,789	C

The Tennessee Higher Education Commission maintains a master plan for the development of public higher education in Tennessee. The Commission coordinates two systems of higher education: the University of Tennessee institutions governed by the University of Tennessee Board of Trustees; and state universities, community colleges, technical institutes and technology centers governed by the Tennessee Board of Regents. There are currently 9 public universities, 2 special purpose institutes, 14 two-year institutions, and 26 technology centers in Tennessee (http://www.state.tn.us/thec/about_us.html#mission). Tennessee's private Vanderbilt University is ranked = 21 of national doctoral universities, and its University of the South is = 28 and Rhodes College = 44 of liberal arts colleges.

Texas

Texas is in the south west of the US, on the Gulf of Mexico and the Mexican border. It has a very high proportion of Hispanics balanced by a proportion of white non Hispanics much lower than the US average.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Texas	20,044,141	55%	12%	30%	3%	0%
US	272,690,813	72%	13%	11%	4%	1%

Texas median household income and college participation is lower than the US average.

	Annual median household income	College participation rate grading
Texas	\$39,296	D
US	\$41,789	C

The Texas Higher Education Coordinating Board was created by the Texas Legislature in 1965 to 'provide leadership and coordination for the Texas higher education system to achieve excellence for the college education of Texas students'. The Board 'reviews and recommends changes in formulas for allocation of state funds to public institutions' and 'it helps eliminate costly duplication in academic programs and un-necessary construction projects. Working with higher education institutions, the Governor, and the Legislature, the Board also ensures that all Texans have access to high quality programs at different instructional levels and administers the state's student financial aid programs.' Texas has 35 public universities and associated academic centers, three public state colleges, 50 public community college districts with multiple campuses, one public technical college system with four main campuses, and seven health-related institutions. There are also 37 independent senior colleges and universities, two

independent junior colleges, and one independent medical school in Texas (<http://www.thecb.state.tx.us/about/>). Texas' private Rice University is ranked =12 and University of Texas – Austin = 48 and the public Texas A & M University – College Station is also ranked = 48 of national doctoral universities.

Utah

Utah is west state on the Rocky Mountains. Very considerable under representation of African Americans is balanced by over representation of white non Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Utah	2,129,836	89%	1%	7%	3%	1%
US	272,690,813	72%	13%	11%	4%	1%

Utah has above average median household income but only average college participation.

	Annual median household income	College participation rate grading
Utah	\$46,539	C
US	\$41,789	C

The Utah State Board of Regents is the governing body for the Utah system of higher education to oversee the establishment of policies and procedures, executive appointments, master planning, budget and finance, proposals for legislation, develop governmental relationships, and perform administrative unit and program approval for higher education for the State of Utah. The Utah system of higher education consists of 9 public colleges and universities governed by the State Board of Regents, assisted by local Boards of Trustees. The system includes 2 major research/teaching universities, 2 metropolitan/regional universities, 1 state college, and 4 community colleges. The board of regents works in partnership with the Utah State Board of Education in providing applied technology education to those individuals who choose to pursue vocational education after high school (<http://www.utahsbr.edu/html/board.html>). Utah is the base of Western Governors University, a consortium of tertiary education institutions in 18 western states that offers post compulsory qualifications by distance education.

Vermont

Vermont 'the green mountain state' (<http://www.state.vt.us/>) is in New England on the Canadian border. Its small population is almost exclusively white non Hispanic.

	Population	White non	African American	Hispanic	Asian & Pacific	American Indian
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		Hispanic				
Vermont	593,740	98%	1%	1%	1%	0%
US	272,690,813	72%	13%	11%	4%	1%

Vermont has just below average median household income and college attendance.

	Annual median household income	College participation rate grading
Vermont	\$40,908	C-
US	\$41,789	C

Vermont's public higher education comprises the University of Vermont (<http://www.uvm.edu/>) and the Vermont State Colleges. The Vermont State Colleges were established as a public corporation in 1961 by an act of the Vermont General Assembly. This act brought together four public institutions—Castleton State College, Johnson State College, Lyndon State College and Vermont Technical College—all of which had earlier served as teachers colleges. In 1972, the Community College of Vermont also joined the Vermont State Colleges system (<http://web.vsc.edu/vsc/>). Middlebury College, a private college located in Vermont, is ranked = 7th of liberal arts colleges.

Virginia

Virginia is in the Appalachians in the south east of the US and on the Atlantic coast. Its slight over representation of African American is almost completely balanced by its under representation of Hispanics.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Virginia	6,872,912	72%	20%	4%	4%	0%
US	272,690,813	72%	13%	11%	4%	1%

Virginia has above average household income and college participation.

	Annual median household income	College participation rate grading
Virginia	\$47,701	B-
US	\$41,789	C

The State Council of Higher Education for Virginia is the Commonwealth's coordinating body for higher education and recommends to the Governor and General Assembly on capital and operating budget planning, enrolment projections, institutional technology needs, and student financial aid. Virginia's system of higher education is the 11th largest in the United States, with over 100 colleges and universities. There are 15 public four-year institutions, 23 community colleges and 1 two-year institution. There also are more than 40 private, not-for profit colleges, over a dozen private for-

profit institutions, and more than 30 out-of-state institutions operating in Virginia (<http://www.schev.edu/schevhome.html>). The State Board for Community Colleges is the governing body of the Virginia Community College System (<http://www.so.cc.va.us/>). The public University of Virginia is ranked = 21 and the public College of William and Mary is ranked = 30 of national doctoral universities and Washington Lee University is ranked 13 amongst liberal arts colleges.

Washington

Washington is the north west corner of the US on the Canadian border and Pacific coast. African Americans are one third of their representation nationally and Hispanics are somewhat under represented, but all other groups are over represented.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Washington	5,756,361	83%	4%	7%	6%	2%
US	272,690,813	72%	13%	11%	4%	1%

Washington state has above average median household income but below average college participation.

	Annual median household income	College participation rate grading
Washington	\$46,412	C-
US	\$41,789	C

The 'Higher Education Coordinating Board provides the planning, coordination, monitoring, and policy analysis for higher education in the state of Washington in cooperation and consultation with the institutions' autonomous governing boards and with all other segments of post secondary education, including the state board for community college education and the commission for vocational education' (<http://www.hecb.wa.gov/intro/background.html>). The State Board for Community and Technical Colleges coordinates a state system of community and technical colleges separate from both the public secondary schools and four-year institutions. Colleges are established by college districts, each of which is governed by a board of 5 trustees (<http://www.sbctc.ctc.edu/College/colsys.htm>). The University of Washington is ranked 45 amongst national doctoral universities and Whitman College is ranked = 38 amongst liberal arts colleges.

West Virginia

West Virginia is in the Appalachians in the south east of the US. Its population is overwhelmingly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
West Virginia	1,806,928	96%	3%	1%	0%	0%
US	272,690,813	72%	13%	11%	4%	1%

West Virginia has the lowest median household income in the US but only just below average college participation.

	Annual median household income	College participation rate grading
West Virginia	\$29,217	D+
US	\$41,789	C

The West Virginia Higher Education Policy Commission is responsible for developing, establishing, and overseeing the implementation of higher education policy. It monitors higher education institutions to ensure they are accomplishing their missions and implementing the provisions set by state statute (<http://www.hepc.wvnet.edu/>). Public universities are governed by the West Virginia University Board of Governors (http://www.nis.wvu.edu/intro/governance_information_for_west_.htm). There is a Joint Commission of Vocational-Technical-Occupational Education.

Wisconsin

Wisconsin is in the north west of the US on the great lakes. It is predominantly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Wisconsin	5,250,446	90%	6%	3%	2%	1%
US	272,690,813	72%	13%	11%	4%	1%

The state has a higher than average median household income and college participation.

	Annual median household income	College participation rate grading
Wisconsin	\$45,441	B
US	\$41,789	C

The University of Wisconsin System is governed by the Board of Regents which appoints the President of the UW System, the chancellors of the 13 universities, the chancellor of extension, the chancellor of UW Colleges and the deans of the 13 colleges. The Board also sets admission standards, reviews and approves university

budgets, and establishes the regulatory framework within which the individual units operate (<http://www.uwsa.edu/bor/index.htm>). The Wisconsin Technical College System Board is the administrative and policy centre of Wisconsin's system of technical and occupational education (<http://www.witechcolleges.com/new.htm>). The University of Wisconsin – Madison is ranked = 32 of national doctoral universities and Beloit College is = 48 and Lawrence College = 48 of liberal arts colleges.

Wyoming

Wyoming is on the Rocky Mountains in the central north of the US. Its small population is mostly white non Hispanic.

	Population	White non Hispanic	African American	Hispanic	Asian & Pacific	American Indian
Wyoming	479,602	90%	1%	6%	1%	2%
US	272,690,813	72%	13%	11%	4%	1%

Wyoming has low median household income but above average college participation.

	Annual median household income	College participation rate grading
Wyoming	\$38,291	B-
US	\$41,789	C

The University of Wyoming is the state's only provider of baccalaureate and graduate education, research, and outreach services (<http://www.uwyo.edu/>). The Community College Commission provides coordination, advocacy, and accountability of and for the Community College System (<http://commission.wcc.edu/>).

State	Coordinating body		
	4-year colleges	2-year colleges	Technical institutes
Alabama	Department of Post Secondary Education	Department of Post Secondary Education	7; Dept post secondary ed
Alaska	Alaska Commission on Postsecondary Education	Alaska Commission on Postsecondary Education	1
Arizona	Arizona Commission for Postsecondary Education	Arizona Commission for Postsecondary Education	Private only
Arkansas	Arkansas Board of Higher Education	Arkansas Board of Higher Education	State Board of Workforce Education and Career Opportunities

State	Coordinating body		
	4-year colleges	2-year colleges	Technical institutes
California	California Postsecondary Education Commission	California Postsecondary Education Commission	
Colorado	Commission on Higher Education	Commission on Higher Education	
Connecticut	Board of Governors for Higher Education	Board of Governors for Higher Education	College of Technology – pathway
District of Columbia	No agency	No agency	None
Delaware	No agency	No agency	Delaware Technical & Community College
Florida	Board of Education division of colleges and universities	Board of Education division of community colleges	
Georgia	Board of Regents of the University System of Georgia	Board of Regents of the University System of Georgia	34 technical colleges
Hawai'i	Board of Regents of the University of Hawai'i	Board of Regents of the University of Hawai'i Community Colleges	
Idaho	State Board of Education/Board of Regents of the University of Idaho	State Board of Education/Board of Regents of the University of Idaho	
Illinois	Board of Higher education	Board of Higher Education	
Indiana	Commission for Higher Education	Commission for Higher Education	Commission on Vocational and Technical Education
Iowa	State Board of Regents	State Board of Regents	
Kansas	State Board of Regents	State Board of Regents	State Board of Regents - 5 technical colleges
Kentucky	Council on Postsecondary Education	Council on Postsecondary Education	State Board for Adult and Technical Education
Louisiana	Board of Regents	Board of Regents	Board of Supervisors of the Louisiana Community and Technical College System
Maine	Board of Trustees of the University of	Maine Technical College System	Maine Technical College System

State	Coordinating body		
	4-year colleges	2-year colleges	Technical institutes
	Maine System		Board of Trustees
Maryland	Maryland Higher Education Commission	Maryland Higher Education Commission	
Massachusetts	Board of Higher Education	Board of Higher Education	
Michigan	Michigan State Board of Education and various boards of trustees, governors and regents	Michigan State Board of Education	
Minnesota	The Board of Regents of the University of Minnesota; Board of Trustees of the Minnesota State Colleges and Universities	Board of Trustees of the Minnesota State Colleges and Universities	
Mississippi	Mississippi Board of Trustees of Institutions of Higher Learning	Mississippi state Board for Community and Junior Colleges	
Missouri	Missouri Coordinating Board for Higher Education	Missouri Coordinating Board for Higher Education	
Montana	Board of Regents of Higher Education	Board of Regents of Higher Education	
Nebraska	Coordinating Commission for Postsecondary Education	Coordinating Commission for Postsecondary Education	
Nevada	Board of Regents of the University and Community College System of Nevada	Board of Regents of the University and Community College System of Nevada	
New Hampshire	Board of Trustees of the University System of New Hampshire	New Hampshire Community Technical College System	New Hampshire Community Technical College System. New Hampshire Technical Institute
New Jersey	Commission on Higher Education	Commission on Higher Education	
New Mexico	Commission on Higher Education	Commission on Higher Education	

State	Coordinating body		
	4-year colleges	2-year colleges	Technical institutes
New York	Office of Higher Education	Office of Higher Education	
North Carolina	UNC-Board of Governors	State Board of Community Colleges	
North Dakota	State Board of Higher Education	State Board for Vocational and Technical Education	State Board for Vocational and Technical Education
Ohio	Ohio Board of Regents	Ohio Board of Regents	
Oklahoma	State Regents for Higher Education	State Regents for Higher Education	State Board of Career and Technology Education
Oregon	Oregon State Board of Higher Education	State Board of Education	Office of Professional Technical Education
Pennsylvania	State Board of Education	State Board of Education	Thaddeus Stevens College of Technology, Pennsylvania Department of Education
Rhode Island	Board of Governors for Higher Education	Board of Governors for Higher Education	
South Carolina	Commission on Higher Education	Commission on Higher Education	State Board for Technical and Comprehensive Education
South Dakota	Board of Regents	Board of Regents	
Tennessee	University of Tennessee Board of Trustees	Tennessee Board of Regents	Tennessee Board of Regents
Texas	Texas Higher Education Coordinating Board	Texas Higher Education Coordinating Board	State Technical College System
Utah	State Board of Regents	State Board of Regents	State Board of Regents
Vermont	The Board of Trustees of the University of Vermont and State Agricultural College	The Board of Trustees of the Vermont State Colleges	Vermont Technical College
Virginia	State Council of Higher Education for Virginia	State Board for Community Colleges	
Washington	Higher Education Coordinating Board	State Board for Community and	State Board for Community and

State	Coordinating body		
	4-year colleges	2-year colleges	Technical institutes
		Technical Colleges	Technical Colleges
West Virginia	West Virginia Higher Education Policy Commission	West Virginia Higher Education Policy Commission	Joint Commission of Vocational-Technical-Occupational Education
Wisconsin	Board of Regents	Wisconsin Technical College System Board	Wisconsin Technical College System Board
Wyoming	University of Wyoming Board of Trustees	Community College Commission	

References

- ABBOTT, MALCOLM & DOUCOULIAGOS CHRIS (1999) 'Economies of scale and the amalgamation of technical and further education institutions in Victoria', *Australia and New Zealand Journal of Vocational Education Research*, vol 7 no 1, pp 1 – 24.
- ADAMS, JONATHAN & SMITH, DAVID (2004) *Research and regions: An overview of the distribution of research in UK regions, regional research capacity and links between strategic research partners*, Higher Education Policy Institute, Oxford, <http://www.hepi.ac.uk/downloads/9%20Research%20and%20Regions%20Report.pdf>
- ALEXANDER, T (1998) *From higher to tertiary education: directions for change in OECD countries*, OECD, Paris, cited in Grubb, Norton W (2003) *The roles of tertiary colleges and institutes: trade-offs in restructuring postsecondary education*, manuscript prepared for the OECD, Directorate of Education, Education and Training Policy Division supplied by the author.
- ALFRED, RICHARD L & PETERSON, RUSSELL, O (1990) 'The path to college success is not a one-way street', *AACJC*, Jun/Jul, pp 26-30.
- ALKIN, M C & HENDRIX, V L (1967) 'Input-output relationships in a sample of California public junior colleges', Center for the Study of Evaluation of Instructional Programs, University of California, Los Angeles (ERIC Document Reproduction Service No. ED 014 989), cited in Higgins & Katsinas (1999).
- ALTBACH, PHILIP G, ARNOVE, ROBERT F & KELLY, GAIL P (1982) 'Approaches and perspectives' in Altbach, Philip G, Arno, Robert F & Kelly, Gail P (eds) (1982) *Comparative education*, Macmillan Publishing Co, New York.
- ANDERSON, C ARNOLD (1961) 'Methodology of comparative education', *International review of education*, vol VII, no 1, pp 1-22.
- ANDERSON, DAMON (1998) 'Chameleon or phoenix: the metamorphosis of TAFE', *Australia and New Zealand Journal of Vocational Education Research*, 6 (2), pp 1-43.
- ANDERSON, DON & JOHNSON, RICHARD (1998) *University autonomy in twenty countries*, Department of Employment, Education, Training and Youth Affairs Higher Education Division Evaluations and Investigations Program report 98/3, <http://www.detya.gov.au/archive/highered/eippubs/eip98-3/execsum.htm>, downloaded 9.9.01.
- ARISTOTLE, *Metaphysics*, Ross, W D (trns), book A, ch 1, 981b, book a, ch 1, 993b, 2nd edition 1928, Clarendon Press, Oxford.
- ARISTOTLE, *Nichomachean Ethics*, book VI, 3 The qualities by which truth is obtained, 1139b-1141a, Ostwald, Martin (trns), the Bobbs-Merrill Company, Indianapolis, p 150.

- ARISTOTLE, *The Politics*, Sinclair, T A (trns), Saunders, Trevor J (revised) (1992), book VIII, Penguin Books, London.
- ASHBY, ERIC (1974) *Adapting universities to a technological society*, Jossey-Bass Publishers, San Francisco.
- ASHTON, DAVID N, MAGUIRE, MALCOLM J & SUNG, JOHNNY (1991) 'Institutional structures and the provision of intermediate level skills: lessons from Canada and Hong Kong' in Ryan, Paul (ed) *International comparisons of vocational education and training for intermediate skills*, The Falmer Press, London, pp 233-45.
- ASSOCIATION OF INDEPENDENT CALIFORNIA COLLEGES & UNIVERSITIES (2001) *AICCU at a glance* <http://www.aiccu.edu/Guidebook/GeneralInfo/ataGlance.html>, downloaded June 2001.
- AUDI, ROBERT (ed) (2002) 'Metaphysics', *The Cambridge dictionary of philosophy*, 2nd ed, Cambridge University Press, Cambridge, UK.
- AUDRETSCH, DAVID B & THURIK, A ROY (2001) *What's new about the new economy? Sources of growth in the managed and entrepreneurial economies*, Indiana University, Bloomington, <http://www.spea.indiana.edu/ids/pdfholder/ISSN-01-1.pdf>
- AURARIA HIGHER EDUCATION CENTER (2003) *Auraria higher education center*, <http://www.ahec.edu/>.
- AUSTRALIAN BUREAU OF STATISTICS (ABS) (2001a) 'Explanatory notes' in *Education and work, Australia 2001* (cat. no. 6227.0), <http://www.abs.gov.au/Ausstats/abs@.nsf/0/D1363A756A115AC3CA256D7100009842?Open>
- AUSTRALIAN BUREAU OF STATISTICS (2001b) *Australia now. Population distribution*, <http://www.abs.gov.au/ausstats/ABS%40.nsf/94713ad445ff1425ca25682000192af2/b30884dddec785fca2569de002139d0!OpenDocument>
- AUSTRALIAN BUREAU OF STATISTICS (2002a) *2001 education and training experience*, Australian Bureau of Statistics cat 6278.0, Canberra, <http://www.ausstats.abs.gov.au>
- AUSTRALIAN BUREAU OF STATISTICS (2002b) *Basic community profile*, catalogue no. 2001.0, table B11.
- AUSTRALIAN BUREAU OF STATISTICS (2003) *Population projections Australia 2002–2101*, ABS Catalogue No. 3222.0, <http://www.abs.gov.au/ausstats/abs@.nsf/7884593a92027766ca2568b5007b8617/f44350d6db1bc2baca256889002853de!OpenDocument>
- AUSTRALIAN COMMITTEE ON TECHNICAL AND FURTHER EDUCATION (ACOTAFE) (1975) *TAFE in Australia*. Second report on needs in technical and further education, Australian Government Publishing Service, Canberra.
- AUSTRALIAN EDUCATION UNION (2002) *Submission to Department of Education Science and Training higher education review from the Australian Education Union*, <http://www.detya.gov.au/crossroads/submissions/pdf/48.pdf>.
- AUSTRALIAN NATIONAL TRAINING AUTHORITY (1997) *1996/7 Annual performance report*, ANTA, Brisbane, <http://www.anta.gov.au>.
- AUSTRALIAN NATIONAL TRAINING AUTHORITY (2001) *National training framework*, <http://www.anta.gov.au/dapTraining.asp>, downloaded 9.9.01.

- AUSTRALIAN NATIONAL TRAINING AUTHORITY (ANTA) (2002a) 'Higher education at the crossroads - a submission to the review of Australia's higher education system' <http://www.detya.gov.au/crossroads/submissions/pdf/289.pdf>.
- AUSTRALIAN NATIONAL TRAINING AUTHORITY (2002b) 'Response to the Commonwealth Department of Education, Science and Training discussion paper varieties of learning – the interface between higher education and vocational education and training', http://www.detya.gov.au/crossroads/issues_sub/pdf/i274.pdf.
- AUSTRALIAN NATIONAL TRAINING AUTHORITY (ANTA) (2003a) *VET - what is it?*, <http://www.anta.gov.au/vetWhat.asp>.
- AUSTRALIAN NATIONAL TRAINING AUTHORITY (ANTA) (2003b) *Shaping our future: creating the national strategy for vocational education and training 2004 – 2010, a discussion starter for the next national strategy for vocational education and training 2004-2010*, http://www.anta.gov.au/images/publications/National_strategy-discussion_starter.pdf.
- AUSTRALIAN NATIONAL TRAINING AUTHORITY (ANTA) (2003c) *Innovation through partnerships*, http://www.anta.gov.au/images/publications/Innovation_ideas_action.pdf.
- AUSTRALIAN NATIONAL UNIVERSITY (2002) *Submission in response to the ministerial discussion paper 'Higher education at the crossroads'*, submission 323, <http://www.backingaustraliasfuture.gov.au/submissions/crossroads/pdf/323.pdf>
- AUSTRALIAN QUALIFICATIONS FRAMEWORK ADVISORY BOARD (AQFAB) (2001) *Twelve AQF qualifications* <http://www.aqf.edu.au/twelve.htm>.
- AUSTRALIAN QUALIFICATIONS FRAMEWORK ADVISORY BOARD TO MCEETYA (2002) *Australian qualifications framework: implementation handbook*, www.aqf.edu.au.
- AUSTRALIAN VICE-CHANCELLORS' COMMITTEE (AVCC) (no date, 2001?) *AVCC policy guidelines on cross-sector qualification linkages*, AVCC, Canberra, http://www.avcc.edu.au/students/credit_transfer/AVCC%20Guidelines%20Final%20for%20Web%20May%202001.doc.
- AUSTRALIAN VICE-CHANCELLORS' COMMITTEE (2002) 'Forward from the crossroads: pathways to effective and diverse Australian universities', *the AVCC submission to the higher education review*, <http://www.detya.gov.au/crossroads/issues4.htm>.
- AUSTRALIAN VICE-CHANCELLORS' COMMITTEE (AVCC) (2003) *AVCC national TAFE-university credit transfer schemes*, AVCC, Canberra, http://www.avcc.edu.au/students/credit_transfer/acts.htm.
- BAINES, CORAL (2000) *Multifunction Polis : lost city of opportunity*, http://www.asto.com.au/News00/MFP_postmortem.htm, accessed 11 August 2003.
- BALAGUER, A, BRYANT, K, DALITZ, R, HOLMEN, M, JONES, A J , MATTHEWS, J, SCOTT-KEMMIS, D (2003) *Innovation systems in Australia*, ANU, Canberra, http://ngsm.anu.edu.au/research/working_%20paper_%205.doc
- BALLAGH, A, LING, H & STEWART, J (1999) 'Seamlessness at RMIT: steps towards a learning university', LifeLong Learning Network 1st National Conference, *Post-Compulsory Education and Training: Looking to the Future*, 27 August 1999, University of Canberra, <http://LLLNetwork.canberra.edu.au/lll/publications.asp>.

- BANKS, D L (1992) 'Environmental factors influencing the community college transfer function', (doctoral dissertation, University of California, Los Angeles), *Dissertation Abstracts International*, 52, 4196, cited in Higgins & Katsinas (1999).
- BANKS, OLIVE (1955) *Parity and prestige in English secondary education*, Routledge & Kegan Paul, London.
- BARLOW, MELVIN L (1965) 'The challenge to vocational education' in Barlow, Melvin L (ed) *64th yearbook of the National Society for the Study of Vocational Education*, University of Chicago Press, Chicago, pp 1-18.
- BARTELS, LYN (2004) 'Accord seen on tuition increase, *Rocky Mountain News*, 8 December, BASTEDO, MICHAEL N & GUMPORT, PATRICIA J (2003) 'Access to what? Mission differentiation and academic stratification in U.S. public higher education', *Higher Education* **46**: 341-359.
- BATROUNEY, T J (1985) 'The national co-ordination of technical and further education', PhD thesis, Monash University.
- BENNETT, CHARLES A (1926) *History of manual and industrial education up to 1870*, Chas A Bennett Co, Illinois.
- BENNETT, CHARLES A (1937) *History of manual and industrial education 1870 to 1917*, Chas A Bennett Co, Illinois.
- BEREDAY, G Z F (1964) *Comparative method in education*, New York.
- BERG, MAXINE (1993) 'Small producer capitalism in eighteenth-century England', *Business History* volume 35 number 1 (January), pp17-40.
- BERG, MAXINE (1999) *The Age of manufactures, 1700-1820: industry, innovation and work in Britain*, 2nd ed, Routledge, London.
- BERMAN, P & WEILER, D (1990) 'Enhancing transfer effectiveness: a model for the 1990s', American Association of Community and Junior Colleges and the National Effective Transfer Consortium, Washington, DC, cited in Higgins & Katsinas (1999).
- BLISS, IAN & GARBETT (1990) 'Learning lessons from abroad' in Summerfield & Evans (eds) *Technical education and the state since 1850: historical and contemporary perspectives*, Manchester University Press, Manchester, pp 189-216.
- BLUNDEN, RALPH (1995) 'Practical intelligence and the metaphysics of competence', *Australian and New Zealand Journal of Vocational Education Research*, 3(2).
- BOURDIEU, PIERRE (1988) [1984 first published] *Homo academicus*, Basil Blackwell Ltd, Oxford.
- BRADBURN, ELLEN M & HURST, AND DAVID G (2001) 'Community college transfer rates to 4-year institutions using alternative definitions of transfer', *Education Statistics Quarterly*, volume 3, issue 3 (Fall 2001), <http://nces.ed.gov/pubs2002/quarterly/fall/q7-1.asp>.
- BRITISH COUNCIL (2003) *Education@UK*, <http://www.educationuk.org/>.
- BROADFOOT, PATRICIA (2000) 'Comparative education for the 21st century: retrospect and prospect', *Comparative Education*, volume 36 no 3, pp 357-371.
- BRUBACHER, JOHN S (1978) *On the philosophy of higher education*, Jossey-Bass Publishers, San Francisco.

- BRYANT, ALYSSA (2001) 'Eric review: community college students: recent findings and trends', *Community College Review*, Winter 2001 v29 i3 p77(18).
- BUREAU OF ECONOMIC ANALYSIS, US Department of Commerce (2001) <http://www.bea.doc.gov/bea/regional/gsp/>, downloaded 22.7.2001.
- BURGESS, T (1986) *New technology and skills in British industry*, MSC Skills series no. 1, Manpower Services Commission, Sheffield; quoted in Ainley, Pat (1993) *Class and skill: changing divisions of knowledge and labour*, Cassell Educational Ltd, London, at p 20.
- BURTCH, BRIAN (2002) 'Review of further education/higher education links in Canada', in Osborne, Mike, Gallacher, Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning Department*, <http://www.scotland.gov.uk/Resource/Doc/1043/0003992.pdf>, pp 48-59.
- BUTLIN, G (2000) 'Determinants of university and community college leaving', *Education Quarterly Review* 6, 4, 8-23.
- CALIFORNIA (2001) *Constitution*, http://www.leginfo.ca.gov/.const/.article_9, downloaded 4.8.2001.
- CALIFORNIA LEGISLATIVE COUNSEL (2001) *California education code*, title 3 post secondary education division, chapter 9.2 student transfer, <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=edc&group=66001-67000&file=66730-66743>, downloaded 7.10.01.
- CALIFORNIA OCCUPATIONAL INFORMATION COORDINATING COMMITTEE (2001) *California training & education providers database*, downloaded 10.8.01.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (1998) *Factsheet 98-1, composition of higher education in California* <http://www.cpec.ca.gov/FactSheets/FactSheet1998/fs98-1.asp>.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2000a) *Performance indicators of California higher education, 2000*, Commission report 01 – 3, <http://www.cpec.ca.gov/completereports/2001reports/01-03.pdf>, downloaded 11.8.01.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2000b) *The condition of higher education in California, 2000. A report on higher education in California for the year 2000*, <http://www.cpec.ca.gov/CompleteReports/ConditionHigherEd/cpec2000.pdf>, downloaded 11.8.01.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (CPEC) (2001) *About the Commission* <http://www.cpec.ca.gov/SecondPages/AboutCPEC.ASP>, downloaded 5.8.2001.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2002a) *The California Postsecondary Education Commission's public agenda: priorities for action*, commission report 02 – 5, <http://www.cpec.ca.gov/completereports/2002reports/02-05.pdf>.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2002b) *Student transfer in California postsecondary education*, commission report 02-3, <http://www.cpec.ca.gov/completereports/2002reports/02-03.pdf>.

- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2003a) *A regional study of undergraduate enrollment demand and capacity for the University of California*, Commission report 03 – 06,
<http://www.cpec.ca.gov/CompleteReports/2003Reports/03-06.pdf>.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2003b), *Bills & summaries*,
<http://www.cpec.ca.gov/BillTrack/BillTrack.asp>.
- CALIFORNIA POSTSECONDARY EDUCATION COMMISSION (2004) *Recommendations on higher education policies contained in the Governor's proposed 2004-05 State budget*, <http://www.cpec.ca.gov/BillTrack/BudgetMatrix.pdf>
- CALIFORNIA STATE UNIVERSITY (CSU) (2001) *Historic milestones*,
<http://www.calstate.edu/PA/info/milestones.shtml>, downloaded 4.8.2001.
- CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS (2003) *About CSU Channel Islands*,
<http://www.csuci.edu/aboutus.htm>.
- CALLAN, PATRICK M (2000) Introduction in NATIONAL CENTER FOR PUBLIC POLICY AND HIGHER EDUCATION (2000) *Measuring up 2000: the State-by-State report card for higher education*, <http://measuringup2000.highereducation.org/Introduction.cfm>.
- CALLAN, PATRICK M (2004) 'Preface' in Hayward, Gerald C, Jones, Dennis P, McGuinness, Aims C Jr & Timar, Allene (2004), *Ensuring access with quality to California's community colleges*, report #04-3, National Center for Public Policy and Higher Education, San Jose, California,
<http://www.highereducation.org/reports/hewlett/Hewlett3.pdf>
- CAMPBELL, GORDON (1974) 'Community colleges in Canada', in Konrad, Abram G (ed) *Clientele and Community. The student in the Canadian community college*, A yearbook of the Canadian Community Colleges.
- CANBERRA INSTITUTE OF TECHNOLOGY (2002) *Higher education at the crossroads*,
<http://www.detya.gov.au/crossroads/submissions/pdf/264.pdf>.
- CANTOR, LEONARD (1989a) 'The "re-visioning" of vocational education in the American high school', *Comparative Education*, volume 25 no 2, pp 125-132.
- CANTOR, LEONARD M (1989b) *Vocational education and training in the developed world: a comparative study*, Routledge, London.
- CANTOR, L M (1992) 'Technical and further education' in Clark, Burton R & Neave, Guy R (eds) *The encyclopedia of higher education*, Pergamon Press, Oxford, pp 1240 – 1245.
- CANTOR, LEONARD, ROBERTS, IOLO & PRATLEY, BERYL (1995) *A guide to further education in England and Wales*, Cassell, London.
- CARLAN, PHILIP E & BYXBE, FERRIS R (2000) 'Community colleges under the microscope: an analysis of performance predictors for native and transfer students', *Community College Review*, Fall 2000 v28 i2 p27.
- CARMICHAEL, LAURIE (1992) *The Australian vocational certificate training system* (Carmichael report), Employment and Skills Formation Council, National Board of Employment, Education and Training, Canberra.

- CARNEGIE, JANE (2000) *Pathways to partnerships*, Report and draft policy guidelines, ANTA/AVCC,
<http://www.avcc.edu.au/students/credit%5Ftransfer/final%5Freport.htm>.
- CENTRAL INTELLIGENCE AGENCY (CIA) (2003) *The world factbook 2002*,
<http://www.cia.gov/cia/publications/factbook/geos/uk.html#Intro>, page last updated on 19 March 2003, downloaded 13.6.03.
- CHAPPELL, CLIVE (1999) 'Issues of teacher identity in a restructuring VET system', *working paper 99.31*, Research Centre for Vocational Education & Training, University of Technology, Sydney,
<http://www.uts.edu.au/fac/edu/rcvet/working%20papers/9942Chappell.pdf>.
- CLARK, BURTON R (1960) *The open door college: a case study*, McGraw-Hill Book Company, New York.
- CLARK, BURTON (1973) 'Some comments on the Grenoble meeting', in OECD *Short-cycle higher education: a search for identity*, OECD, Paris, 389-392.
- CLARK, BURTON R (1983) *The higher education system: academic organization in cross-national perspective*, University of California Press, Berkeley.
- CLARK, B R (1990), 'Is California the model for OECD futures?', paper presented at the OECD seminar, Berkeley.
- COALITION (2004a) 'Institute for trade skill excellence', *The Howard government election 2004 policy*, http://www.liberal.org.au/2004_policy/ACFABF1.pdf
- COALITION (2004b) 'Australian technical colleges', *The Howard government election 2004 policy*,
http://www.liberal.org.au/2004_policy/Sept26_Australian_Technical_Colleges.pdf
- COBBAN, ALAN B (1975) *The medieval universities: their development and organisation*, London, Methuen & Co.
- COHEN, ARTHUR M (1992) 'Calculating transfer rates', *AACJC Journal*, Feb/Mar, pp 32-35.
- COHEN, A M & BRAWER, F B (1996) *The American Community College* (3rd Edition) Jossey-Bass, San Francisco.
- COLEY, RICHARD J (2000) *The [north] American community college turns 100: a look at its students, programs and prospects*, Educational Testing Service, Princeton,
www.ets.org/research/pic.
- COLLEGE OPPORTUNITY FUND (2004) *What is the college opportunity fund?*
<https://cof.college-access.net/cofapp/WhatIsCof.jsp>
- COLORADO COMMISSION ON HIGHER EDUCATION (1995) *Scorecard on Colorado public higher education*,
<http://www.colorado.edu/libraries/govpubs/colonumb/scorecard/comments.htm#SG>, downloaded 22.7.01.
- COLORADO COMMISSION ON HIGHER EDUCATION (2000a) *Master plan*,
<http://www.state.co.us/cche/mastipln.html>, last modified 5.9.2000, downloaded 10.8.01.

- COLORADO COMMISSION ON HIGHER EDUCATION (2000b) *Higher education 2000. Past, Present, and Future. House Bill 99-1289, Report 1*, http://www.state.co.us/cche_dir/hb1289/12899.html, downloaded 7 Feb 02.
- COLORADO COMMISSION ON HIGHER EDUCATION (2001a) *Transfer*, <http://www.state.co.us/cche/conguide/2001/index.html>.
- COLORADO COMMISSION ON HIGHER EDUCATION (2001b) *General education*, <http://www.state.co.us/cche/gened/overview.pdf>.
- COLORADO COMMISSION ON HIGHER EDUCATION (2002) *Blue ribbon panel role and mission recommendations*, <http://www.state.co.us/cche/blueribbon/recommrept.pdf>.
- COLORADO COMMISSION ON HIGHER EDUCATION (2003a) *Admissions standards*, <http://www.state.co.us/cche/policy/newpolicies/i-partf.pdf>
- COLORADO COMMISSION ON HIGHER EDUCATION (2003b) *General education*, <http://www.state.co.us/cche/gened/overview.pdf>
- COLORADO COMMISSION ON HIGHER EDUCATION (2004) 'State raises performance bar on Colorado's colleges and universities' *Press release*, <http://www.state.co.us/cche/cof/contract/pressrelease.pdf>
- COLORADO DEMOGRAPHY SECTION (2000) *Census of population*, <http://www.dlg.oem2.state.co.us/demog/Census/2kPop.htm>, downloaded 21.7.01.
- COLORADO DEPARTMENT OF LOCAL AFFAIRS (2001) *Smart growth: Colorado's future*, <http://www.state.co.us/smartgrowth/oppty2.html>, downloaded 21.7.01.
- COLORADO DEPARTMENT OF HIGHER EDUCATION (2004a) *Request for information*, <http://www.state.co.us/cche/cof/cofrfi.pdf>
- COLORADO DEPARTMENT OF HIGHER EDUCATION (2004b) *Notification of awards*, <http://www.state.co.us/cche/cof/awards.html>
- COLORADO STATE ARCHIVES (2001) *Geography page*, <http://www.archives.state.co.us/arcgeog.html>, downloaded 21.7.01.
- COLORADO TECHNICAL UNIVERSITY (2001) *Academic programs*, http://www.colotechu.edu/main/academic_frame.htm, downloaded 11.8.01.
- COMMONWEALTH OF AUSTRALIA – Department of Foreign Affairs and Trade (2000) *Australia and the world*, http://www.dfat.gov.au/aib2000/part_1/d.html, downloaded 9.9.01.
- COMMONWEALTH OF AUSTRALIA (2001) *Backing Australia's ability - an innovation action plan for the future*, http://backingaus.innovation.gov.au/statement/pm_speech.htm.
- COMMONWEALTH OF AUSTRALIA (2003) *Our universities: backing Australia's future*, <http://www.backingaustraliasfuture.gov.au/policy.htm>.
- COMMONWEALTH OF AUSTRALIA, ERNST & YOUNG AND FREEHILLS (2001) *Australian Biotechnology Report 2001*, http://www.biotechnology.gov.au/library/content_library/BA_BiotechnologyReport2001a.pdf.

- COMMONWEALTH TERTIARY EDUCATION COMMISSION (CTEC) (1986) *Review of efficiency and effectiveness in higher education: report of the committee of inquiry*, AGPS: Canberra.
- COMMUNITY COLLEGE SURVEY OF STUDENT ENGAGEMENT (2004) *Engagement by design: 2004 findings*, http://www.ccsse.org/publications/CCSSE_reportfinal2004.pdf
- COMTE, AUGUSTE in Lenzer, Gertrud (1975) (ed) *Auguste Comte and positivism: the essential writings*, Harper & Row, New York, 1st published in 1842 as *Cours de philosophie positive*.
- CONANT, JAMES B (1959) *The American high school today*, MacGraw-Hill Book Company, New York.
- CONNELL, R W & IRVING, T H (1980) *Class structure in Australian history: documents, narrative and argument*, Longman Cheshire, Melbourne.
- CORNFORD, IAN R (1998) 'Schooling and vocational preparation: is a revolution really taking place?', *Australian Journal of Education*, vol 42, no 2, 169-182.
- COTGROVE, STEPHEN F (1958) *Technical education and social change*, George Allen & Unwin, London.
- COUTURIER, LARA K (2003), 'Balancing State control with society's needs', *The Chronicle of Higher Education*, volume 49, issue 42, page B20.
- CU-BOULDER (2001) *Academic profile - new freshmen by college*, <http://www.colorado.edu/admissions/profile.html>.
- CULPEPPER, PEPPER D (2001) 'Employers, public policy, and the politics of decentralised cooperation in Germany and France', in HALL, PETER A & SOSKICE, DAVID (eds) *Varieties of capitalism: the institutional foundations of comparative advantage*, Oxford University Press, Oxford, pp 275-306.
- CUMMINS, GAIL, RUTTEN, BERNIE & WAGSTAFF, DERRIC (1999) *Movement of students from tafe to university: a data analysis*, National Centre for Vocation Education Research, Leabrook.
- CUNNINGHAM, STUART & HARTLEY, JOHN (2001) 'Creative industries—from Blue Poles to fat pipes', paper presented to the National Humanities and Social Sciences Summit—2001, Canberra, <http://www.detya.gov.au/highered/respubs/humanities/summit701.pdf>.
- CURTIN, DAVE (2005) 'Tuition tied to colleges' costs, *Denver Post*, 6 January, <http://www.denverpost.com/Stories/0,1413,36~53~2635188,00.html>
- DALLAS MORNING NEWS (1999) *The 2000-2001 Texas Almanac*, <http://www.texasalmanac.com/>, downloaded 17.9.01.
- DAVIS, GRAY (2000) *Opening wide the doors to college*, http://www.governor.ca.gov/state/govsite/gov_htmldisplay.jsp?BV_SessionID=@@&BV_EngineID=iallikijhifbemfcfkmchcgi.0&iOID=13965&sFilePath=%2fgovsite%2fissues%2feducation_opening_wide.html&sTitle=OPENING+WIDE+THE+DOORS+TO+COLLEGE&sCatTitle=Issues&sSubCat=EDUCATION, downloaded 5.8.2001.
- DAVIS, SUSAN (1989) *The Martin Committee and the binary policy of higher education in Australia*, Ashwood House, Melbourne.

- DAWKINS, THE HON J S, MP (1988) *Higher education: a policy statement* ('the White Paper') Australian Government Publishing Service, Canberra.
- DEARING, RON (1997) (chair) *Higher education in the learning society*, report of the National Committee of Inquiry into Higher Education, <http://www.leeds.ac.uk/educol/ncihe/>
- DE LOS SANTOS, ALFREDO G JR & WRIGHT, IRENE (1990) 'Maricopa's swirling students: earning one third of Arizona State's bachelor's degrees', *AACJC Journal*, Jun/Jul, pp 32-4.
- DEISSINGER, THOMAS (2005) 'Links between vocational education and training (VET) and higher education: the case of Germany', in Gallacher, Jim & Osborne, Michael (eds) *A contested landscape*, National Institute of Adult Continuing Education, Leicester (expected publication June 2005), pp 92-116.
- DELORS, JACQUES, ET AL (1996) *Learning: the treasure within*, Report to UNESCO of the International Commission on Education for the Twenty-first Century, UNESCO Publishing, Paris, Internet: <http://www.unesco.org>
- DENNISON, JOHN D & GALLAGHER, PAUL (1986) *Canada's community colleges: a critical analysis*, University of British Columbia Press, Vancouver.
- DEPARTMENT OF CONSUMER AFFAIRS (2001) *Licensee information*, <http://www.dca.ca.gov/aboutdca/licnhelp.htm>, downloaded 10.8.01.
- DEPARTMENT OF EDUCATION, SCIENCE AND TRAINING (DEST) (2002a) *Higher education student statistics, 2001*, <http://www.detya.gov.au/highered/statistics/students/01/tables/'2001table15'!A3>.
- DEPARTMENT OF EDUCATION, SCIENCE AND TRAINING (DEST) (2002b) *Varieties of learning: the interface between higher education and vocational education and training*, www.dest.gov.au/crossroads.
- DEPARTMENT OF EDUCATION, SCIENCE AND TRAINING (DEST) (2003) *Higher education student statistics, 2002*, <http://www.detya.gov.au/highered/statistics/students>.
- DEPARTMENT OF EDUCATION, SCIENCE AND TRAINING (2005) *Higher education reform implementation - higher education information management system*, [http://www.dest.gov.au/sectors/higher_education/policy_issues_reviews/key_issues/higher_education_reform/higher_education_information_management_system.htm#Commonwealth%20Higher%20Education%20Student%20Support%20Number%20\(CHSSN\)](http://www.dest.gov.au/sectors/higher_education/policy_issues_reviews/key_issues/higher_education_reform/higher_education_information_management_system.htm#Commonwealth%20Higher%20Education%20Student%20Support%20Number%20(CHSSN))
- DEPARTMENT OF EMPLOYMENT, EDUCATION AND TRAINING (DEET) (1993a) *National report on Australia's higher education sector* ('the blue book') Australian Government Publishing Service, Canberra.
- DEPARTMENT OF EDUCATION, SCIENCE AND TRAINING (2003b) *Higher education report for the 2003 to 2005 triennium*, http://www.detya.gov.au/highered/he_report/2003_2005/default.htm.
- DEPARTMENT OF EMPLOYMENT, EDUCATION, TRAINING AND YOUTH AFFAIRS (DEETYA) (1996) *Higher education students time series tables*, Australian Government Publishing Service, Canberra, <http://www.detya.gov.au/highered/statistics/timeseries/'TBL 1'!B1>.

- DEPARTMENT OF EDUCATION, TRAINING AND YOUTH AFFAIRS (DETYA) (1998) *Selected higher education student statistics, 1998*, <http://www.detya.gov.au/highered/statistics/students/student98shes.pdf>.
- DEPARTMENT OF EDUCATION, TRAINING AND YOUTH AFFAIRS (2001) *Students 2000: selected higher education statistics*, <http://www.detya.gov.au/highered/statistics/tables/students2000.htm>, page last updated on 15 August 2001, downloaded 9.9.01.
- DEPARTMENT OF INDUSTRY, SCIENCE AND RESOURCES (1999) *Shaping Australia's future innovation – framework paper*, http://www.industry.gov.au/library/content_library/Shaping.pdf.
- (COLORADO) DEPARTMENT OF REGULATORY AGENCIES (DORA) (2001) *Occupational and professional licensing* <http://www.dora.state.co.us/professional.htm>, downloaded 11.8.01.
- DEWEY, JOHN (1916) *Democracy and education: an introduction to the philosophy of education*, The Free Press, New York.
- DOUGHERTY, K (1994) *The contradictory college: The conflicting origins, impacts, and futures of the community college*, SUNY Press, Albany.
- DOUGHNEY (now WHEELAHAN), LEESA (2000a) 'Lifelong learning and student data collection in Australia', 9th Annual Vocational Education & Training Research Conference, Coffs Harbour, 4 July.
- DOUGHNEY (NOW WHEELAHAN), L (2000b) *Bridging the divide: developing the institutional structures that most effectively deliver cross-sectoral education and training*, NCVER, Adelaide, <http://www.ncver.edu.au>.
- DOUGHNEY (NOW WHEELAHAN), LEESA (2000c) 'Universal tertiary education: how dual-sector universities can challenge the binary divide between TAFE and higher education' in *Journal of Higher Education Policy Management*, vol 22, no 1, pp 59-72.
- DOUGLASS, JOHN AUBREY (2000) 'Institutional differentiation and coordination: a case study of California', mimeo, Centre for Studies in Higher Education, University of California, Berkeley.
- DOUGLASS, JOHN AUBREY (2004) 'The dynamics of massification and differentiation: a comparative look at higher education systems in the United Kingdom and California', *Higher Education Management and Policy*, volume 16, no 3, pp 9-33.
- DOUGLASS, JOHN AUBREY (2005) 'Less than the sum? What is missing in UK mass HE?', *Perspectives*, volume 9, number 1 (January), pp 1-6.
- DOUGHERTY, KEVIN J (1992) 'Community colleges and baccalaureate attainment', *Journal of Higher Education*, 63 (2): 188-214.
- DUNCAN, W G K & LEONARD, ROGER ASHLEY (1973) *The University of Adelaide 1874-1974*, Rigby, Adelaide.
- DURKHEIM, EMILE (1938, 1st pub 1895) Solovay, Sarah H & Mueller, John H (trns) *The rules of sociological method*, 8th ed, The Free Press, New York.
- DURKHEIM, EMILE (1977, 1st pub 1938) Collins, Peter (trns) *The evolution of educational thought*, Routledge & Kegan Paul, London.

- EATON, JUDITH (1990) 'Three myths of transfer education', *AACJC Journal*, Jun/Jul, pp 18-20.
- ELY, JEAN (1978) *Reality and rhetoric: an alternative history of Australian education*, Alternative Publishing Cooperative in association with New South Wales Teachers' Federation, Chippendale.
- EDQUIST, CHARLES, REES, GARETH, LORENZEN, MARK, VINCENT-LANCRIN, STÉPHAN & LARSEN, KURT (2001) *Cities and regions in the new learning economy*, Organisation for Economic Co-operation and Development, Paris, <http://www.oecd.org/>.
- ENGSTRÖM, Y (1994) *Training for change*, Labour office, Geneva.
- ENRIGHT, TERRY (no date) *Technology adoption in rural industries: a snapshot of past successes and future targets*, Rural Industries Research and Development Corporation, www.rirdc.gov.au
- ESNAULT, ERIC M & SKILBECK, MALCOLM (1993) 'OECD background paper', in OECD (ed) *The transition from elite to mass higher education*, proceedings of an international conference sponsored by the Australian Department of Employment, Education and Training in association with the Organisation for Economic Co-operation and Development, 15-18 June, Commonwealth of Australia, Canberra, pp.
- EUROPEAN COMMUNITIES (2003) *Baden-Württemberg research and innovation strategy*, Community R&D Information Service, <http://www.cordis.lu/baden-wuerttemberg/strateg4.htm>
- EVIDENCE LTD (2003a) *Funding research diversity – summary report. The impact of further concentration on university research performance and regional research capacity*, A report for Universities UK, http://www.universitiesuk.ac.uk/bookshop/downloads/funding_sum.pdf.
- EVIDENCE LTD (2003b) *Funding research diversity. A technical report supporting a study of the impact of further concentration on university research performance and regional research capacity*, (written by Jonathan Adams and David Smith), Universities UK, London, http://www.universitiesuk.ac.uk/bookshop/downloads/funding_tech.pdf
- FARRELL, J P (1979) 'The necessity of comparisons in the study of education: the salience of science and the problems of comparability', *Comparative Education Review*, 23, pp 3-16, cited in Watson (1994: 92).
- FAURE, EDGAR (chair) (1972) *Learning to be: the world of education today and tomorrow*, report of the international commission on the future of education, Unesco, Paris.
- FEINBERG, W (1983) *Understanding education: towards a reconstruction of educational inquiry*, Cambridge University Press, Cambridge.
- FERRIER, FRAN, TROOD, CLIFFORD & WHITTINGHAM, KAREN (2003) *Going boldly into the future: a VET journey into the national innovation system*, National Centre for Vocational Education Research, Leabrook, http://www.ncver.edu.au/research/proj/nr9036_vol1.pdf.
- FIELD, JOHN (2002) 'Chapter 6 further and higher education links in England', in Osborne, Mike, Gallacher, Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning*

- Department, pp 60-68,
<http://www.scotland.gov.uk/about/ELLD/HESP/00016640/annexe2p1.pdf>
- FINN, B T (chair) (1991) *Young peoples' participation in post-compulsory education and training*, report of the Australian Education Council Review Committee, Australian Government Publishing Service, Canberra.
- FINNIE, ROSS (2004) 'The school to work transition of Canadian post secondary graduates: a dynamic analysis', *Journal of Higher Education Policy and Management*, pp 35-58.
- FLORENCE, P SARGANT (1953) *The logic of British and American industry* (2nd edn., 1961), pp. 86-92, cited in Berg (1993).
- FOOKS, DES (1994) 'The life and times of Cinderella', in Kearns, Peter & Hall, William (eds) *Kangan: 20 years on*, National Centre for Vocational Education Research Ltd, Leabrook, pp 29-43.
- FORSMAN, MARIA & SOLITANDER, NIKODEMUS (2003) 'Knowledge transfer in clusters and networks - an interdisciplinary conceptual analysis', *Journal of International Business Studies*, 2003 issue 1,
http://copenhagen.jibs.net/LitReview/2003/2003_3_24.pdf
- FOSTER, S G (STEPHEN GLYNN) & VARGHESE, MARGARET M (1996) *The making of the Australian National University*, Allen & Unwin Pty Ltd, St Leonards.
- FREDRICKSON, JANYTH (1998) 'Today's transfer students: who are they?', *Community College Review*, Summer 1998 v26 i1 p43.
- FREELAND, BRETT (2000) *International comparisons of vocational education and training*, National Centre for Vocational Education Research, Leabrook,
www.ncver.edu.au.
- FRIJHOFF, W (1992) 'Universities: 1500 –1900', in Clark, Burton R & Neave, Guy R *The encyclopedia of higher education*, volume 2: analytical perspectives, Pergamon Press, Oxford, pp 1251-1259.
- FROESE, LEONHARD (1960) Neuere Beitrage zum methodologischen Problem der Vergleichenden Padagogik, in *Zeitschrift fur Padagogik*.
- FROESE, LEONHARD (Geoffrey Plow, trns) (1982) 'On the comparative aspect in historical studies: a contribution to discussion of methodological problems in comparative education and comparative studies in the history of education' in *Comparative Education*, volume 18 no 3, pp 305-311.
- FRYER, THOMAS W JR, BERMAN, PAUL, WEILER, DANIEL & CLAWSON, CAROL (1990) 'NETS's new definition of transfer', *AACJC Journal*, Jun/Jul, pp 30-1.
- FURTH, DOROTEA (1973) 'Short-cycle higher education: some basic considerations' in Furth, Dorotea (ed) *Sort-cycle higher education: a search for identity*, OECD, Paris, pp 13-42.
- FURTH, D (1992) 'Short-cycle higher education: Europe' in Clark, Burton R & Neave, Guy R *The encyclopedia of higher education*, vol 2, pp 1217-1225, Pergamon Press Ltd, Oxford.
- GALLACHER, JIM (2002) 'Chapter 2 Articulation links between further education colleges and higher education institutions in Scotland', in Osborne, Mike, Gallacher,

- Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning Department*, <http://www.scotland.gov.uk/about/ELLD/HESP/00016640/annexe2p1.pdf>, pp 4-17.
- GALLACHER, JIM (2003) *Higher education in further education colleges: the Scottish experience*, the Council for Industry and Higher Education, London, <http://www.cihe-uk.com/publications.htm>.
- GALLAGHER, MICHAEL (2001) *Modern university governance – a national perspective*, Paper presented at The idea of a university: enterprise or academy? Conference organised by The Australia Institute and Manning Clark House, The Australian National University, http://www.detya.gov.au/highered/otherpub/mod_uni_gov/default.htm.
- GARDNER, MARGARET (2002) *Review in Queensland of pathways articulation through the post-compulsory years of school to further education, training and labour market participation*, <http://www.training.qld.gov.au/reports/gardner/index.htm>.
- GEIGER, R L (1992) 'Introduction', the institutional fabric of the higher education system, in Neave, Guy R & Clark, Burton R (eds) *The encyclopedia of higher education*, Pergamon Press, Oxford.
- GELIN, FRANK (1999) *Transfer rates: how to measure and for what purpose? A discussion paper*, British Columbia Council on Admissions and Transfer, Vancouver, <http://www.bccat.bc.ca/pubs/transrates.pdf>.
- GESLING, LARS (1992) 'Innovation and the development of industrial networks', in LUNDVALL, BENGT-ÅKE (ed) *National systems of innovation: towards a theory of innovation and interactive learning*, Pinter Publishers, London, pp 116-128.
- GEUNA, ALDO (1999) *The economics of knowledge production: funding and the structure of university research*, Edward Elgar Publishing Limited, Cheltenham.
- GIBBONS, MICHAEL, LIMOGES, CAMILLE, NOWOTNY, HELGA, SCHWARTZMAN, SIMON, SCOTT, PETER & TROW, MARTIN (1994) *The new production of knowledge: the dynamics of science and research in contemporary societies*, Sage, London.
- GIBBONS, MICHAEL (1997) 'What kind of university? Research and teaching in the 21st century', 1997 Beanland lecture, Victoria University of Technology, Melbourne.
- GIDDENS, ANTHONY (1976) *New rules of sociological method: a positive critique of interpretative sociologies*, Hutchinson, London.
- GIDJUNIS, JOSEPH (2004) 'Proposed change in how Federal Government collects student data raises privacy concerns', *The Chronicle of Higher Education*, volume 51, issue 14 (26 November), <http://chronicle.com/prm/weekly/v51/i14/14a02201.htm>
- GILBERT, A (2001) 'The idea of a university: enterprise or academy', paper presented to the Manning Clark symposium, Canberra, 25 July 2001, <http://www.unimelb.edu.au/vc/present/manningclark.pdf>.
- GILES-PETERS, ANDREW (2004) personal communications 13, 17 & 19 July.
- GLAESER, E L, KALLAL, H D, SCHEINKMAN, J A & SHLEIFER, A (1992) 'Growth in cities', *Journal of Political Economy*, 100, 6, 1126-1152.

- GLOVER, JUDITH (1996) 'Quantitative comparisons of European cities and regions', in Hantrais, Linda & Mangen, Steen (eds) *Cross-national research methods in the social sciences*, Cassell, London.
- GOLDING, BARRY (1995a), 'Exploding the myth of education traffic', *The Australian Tafe Teacher*, first quarter (vol 29), pp 34-44.
- GOLDING, BARRY (1995b) 'Intersectional articulation and quality assurance', *Journal of Tertiary Education Administration*, vol 17, no 1, pp 21-39.
- GOLDING, BARRY, MARGINSON, SIMON & PASCOE, ROBERT (1996) *Changing context, moving skills: generic skills in the context of credit transfer and the recognition of prior learning*, Australian Government Publishing Service, Canberra.
- GOLDING, BARRY & VALLENCE, KEVIN (1999) *The university-VET transition*, Research Centre for Vocational Education and Training, University Technology Sydney, Sydney.
- GOEDEGEBUURE, LEO & VAN VUGHT, FRANS (1994) 'Intellectual context and methodological framework', in Geodegebuure, Leo & van Vught, Frans (eds) *Comparative higher education policy studies*, Centre for Higher Education Policy Studies, Utrecht.
- GONCZI, ANDREW (1997) 'Future directions for vocational education in Australian secondary schools', *Australian and New Zealand Journal of Vocational Education Research*, 5(1).
- GOOD, CARTER V (ed) (1959) *Dictionary of education*, MacGraw-Hill Book Company, New York.
- GOOZEE, G (1993) *The development of TAFE in Australia. An historical perspective*, NCVER, Adelaide.
- GORDON, HOWARD R D (1999) *The history and growth of vocational education in America*, Allyn and Bacon, Boston.
- GOUVERNEMENT DU QUÉBEC MINISTÈRE DE L'ÉDUCATION (2001) *Éducation Québec history*, <http://www.meq.gouv.qc.ca/rens/brochu/anglais/history.htm>.
- GOVERNOR OF CALIFORNIA (2003) 'Institutes for science and innovation', *Governor's issues*, <http://www.governor.ca.gov/state/govsite/>.
- GREGOR, A D (1994) 'The universities of Canada' *Commonwealth universities yearbook 1994*, Association of Commonwealth Universities, London.
- GRENDLER, PAUL F (2002) *The universities of the Italian Renaissance*, The Johns Hopkins University Press, Baltimore.
- GRIFFITH UNIVERSITY (2002) *The Griffith model for reform of Australian higher education*. Response to the Commonwealth's discussion papers 'Higher education at the crossroads', http://www.backingaustraliasfuture.gov.au/submissions/issues_sub/pdf/i257.pdf.
- GROUP OF EIGHT (2003) *About the group of eight*, <http://www.go8.edu.au/about.html>.
- GRUBB, W N (1990) *The decline of community college transfer rates: evidence from national longitudinal surveys*, The University of California, Berkeley, CA.

- GRUBB, W N (1991) 'The decline of community college transfer rates: evidence from national longitudinal surveys', *Journal of Higher Education*, 62(2), 194-222.
- GRUBB, W NORTON (1996) 'Learning to earn all over again: current issues in vocational education and training in the United States' in Selby Smith, C & Ferrier, Fran (eds) *The economic impact of vocational education and training*, pp 30-85, Australian Government Publishing Service, Canberra.
- GRUBB, NORTON W (2004) 'Chapter 1: Trade-offs in restructuring tertiary education: alternatives to universities revisited', *Education policy analysis*, pre publication draft supplied by author on 23 June 2005.
- GRUBB, W NORTON & RYAN, PAUL (1999) *Roles of evaluation for vocational education and training*, Kogan Page, London.
- GRUBB, NORTON W, DAVIS, GARY, LUM, JEANNIE, PLIHAI, JANE & MORGAIN, CAROL (1991) *'The cunning hand, the cultured mind': models for integrating vocational and academic education*, National Center for Research in Vocational Education, University of California at Berkeley, Berkeley.
- HAGEDORN, L S, & CASTRO, C R (1999) 'Paradoxes: California's experience with reverse transfer students', in Townsend, Barbara K (1999) *Understanding the impact of reverse transfer students on community colleges: new directions for community colleges* (Summer, vol 106, pp 15-26), San Francisco, Jossey-Bass.
- HALL, PETER A & SOSKICE, DAVID (2001) 'An introduction to varieties of capitalism' in Hall & Soskice (eds) *Varieties of capitalism: the institutional foundations of comparative advantage*, Oxford University Press, Oxford, pp 1 – 68.
- HAMMONDS, CARSIE & LAMAR, CARL F (1968) *Teaching vocations*, Interstate Printers & Publishers, Inc, Danville, Ill.
- HANS, NICHOLAS (1964) 'Functionalism in comparative education' *International Review of Education*, vol 10.
- HANTRAIS, LINDA & MANGEN, STEEN (1996) Methods and management of cross-national social research in Hantrais, Linda & Mangen, Steen (eds) *Cross-national research methods in the social sciences*, Cassell, London.
- HARMAN, GRANT (2003) Personal communication: comments on the first draft of this thesis.
- HARMAN, GRANT (2005) Personal communication: comments on the second draft of this thesis.
- HARRIS, CHESTER W (ed) (1960) *Encyclopedia of educational research*, The Macmillan Company, New York.
- HARRIS, ROGER, SUMNER, ROBERT & RAINEY, LINDA (2004) *Student traffic: two-way movement between vocational education and training and higher education*, National Centre for Vocational Education Research, Leabrook, <http://www.ncver.edu.au>
- HARVEY, L (1996) 'The nature and role of quality in the federal omniversity', conference paper, *Dilemmas in mass higher education*, Staffordshire University, 10-12 April 1996, cited in Marks (2002, p 78).
- HASLEGRAVE, H L (chair) (1969) *Report of the committee on technical courses and examinations*, HMSO, London.

- HAYWARD, GERALD C, JONES, DENNIS P, MCGUINNESS, AIMS C JR & TIMAR, ALLENE (2004), *Ensuring access with quality to California's community colleges*, report #04-3, National Center for Public Policy and Higher Education, San Jose, California, <http://www.highereducation.org/reports/hewlett/Hewlett3.pdf>
- HEBEL, SARA (2003) 'California colleges face smaller cuts in Governor's revised state budget plan' *The Chronicle of Higher Education*, Thursday, May 15, 2003, <http://chronicle.com/news>.
- HEIDENHEIMER, A J, HECLO, H & ADAMS, C T (1990) *Comparative public policy: the politics of social choice in America, Europe and Japan*, 3rd edn, Macmillan, Basingstoke.
- HENNINGER, G ROSS (1959) *The technical institute in America*, MacGraw-Hill Book Company, New York.
- HERMANN, G D, RICHARDSON, E & WOODBURN, G J (1976) *Trade and technical education. Principles and issues*, Cassell Australia, Stanmore, NSW.
- HIGGINS, C STEVEN & KATSINAS, STEPHEN G (1999) 'The relationship between environmental conditions and transfer rates of selected rural community colleges: a pilot study', *Community College Review*, Fall 1999 v27 i2 p1.
- HIGHER EDUCATION DIVISION (2000) *OECD thematic review of the first years of tertiary education*, Australian seminar, Sydney 20-21 April 1998, Department of Education, Training and Youth Affairs, Canberra, <http://www.dest.gov.au/archive/highered/occpaper/00A/00a.pdf>.
- HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND (HEFCE) (2001a), *Trends in higher education in further education colleges*, <http://www.hefce.ac.uk/Learning/FEFund/trends/FEtrends.doc>
- HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND (HEFCE) (2001b), *Higher education in the United Kingdom*, http://www.hefce.ac.uk/pubs/hefce/2001/01_56.pdf.
- HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND (2004) *Recurrent grants for 2004-05*, http://www.hefce.ac.uk/pubs/hefce/2004/04_12/
- HIGHER EDUCATION & RESEARCH OPPORTUNITIES IN THE UNITED KINGDOM (HERO) (2001) *2001 research assessment exercise: the outcome*, <http://195.194.167.103/Results/all/all.xls>.
- HIRSCH AND HAGEDORN (no date) *The historical growth of the community college*, <http://www.usc.edu/dept/education/truccs/>.
- HOBBSAWM, E J (1999) [1968] *Industry and empire from 1750 to the present day*, Penguin Books, London.
- HOFMANN, H G & MALKOVA, ZIA (1990) 'The socialist countries' in Halls, W D (ed) *Comparative education: contemporary issues and trends*, Jessica Kingsley Publishers, London.
- HOLMES, BRIAN (1981) *Comparative education: some considerations of method*, George Allen & Unwin, London.
- HOWARD, JOHN (2004) 'Fourth Howard ministry', *Media releases*, http://www.pm.gov.au/news/media_releases/media_Release1134.html

- HUISMAN, JEROEN & KAISER, FRANS (EDS) (2001) *Fixed and fuzzy boundaries in higher education. A comparative study of (binary) structures in nine countries*, <http://www.awt.nl/nl/pdf/as19.pdf>.
- HUISMAN, JEROME, KAISER, FRANS & VOSSENSTEYEN, HANS (2003) 'The relations between access, diversity and participation: searching for the weakest link' in Tight, Malcolm (ed) (2003) *Access and exclusion*, Elsevier Science Ltd, Oxford, pp 1-28.
- HUME, DAVID (1964) (first published 1738) *A treatise of human nature*, volume 1, J M Dent & sons, London.
- HUSÉN, TORSTEN (1976) 'Problems of securing equal access to higher education: the dilemma between equality and excellence', *Higher Education*, 5, pp 407-22.
- HUXLEY, THOMAS HENRY (1895) 'Technical education' in *Collected essays III*, Macmillan & Co, London.
- HYDE, JIM (1983) 'The development of Australian tertiary education to 1939' in Murray-Smith, Stephen (ed) *Melbourne studies in education 1982*, pp 105-140, Melbourne University Press, Parkville.
- HYLAND, TERRY (1999) *Vocational studies, lifelong learning and social values. Investigating education, training and NVQs under the new deal*, Aldershot, Ashgate.
- IGNASH, JAN M & TOWNSEND, BARBARA (2000) Evaluating state-level articulation agreement according to good practice', *Community College Review*, Winter 2000 v28 i3 p1.
- ILLINOIS BOARD OF HIGHER EDUCATION, ILLINOIS COMMUNITY COLLEGE BOARD, AND TRANSFER COORDINATORS OF ILLINOIS COLLEGES AND UNIVERSITIES (2003) *Illinois articulation initiative*, <http://www.itransfer.org/>
- INNOVATION SUMMIT IMPLEMENTATION GROUP (2000) *Innovation: unlocking the future*, Final report of the innovation summit implementation group, <http://www.industry.gov.au/archive/summit/isigreport.pdf>.
- JACOBS, JIM (2002) Colorado Commission on Higher Education, *Transfer data*, personal communication (data file available from author).
- JAFFE, ADAM B, TRAJTENBERG, MANUEL & HENDERSON, REBECCA (1993) 'Geographic localization of knowledge spillovers as evidenced by patent citations' *Quarterly Journal of Economics* 63:577-98.
- JAMES, PAULINE (1995) 'Models of vocational development revisited: reflecting on concerns' *The Vocational Aspects of Education*, vol 47, no 3, p 298.
- JAKUPEC, V & ROANTREE, B (1993) 'Impact of the Martin report on technical and further education', in Meek, L V & Harman, G (eds) *The binary experiment for higher education: an Australian perspective*, pp 151 – 165, Department of Administrative, Higher and Adult Education Studies, University of New England, Armidale.
- JOCHIMSEN, REIMUT (1978) 'Aims and objectives of German vocational and professional education in the present European context', *Comparative Education*, volume 14 no 3 (October), pp 199-209.
- JOHNSON, RON (1994) 'Effects of resource concentration on research performance', *Higher Education*, 28: 25-37.

- JOHNSTONE, BRUCE D (no date) *Role, scope, mission, and purposes of multicampus systems*, <http://www.gse.buffalo.edu/FAS/Johnston/systems.htm>
- JONES, BARRY (1982) *Sleepers, wake!: technology and the future of work*, Oxford University Press, Melbourne.
- JONES, GLEN A (1996) 'Diversity within a decentralised higher education system: the case of Canada' in Meek, V Lynn & Goedegebuure, Leo (eds) *The mockers and the mocked: comparative perspectives on differentiation, convergence and diversity in higher education*, Permagon, Oxford.
- KAJSTURA, A, & KEIM, M C (1992) 'Reverse transfer students in Illinois community colleges', *Community College Review*, 20(2), 39-44.
- KANDEL, I L (1933) *Studies in comparative education*, George G Harrap & Co, London.
- KANGAN, MYER (chair) Australian Committee on Technical and Further Education (1974) *TAFE in Australia. Report on needs in technical and further education*, Australian Government Publishing Service, Canberra.
- KARMEL, PETER (2001) 'Public policy and higher education', *Australian Journal of Management*, 26, pp 123-143.
- KARMEL, TOM (2004) Personal communication, 16 August 2004.
- KARMEL, TOM & NGUYEN, NHI (2003) *Australia's Tertiary Education Sector*. Centre for the Economics of Education and Training 7th National Conference, Melbourne
- KEATING, JACK (2003) 'Course development at Victoria University. Interim report of the review of course development at Victoria University, Victoria University of Technology, Melbourne (internal paper).
- KEATING, JACK, MEDRICH, ELLIOT, VOLKOFF, VERONICA & PERRY, JANE (2002) *Review of research: comparative study of VET systems – national vocational education and training systems across three regions under pressure of change*, NCVER Ltd, Leabrook, <http://www.ncver.edu.au/research/proj/nr9009.pdf>.
- KEEP, EWART (1991) 'The grass looked greener – some thoughts on the influence of comparative vocational training research on the UK policy debate' in Ryan, Paul (ed) *International comparisons of vocational education and training for intermediate skills*, The Falmer Press, London.
- KELLY, G P (1992) 'Debates and trends in comparative education' in Arnove, R F, Altbach, P G & Kelly, G P (eds) *Emergent issues in education: comparative perspectives*, State University of New York Press, pp 13-22, cited in Watson (1996, p 362).
- KERR, CLARK (1963) 'The idea of a multiversity', in *The uses of the university*, Harvard University Press, Cambridge, pp. 1-45.
- KERR, CLARK IN ASSOCIATION WITH GADE, MARIAN L & KAWAOKA (1994) *Higher education cannot escape history: issues for the twenty-first century*, State University of New York Press, Albany.
- KING, EDMUND (1967) 'Comparative studies and policy decisions', *Comparative Education*, volume 4 number 1.
- KINGSTON, PETER & MIDGLEY, SIMON (2002) At your peril, *The Guardian*, 30 April, <http://education.guardian.co.uk/egweekly/story/0,5500,707089,00.html>.

- KINTZER, F C (1989) 'Articulation and transfer: a review of current literature on statewide and interinstitutional program models and trends', New Jersey State Department of Higher Education, Trenton (ERIC Document Reproduction Service No. ED 311 946), cited in Higgins & Katsinas (1999).
- KINTZER, FREDERICK C & BRYANT, DONALD W (1998) 'Global perceptions of the community college', *Community College Review*, volume 26, no 3, pp 35-55.
- KISSLER, G R (1980, October) *Trends affecting undergraduate education in the University of California*. Paper presented at the Board of Regents of the University of California Committee on Educational Policy.
- KLEMPERER, ANNE (2001) 'Sweden' in Huisman, Jeroen & Kaiser, Frans (editors) *Fixed and fuzzy boundaries in higher education a comparative study of (binary) structures in nine countries*, Javastraat 42, <http://www.awt.nl/>.
- KNIGHT, ANNE & NESTOR, MARIANNE (2000) *A glossary of Australian vocational education and training terms*, National Centre for Vocational Education Research, Leabrook, <http://www.ncver.edu.au/publications/516.html>
- KOEHL, ROBERT (1977) 'The comparative study of education: prescription and practice', *Comparative Education Review*.
- KOGAN, MAURICE (1993) 'Binary systems in higher education: the British experience', in Meek, Lynn V & Harman, Grant (1993) *The binary experiment for higher education: an Australian perspective*, Department of Administrative, Higher and Adult Education Studies, University of New England, Armidale, pp 65-73.
- Kuznik, A E , Makey, E J , & Anderson, D D (1974) 'Reverse transfers: a survey', *Community and Junior College Journal*, 44(4), 25-27.
- LACHENMANN, GERHARD (1988) 'Vocational and general education in England' in Rohrs, Hermann (ed) *Vocational and general education in Western industrial societies*, Symposium Books, London, pp 26-34.
- LAMAR UNIVERSITY (2002) *The Texas State University System*, <http://www.lamar.edu/tsus/>, downloaded 12.01.02.
- LAMBERT, RICHARD, (2003) *Review of business-university collaboration*. Final report, HM Treasury: London, www.lambertreview.org.uk
- LAURENTE, ZOANN & PAILTHORP, KEITH (2002) California's transfer patterns, http://www.cpec.ca.gov/commission/Agenda0212/Tab_07.pdf.
- LEE, V, & FRANK, K (1990) 'Student characteristics that facilitate the transfer from two-year to four-year colleges', *Sociology of Education*, 63, 1978-1993.
- LEGAL INFORMATION INSTITUTE (2002) US code collection, title 20, chapter 44, section 2302, subsection 29, <http://www4.law.cornell.edu/uscode/20/2302.html>.
- LEGISLATIVE COUNSEL OF CALIFORNIA (2002) *California Education Code*, <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=edc&group=66001-67000&file=66720-66722.5>, downloaded 7 Feb 02.
- LEVY, MARION J (1970) 'Scientific analysis is a subset of comparative analysis' in MCKINNEY, JOHN C & TIRYAKIAN, EDWARD A (eds) (1970) *Theoretical sociology: perspectives and developments*, Appleton-Century-Crofts, New York.

- LIMOGES, CAMILLE (1996) 'L'université à la croisée des chemins: une mission à affirmer, une gestion à réformer', *Actes du colloque ACFAS.CSE.CST*, Québec, pp 14-15.
- LITTLE, ARTHUR D (2001) *North West Science and Daresbury Development Study*, Report to the Government Office for the North West, http://www.northwestscience.co.uk/about/downloads/adl_final.pdf
- LUNDVALL, BENGT-ÅKE (1992) 'Introduction' in LUNDVALL, BENGT-ÅKE (ed) *National systems of innovation: towards a theory of innovation and interactive learning*, Pinter Publishers, London.
- LUNDVALL, BENGT-ÅKE (ed) (1992) *National systems of innovation: towards a system of innovation*, Pinter Publishers, Covent Garden.
- LUNDVALL, BENGT-ÅKE & BORRÁS, SUSANA (1997) *The globalising learning economy: implications for innovation policy*, Report based on contributions from seven projects under the TSER programme DG XII, Commission of the European Union, Brussels, <http://www.cordis.lu/tser/src/globec.htm>.
- MACINTOSH, JAMES (1833, first published 1791), *Vindiciae Gallicae*, section 1, p 14, cited in Platt, Suzy (1989) *Respectfully quoted. A dictionary of quotations requested from the Congressional research service*, Library of Congress, Washington DC, Bartleby.com, New York, <http://www.bartleby.com/73/1038.html>.
- MACLENNAN, ALEX, MUSSELBROOK, KERRY & DUNDAS, MARGARET (2000) *Credit transfer at the FE/HE interface – Research report for the Scottish Further Education Funding Council*, Scottish Higher Education Funding Council/Scottish Further Education Funding Council, <http://www.sfefc.ac.uk/publications/other/wideopps.pdf>.
- MACLEOD, DONALD (2002) Together we stand, *The Guardian*, 3 December, <http://education.guardian.co.uk/egweekly/story/0,5500,852156,00.html>
- MACLEOD, DONALD (2003a) 'Government hints at research elitism', *EducationGuardian.co.uk*, Monday June 9, <http://education.guardian.co.uk/RAE/story/0,7348,973997,00.html>.
- MACLEOD, DONALD (2003b) 'Minister hints at research rethink', *EducationGuardian.co.uk*, Wednesday September 10, <http://education.guardian.co.uk/RAE/story/0,7348,973997,00.html>.
- MACOMB COMMUNITY COLLEGE (2003) *Macomb's university center*, <http://www.macomb.edu/UnivCtr/default.asp>
- MAGNUS, PHILIP (1888) *Industrial education*, Kegan, Paul, Trench & Co, London.
- MAIDEN, SAMANTHA (2004) 'Nelson warns unis on TAFE credits', *The Australian*, 23 August 23, 2004, <http://theaustralian.news.com.au/archives/>
- MARKS, ANDREW (2002) 'Weaving the "seamless web": why higher education and further education need to "merge" if lifelong learning is to become a reality', *Journal of Further and Higher Education*, vol 26, no 1, pp 75-80.
- MARSHALL, ALFRED (1890) *Principles of economics*, Macmillan, London.
- MARTIN L H (chair) Australian Universities Commission, Committee on the Future of Tertiary Education in Australia (1964) *Report*, Government Printer, Canberra.

- MARTORANA, S V (1973) 'Community-junior colleges in the United States' in OECD *Short-cycle higher education: a search for identity*, OECD, Paris, pp 87-149.
- MAXWELL, WILLIAM, HAGEDORN, LINDA SERRA, BROCATO, PHILLIP, HYE SUN MOON, PERRAKIS, ATHENA (2002) 'The community college shuffle: student patterns of multiple enrolments', presented at the annual meetings of the American Educational Research Association.
- MCCONVILLE, CHRIS (1991) *Rising in the west*, Council of the Western Institute, St Albans.
- MCCORMICK, ALEXANDER C & CARROLL, C DENNIS (1997) 'Transfer behavior among beginning postsecondary students: 1989-94', National Center for Educational Statistics Statistical Analysis Report June 1997, data series: BPS:90/94, Office of Educational Research and Improvement NCES 97-266, <http://nces.ed.gov/pubs97/97266.pdf>
- MCINTYRE, C (1987) 'Assessing community college transfer performance', *Research in Higher Education*, 27(2), 142-162. McIntyre, cited in Higgins & Katsinas (1999).
- MCKINNEY, JOHN C & TIRYAKIAN, EDWARD A (1970) 'Introduction' in McKinney, John C & Tiryakian, Edward A (eds) *Theoretical sociology: perspectives and developments*, Appleton-Century-Crofts, New York.
- MCLAURIN, IAIN & OSBORNE, MIKE (2002) 'Chapter 10 Data on transfer from FECs in Scotland to HEIs in Scotland', in Osborne, Mike, Gallacher, Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning Department*, <http://www.scotland.gov.uk/about/ELLD/HESP/00016640/annexe2p1.pdf>
- MCLURE, WILLIAM P (1965) 'Rationale for organising, administering and financing vocational education' in Barlow, Melvin L (ed) *64th yearbook of the National Society for the Study of Vocational Education*, University of Chicago Press, Chicago, pp 222-243.
- MEDSKER, LELAND L (1960) *The junior college: progress and prospect*, McGraw-Hill Book Company, New York.
- MEDSKER, LELAND L & TILLERY, DALE (1971) *Breaking the access barriers: a profile of two-year colleges*, McGraw Hill, New York.
- MEEK, LYNN V (2000) 'Uses of higher education policy research. An inaugural public lecture', UNE, NSW. http://fehps.une.edu.au/F/r/higher/UNE_surveys/Lynn_inaugural/Meek.pdf, downloaded 9.9.01.
- MEEK, LYNN V AND WOODS, FIONA Q (1997) *Higher Education Governance and Management An Australian Study*, Evaluations and Investigations Program, Higher Education Division, Department of Employment, Education, Training and Youth Affairs, Canberra. <http://www.detya.gov.au/archive/highered/eippubs/eip9701/front.htm>
- MIDDLETON, JOHN & DEMSKY, TERRY (1989) *Vocational education and training*, World Bank discussion papers, 51, The World Bank, Washington.
- MIDGLEY, SIMON (2002) Gold and goals, *The Guardian*, 19 November, <http://education.guardian.co.uk/egweekly/story/0,5500,842526,00.html>

- MILL, JOHN STUART (1925) (1st published 1843) *System of logic ratiocinative and inductive*, Longmans, Green & Co, London.
- MILLICAN, R (1995) *University-TAFE articulation in Queensland*, Research Report 8, Tertiary Entrance Procedures Authority, Brisbane.
- MINISTERIAL COUNCIL ON EDUCATION, EMPLOYMENT, TRAINING AND YOUTH AFFAIRS (MCEETYA) (2003) *Joint communiqué*, http://www.mceetya.edu.au/pdf/joint_comm.pdf
- MINISTRY OF EDUCATION TE TĀHUHU O TE MĀTAURANGA (2001) *Interim statement of tertiary education priorities (STEP) 2002-3*, <http://www.minedu.govt.nz/index.cfm?layout=document&documentid=7366&indexid=1216&indexparentid=1028>.
- MINISTRY OF EDUCATION TE TĀHUHU O TE MĀTAURANGA (2002) *National student index*, http://www.minedu.govt.nz/index.cfm?layout=document&documentid=5724&indexid=1200&indexparentid=1028#P86_6553
- MITCHELL, G & GRAFTON, C (1985) 'Comparative study of reverse transfer', *Community and Junior College Quarterly*, 9(3), 273-280.
- MITTER, WOLFGANG (1988) 'Problems of the interrelationship between general and vocational education in Europe: a historical and conceptual approach' in Rohrs, Herman (ed) *Vocational and general education in western industrial societies*, Symposium Books, London.
- MITTER, W (1992) 'Comparative education' in Clark, Burton R & Neave, Guy R *The encyclopedia of higher education*, vol 3, Pergamon Press, Oxford, pp 1788-1797 at 1788.
- MOBLEY, MAYOR D & BARLOW, MELVIN L (1965) 'Impact of federal legislation and policies upon vocational education' in Barlow, Melvin L (ed) *64th yearbook of the National Society for the Study of Vocational Education*, University of Chicago Press, Chicago, pp 186-202.
- MOODIE, GAVIN (2002a) 'Counting on an end to the sectoral divide' *Perspectives*, **6, 2**, pp 45-9.
- MOODIE, GAVIN (2002b) 'Identifying vocational education and training', *Journal of Vocational Education and Training*, volume 54, number 2, pp 251-267.
- MOODIE, GAVIN (2002c) 'On the level: two constructions of VET's identity' in Searle, Jean & Roebuck, Dick (eds) *Envisioning practice – implementing change, Proceedings of the 10th annual international conference on post-compulsory education and training*, volume 2, Australian Academic Press: Brisbane, 186-192.
- MOODIE, GAVIN (2003) 'The missing link in Australian tertiary education: short-cycle higher education', *International Journal of Training Research*, volume 1, number 1, 44-63.
- MOODIE, GAVIN (2004) 'Optimising tertiary education for innovating Australia' in Marsh, Ian (ed) *Innovating Australia*, Committee for the Economic Development of Australia, Melbourne, pp 92-108.

- MOORHOUSE, C E (1960) 'Technical and technological education in Australia', *The Australian Journal of Education*, 4, 3, pp 175-90.
- MORGAN, K J (2004) 'The research assessment exercise in English universities, 2001', *Higher Education* **48**, pp 461-482.
- MORGAN, W J (2000) 'Community colleges in the United States: are they a model for Britain?', *International Journal of Lifelong Education*, vol 19, no 3 (May-June), pp 225-235.
- MOUSSOURIS, LINDA (1998) The higher education – economic development 'connection' in Massachusetts: forging a critical linkage?, *Higher Education*, **35**: 91-112.
- MURPHY, MARK (2002) 'Chapter 3 International issues' in Osborne, Mike, Gallacher, Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning Department*, <http://www.scotland.gov.uk/about/ELLD/HESP/00016640/annexe2p1.pdf>, pp 18-28
- MURRAY-SMITH, S (1965) 'Technical education in Australia: a historical sketch', in Wheelwright, E L (ed) *Higher education in Australia*, F W Cheshire, Melbourne, pp 170-91.
- NADEL, S F (1951) *Foundations of social anthropology*, Free Press, Glencoe.
- NATIONAL BOARD OF EMPLOYMENT, EDUCATION AND TRAINING (NBEET) (1994) *Cross-sectoral collaboration in post-secondary education and training*, Australian Government Publishing Service, Canberra.
- NATIONAL CENTER FOR PUBLIC POLICY AND HIGHER EDUCATION (2000) *Measuring up 2000: the state by state report card for higher education*, <http://measuringup2000.highereducation.org/stateprofilenet.cfm>, downloaded 22.7.01.
- NATIONAL CENTER FOR PUBLIC POLICY AND HIGHER EDUCATION (2002) 'States at a glance: Texas, *Measuring up 2002: the State-by-State report card for higher education*, <http://measuringup.highereducation.org/2002/stateglance.cfm>, downloaded 15.6.03.
- NATIONAL CENTRE FOR VOCATIONAL EDUCATION AND RESEARCH (2000) *Vet stats highlights for 1999*, <http://www.ncver.edu.au/statistics/vet/pocketgd/pocket99.pdf>, downloaded 9.9.01.
- NATIONAL CENTRE FOR VOCATIONAL EDUCATION RESEARCH (NCVER) (2002) *Australian vocational education and training statistics 2001: in detail*, <http://www.ncver.edu.au/statistics/vet/ann01/id01/idall01.pdf>.
- NATIONAL INFORMATION SERVICES AND SYSTEMS (NISS) (2003) *Russell group of universities*, http://www.niss.ac.uk/admin/russell_group.html.
- NATIONAL OFFICE OF OVERSEAS SKILLS RECOGNITION (NOOSR) (1992) 'Higher education', *Country Education Profiles: Germany*, <http://www.dest.gov.au/noosr/cep/germany/index.htm>, page last updated on Thursday, 24 April 2003, downloaded 9 June 2003.

- NATIONAL OFFICE OF OVERSEAS SKILLS RECOGNITION (NOOSR) (2000) *Country education profiles: Australia*, 'Technical and vocational education', <http://www.dest.gov.au/noosr/cep/australia/cepau5.htm>.
- NATIONAL STATISTICS WEBSITE (2002) from Department for Education and Skills; National Assembly for Wales; Scottish Executive; Department of Education (Northern Ireland), *data set ST30312, Students in further and higher education: by type of course and gender, 1970/71-1997/98: Social Trends 30*, www.statistics.gov.uk, Crown copyright material is reproduced with the permission of the Controller of HMSO.
- NEAVE, GUY (1979) 'Academic drift: some views from Europe', *Studies in Higher Education*, 4(2), pp 143-159.
- NEAVE, GUY (1992) 'On instantly consumable knowledge and snake oil', *European Journal of Education*, 27(1/2), pp 5-27.
- NEAVE, GUY (2001) 'Editorial: dimensions of comparison', *Higher Education Policy*, 14 (2001) 273-275, www.elsevier.com/locate/highedpol.
- NELSON, BRENDAN (2002a) 'Doorstop interview - Parliament House Canberra, 22nd January 2002', *Transcripts*, http://www.dest.gov.au/ministers/nelson/jan02/transcript_220102.htm.
- NELSON, THE HON DR B (2002b) *Higher education at the crossroads: ministerial discussion paper*, www.dest.gov.au/crossroads.
- NELSON, BRENDAN (2002c) 'Interview with Leon Byner, Adelaide 5AA, 28 November 2002', *Transcripts*, http://www.dest.gov.au/ministers/nelson/nov02/transcript_281102.htm.
- NESPOLI, LAWRENCE A (1997) New Jersey's dual admissions program, *Community College Journal*, Feb/Mar, pp 22-6.
- NEWMAN, JOHN HENRY (1959, first published 1853) *The idea of a university*, (1st ed) Image Books, New York.
- NOAH, HAROLD J & ECKSTEIN, MAX A (1969) *Towards a science of comparative education*, The Macmillan Company, London.
- NORTH HARRIS MONTGOMERY COMMUNITY COLLEGE DISTRICT (2003) *The University Center*, <http://www.tuc.edu/>.
- NORTHWEST EDUCATION RESEARCH CENTER (NORED) (2000) *Steady progress: higher education governance in Colorado at the dawn of the 21st century*, <http://www.nored.net/Colorado%20Report.pdf>, downloaded 10.8.01.
- NOWOTNY, HELGA, SCOTT, PETER & GIBBONS, MICHAEL (2001) *Rethinking science: knowledge in an age of uncertainty*, Polity, Cambridge.
- OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION (1970) *The role and scope of Oklahoma higher education*, Oklahoma City. Quoted in Martorana, S V (1973) 'Community-junior colleges in the United States' in OECD *Short-cycle higher education: a search for identity*, OECD, Paris, pp 87-149, at page 90.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) (1991) *Alternatives to university*, OECD, Paris.

- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) (2001a) *Education at a glance*, Organisation for Economic Co-operation and Development, Paris, http://www.oecd.org.els.stats/els_stat.htm.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) (2001b) *Cities and regions in the new learning economy*, Organisation for Economic Co-operation and Development, Paris, <http://www.oecd.org/>.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) (2002) *Science, technology and industry outlook*, OECD, Paris, <http://www1.oecd.org/publications/e-book/9202141E.PDF>.
- ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) (2003) *The Science, Technology and Industry (STI) Scoreboard 2003*, OECD, Paris, <http://www1.oecd.org/publications/e-book/92-2003-04-1-7294/>.
- OSBORNE, MIKE (2002) 'Chapter1 Introduction' in Osborne, Mike, Gallacher, Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning Department*, pp 1-3, <http://www.scotland.gov.uk/about/ELLD/HESP/00016640/annexe2p1.pdf>
- OSBORNE, MIKE (2002) 'Chapter 11 Implications' in Osborne, Mike, Gallacher, Jim & Murphy, Mark (eds) *A research review of FE/HE links - a report to the Scottish Executive Enterprise and Lifelong Learning Department*, pp 68-74, <http://www.scotland.gov.uk/about/ELLD/HESP/00016640/annexe2p2.pdf>
- OSBORNE, MICHAEL (2003) 'Increasing or widening participation in higher education? — a European overview, <http://www.ingenta.com>, pp 5-24.
- PAIR, CLAUDE (1998) 'Synthesis of country reports', *Pathways and participation in vocational and technical education and training*, OECD, Paris.
- PALMER, JIM (1990) 'Is vocationalism to blame' (1990) *AACJC Journal*, Jun/Jul, pp 21-25.
- PARKES, DAVID (1991) 'Home thoughts from abroad: diagnosis, prescription and prognosis for British vocational education and training', *European Journal of Education*, vol 26, no 1, pp 41-53.
- PARRY, GARETH (2003) 'Mass higher education and the English: wherein the colleges?', *Higher Education Quarterly*, volume 57, number 4 (October), pp 308-337.
- PARRY, GARETH, DAVIES, PAT & WILLIAMS, JENNY (2003) *Dimensions of difference: higher education in the learning and skills sector*, Learning and Skills Development Agency, London, <http://www.lsda.org.uk/files/PDF/1536.pdf>.
- PARRY, GARETH & THOMPSON, ANNE (2002) *Closer by degrees: the past, present and future of higher education in further education colleges*, Learning and Skills Development Agency, www.LSDA.org.uk.
- PARTRIDGE, P H (1968) *Society, schools and progress in Australia*, Permagon Press, Oxford.
- PASCOE, ROBERT (2001) Personal communication.
- PAULSTON, ROLLAND (2000) 'Imagining comparative education: past, present, future', *Compare*, vol 30, no 3.

- PECHAR, HANS (2004a) 'Should Austria establish a non-university sector? 1969-1990', in Pratt, John (2004) *The 'accreditation model': policy transfer in higher education in Austria and Britain*, Symposium Books, Oxford, pp 37-51.
- PECHAR, HANS (2004b) 'The emergence of the accreditation model 1990-1994', in Pratt, John (2004) *The 'accreditation model': policy transfer in higher education in Austria and Britain*, Symposium Books, Oxford, pp 53-72.
- PERRY, ADRIAN (2005) 'Further and higher education: a cautionary note', in Duke, Chris, *The tertiary moment. What road to inclusive higher education?*, National Institute of Adult and Continuing Education, Leicester, pp 33-41.
- PETER, KATHARIN & CATALDI, FORREST EMILY (2005) *The road less traveled? Students who enroll in multiple institutions*, (NCES 2005-157), U.S. Department of Education, National Center for Education Statistics, U.S. Government Printing Office, Washington, DC, <http://nces.ed.gov/pubs2005/2005157.pdf>
- PHILLIPSKPA AND LIFELONG LEARNING ASSOCIATES (2005) *Evaluation of the Education Services for Overseas Students Act 2000*, http://www.dest.gov.au/sectors/international_education/publications_resources/profiles/evaluation_report.htm
- PILIPOVSKI, V Y (1992) 'Technical institutes: Soviet Union and Eastern Europe' education' in Clark, Burton R & Neave, Guy R (eds) *The encyclopedia of higher education*, Pergamon Press, Oxford, pp 1243-5.
- PLATO *The Republic*, Lee, Desmond (trns) (1974) part two, 370, b – c, pp 118-9; and part four, 415, b – c, p 182, 2nd ed, Penguin Books, London.
- POLANYI, MICHAEL (1967) *The tacit dimension*, Routledge & Kegan Paul Ltd, London.
- POPPER, KARL (1972) [first published as *Logik der Forschung* in 1934] *The logic of scientific discovery*, Hutchinson & Co, London.
- PORTER, MICHAEL E (1998) 'Clusters and competition: new agendas for companies, governments, and institutions', in *On competition*, Harvard Business School Press, Cambridge.
- PORTER, MICHAEL E (2002) *Australian competitiveness*, presentation slides, IIR leading minds conference, Sydney, 1 August, <http://www.isc.hbs.edu/archive-speeches.htm>
- PORTER, MICHAEL E & KETELS, CHRISTIAN H M (2003) *UK competitiveness: moving to the next stage*, (UK) Department of Trade and Industry economics paper no. 3, <http://www.dti.gov.uk/economics/paper3-porter-ketels.pdf>.
- PRAGER, CAROLYN (1993) 'Transfer and articulation within colleges and universities', *The Journal of Higher Education*, 64, 5, pp 539-554.
- PRATT, JOHN (1970) *Policy and practice: the colleges of advanced technology*, Allen Lane The Penguin Press, London.
- PRZEWORSKI, ADAM & TEUNE, HENRY (1970) *The logic of comparative social inquiry*, Wiley-Interscience, New York.
- QUEBEC MINISTERE DE L'EDUCATION (2001) *Education in Quebec*, http://www.meq.gouv.qc.ca/rens/brochu/anglais/m_educaqc.htm.

- RAFFE, DAVID, HOWIESON, CATHY, SPOURS, KEN & YOUNG, MICHAEL (1998) 'The unification of post-compulsory education: towards a conceptual framework', *British Journal of Educational Studies* 46(2): 169-187.
- RAINBIRD, HELEN (1996) 'Negotiating a research agenda for comparisons of vocational training', in Hantrais, Linda & Mangen, Steen (eds) *Cross-national research methods in the social sciences*, Cassell, London.
- RAIVOLA, REIJO (1985) 'What is comparison? Methodological and philosophical considerations', *Comparative Education Review*, vol 29, no 3.
- RAMIREZ, FRANCISCO & RIDDLE, Phyllis (1991) 'The expansion of higher education' in Altbach, Philip (ed) *International higher education: an encyclopedia*, Garland Publishing Inc, New York and London, cited in Smith (1993, p 25).
- REVIEW PANEL (2002), *Scottish higher education review. Report of the review panel*, <http://www.scotland.gov.uk/about/ELLD/HESP/00016640/rprpt.pdf>
- RIFKIN, TRONIE (1998) 'Improving articulation policy to increase transfer', *ECS Policy Paper*, Education Commission of the States, cited in Coley, Richard J (2000) *The American community college turns 100: a look at its students, programs, and prospects*, Educational Testing Service, Princeton, New Jersey, www.ets.org/research/pic.
- ROBERTS, GARETH (2003) *Review of research assessment*, report by Sir Gareth Roberts to the UK funding bodies, <http://www.ra-review.ac.uk/>.
- ROBINSON, CHRIS & MISKO, JOSIE (2001) *Extending learning opportunities. A study of co-operation between tafe institutes and schools and universities in Queensland*, National Centre for Vocational Education Research, Leabrook.
- ROMANO, RICHARD M & WISNIEWSKI, MARTIN (2003) 'Tracking community college transfers using national student clearinghouse data', paper presented at the 45 annual conference of the Council for the Study of Community Colleges – Dallas, TX, April 4-5, 2003, http://www.studentclearinghouse.org/colleges/esearch/pdfs/SUNY_ES_casestudy.pdf
- ROODHOUSE, SIMON (2000) 'Editorial. Vocational qualifications in higher education', *Journal of Vocational Education and Training*, volume 52, number 4.
- ROSENFELD, STUART A (1998) *Community college/cluster connections: specialization and competitiveness in the U.S. and Europe*, Teachers College, Columbia University, New York, <http://www.tc.columbia.edu/~iee/ccrc/PAPERS/rosenfl1.pdf>
- RUSHBROOK, PETER (1997) 'Tradition, pathways and the renegotiation of tafe identity in Victoria', *Discourse: studies in the cultural politics of education*, vol 18, no 1, pp 103-112.
- RUST, VAL D (2001) 'Editorial', *Comparative Education Review*, vol 45 no 3, pp iii-iv.
- RYAN, PAUL (1991) 'Introduction' in Ryan, Paul (ed) *International comparisons of vocational education and training for intermediate skills*, The Falmer Press, London.
- RYLE, GILBERT (1975) [first published 1949] *The concept of mind*, Hutchinson & Co (Publishers) Ltd, London.
- SADLER, SIR MICHAEL E (1964) (1st published 1900) (Bereday, George, Z F, ed) 'How far can we learn anything of practical value from the study of foreign systems of

- education?', notes of an address given at the Guilford educational conference, on Saturday, 20 October, *Comparative Education Review*, vol 7 no 3, February.
- SALTER, AMMON J & MARTIN, BEN R (2001) 'The economic benefits of publicly funded basic research: a critical review', *Research Policy* 30 (2001) 509–532, www.elsevier.com/locate/econbase.
- SAN HOUSTON STATE UNIVERSITY (2001) *Undergraduate Degree Programs*, <http://www.collegefortexans.com/cfbin/extpage.cfm?SiteURL=http://www.shsu.edu>, downloaded 17 December 2001.
- SANDERSON, MICHAEL (1999) *Education and economic decline in Britain, 1870 to the 1990s*, Cambridge University Press, Cambridge.
- SCHOFIELD, KAYE (1998) 'University-tafe collaboration: the kiss of death?' Paper to the 22nd ATEM conference, Darwin
<http://www.ntu.edu.au/local/atem/conference/plenary/p2.pdf>.
- SCHOFIELD, K (1999a) *Independent investigation into the quality of training in Queensland's traineeship system: report*, Queensland, Dept of Employment, Training and Industrial Relations.
- SCHOFIELD, K (1999b) *Risky business: review of the quality of Tasmania's traineeship system*, Hobart, Office of Vocational Education and Training.
- SCHOFIELD, K (2000a) *Delivering quality: report of the independent review of the quality of training in Victoria's apprenticeship and traineeship system*, Melbourne, Communications Division, Department of Education, Employment and Training (Victoria).
- SCHOFIELD, KAYE (2000b) 'Traineeships: lessons from three reviews', answer to question from the audience 15 August (author's notes), presentation to Victoria University of Technology, Melbourne.
- SCOTT, PETER (2000) 'A tale of three revolutions? Science, society and the university' in Scott, Peter (ed) *Higher education re-formed*, Falmer Press, London, 190–206.
- SCOTT, DAVID (2004) *Pathways in tertiary education 1998–2002*, Aotearoa New Zealand Ministry of Education Te Tāhuhu o te Mātauranga,
http://www.minedu.govt.nz/web/downloadable/dl9703_v1/pathways-report-web.pdf
- SCOTTISH EXECUTIVE (2001) *Scottish higher education review: first consultation paper*, <http://www.scotland.gov.uk/consultations/lifelonglearning/sher.pdf>
- SCOTTISH EXECUTIVE (2002) *A framework for higher education in Scotland*, higher education review: phase 2, <http://www.scotland.gov.uk/library5/lifelong/herp2.pdf>
- SCOTTISH HIGHER EDUCATION REVIEW (2002) *Second consultation paper: shaping our future*, <http://www.scotland.gov.uk/consultations/lifelonglearning/sher2.pdf>
- SCOTTISH PARLIAMENT ENTERPRISE AND LIFELONG LEARNING COMMITTEE (2002) *9th Report 2002: Final report on lifelong learning*,
http://www.scottish.parliament.uk/official_report/cttee/enter-02/elr02-09-01.htm.
- SCOTTISH QUALIFICATIONS AUTHORITY (2004a) *Background*,
http://www.sqa.org.uk/sqa/sqa_nu_display.jsp?pContentID=4609&p_applic=CCC&p_MenuID=558&p_service=Content.show&

- SCOTTISH QUALIFICATIONS AUTHORITY (2004b) *SCQF postcard*,
http://www.sqa.org.uk/files_ccc/SCQF-Postcard-2004.pdf
- SCOTT, PETER (2000) 'A tale of three revolutions? Science, society and the university' in Scott, Peter (ed) *Higher education re-formed*, Falmer Press, London, 190-206.
- SECRETARY OF STATE FOR EDUCATION AND SKILLS (2003a) *The future of higher education*, Cm 5735, <http://www.dfes.gov.uk/highereducation/hestrategy/pdfs/DfES-HigherEducation.pdf>.
- SECRETARY OF STATE FOR EDUCATION AND SKILLS (2003b) *21st century skills – realising our potential: individuals, employers, nation*, Cm 5810,
<http://www.dfes.gov.uk/skillsstrategy/docs/fulldoc.pdf>.
- SEIDENFADEN, F (1972) 'Some thoughts on the function of comparative education in the context of educational research', *Comparative Education*, vol 8 no 1.
- SENATE COMMITTEE ON EDUCATION (2001) *Committee Information*,
<http://www.senate.state.tx.us/75r/senate/commit/c530/c530.htm>, downloaded 3.12.01.
- SHAPIN, S & BARNES, B (1976) 'Head and hand: rhetorical resources in British pedagogical writing, 1770-1850' *Oxford Review of Education*, 2 (3) pp 231-253.
- SHAPIRO, BERNARD (1993) 'Mass higher education: problems and challenges', in OECD (ed) *The transition from elite to mass higher education*, proceedings of an international conference sponsored by the Australian Department of Employment, Education and Training in association with the Organisation for Economic Co-operation and Development, 15-18 June, Commonwealth of Australia, Canberra, pp51-61.
- SHAW, K M & LONDON, H B (1995, November) 'Negotiating class and cultural boundaries: toward an expanded definition of the transfer process', paper presented at the ASHE Annual Meeting, Orlando, Florida. (ERIC Reproduction Document Service No. ED 391 432)
- SHAW, KATHLEEN M & LONDON, & HOWARD B (2001) 'Culture and ideology in keeping transfer commitment: three community colleges', *The Review of Higher Education*, Fall 2001, Volume 25, No. 1, pp. 91-114.
- SHOEMAKER, ADAM, ALLISON, JANELLE, GUM, KINGSLEY, HARMONI, ROSE, LINDFIELD, MIKE, NOLAN, MARGUERITE, STEDMAN, LAWRENCE (2000) *Multi-partner campuses. The future of Australian higher education?*, Evaluations and investigations programme 00/13, Department of Education, Training and Youth Affairs,
http://www.detya.gov.au/archive/highered/eippubs/eip00_13/00_13.pdf.
- SHULOCK, NANCY (2004) 'The impact of recent budget reductions and enrollment pressures on access and quality', in Hayward, Gerald C, Jones, Dennis P, McGuinness, Aims C Jr & Timar, Allene, *Ensuring access with quality to California's community colleges*, report #04-3, National Center for Public Policy and Higher Education, San Jose, California,
<http://www.highereducation.org/reports/hewlett/Hewlett3.pdf>
- SKILBECK, MALCOLM, CONNELL, HELEN, LOWE, NICHOLAS & TAIT, KIRSTEEN (1994) *The vocational quest: new directions in education and training*, Routledge, London.

- SKILBECK, MALCOLM, WAGNER, ALAN & ESNAULT, ERIC (1998) *Redefining tertiary education*, Organisation for Economic Co-operation and Development, Paris, <http://www.oecd.org/>
- SKOLNIK, M L (1986) 'Diversity on higher education: the Canadian case', *Higher education in Europe*, **11**, No 2, pp 19-32.
- SKOLNICK, MICHAEL L & JONES, GLEN A (1992) 'A comparative analysis of arrangements for state coordination of higher education in Canada and the United States', *The Journal of Higher Education*, (March) 63, 2, pp 121-142.
- SMITH, ERICA & KEATING, JACK (2003) *From training reform to training packages*, Social Sciences Press, Tuggerah.
- SMITH, LARRY (2003) 'Welcome', *Enhancing university-tafe partnerships*, professional development and policy seminar, Friday 21 November, University of New England, Armidale.
- SMITH, ROBERT (1993) 'The transition from elite to mass higher education systems: overview and current issues', in OECD (ed) *The transition from elite to mass higher education*, proceedings of an international conference sponsored by the Australian Department of Employment, Education and Training in association with the Organisation for Economic Co-operation and Development, 15-18 June, Commonwealth of Australia, Canberra, pp 24-43.
- SOMMERLAD, ELIZABETH, DUKE, CHRIS & McDONALD, ROD (1998) *Universities and TAFE collaboration in the emerging world of 'universal higher education'*, Higher Education Council, http://www.detya.gov.au/nbeet/publications/pdf/98_10.pdf.
- SORENSEN, ANTHONY (1998) *Regional development policy*, <http://www.une.edu.au/geoplan/gp345/sld179.ht>, accessed 11 August 2003.
- SOYDAN, HALUK (1996) 'Using the vignette method in cross-cultural comparisons', in Hantrais, Linda & Mangen, Steen (eds) *Cross-national research methods in the social sciences*, Cassell, London.
- SPICKER, PAUL (1996) Comparing education, training and employment in Germany, the United Kingdom and Italy in Hantrais, Linda & Mangen, Steen (eds) *Cross-national research methods in the social sciences*, Cassell: London.
- SPOLTON, LEWIS (1968) 'Methodology in comparative education', *Comparative Education*, volume 4 number 2.
- STARR, KEVIN (2001) *California: the dream and the challenge in the twenty-first century*, State Library of California, http://www.ca.gov/state/portal/myca_htmldisplay.jsp?sFilePath=/portal/links/the_dream.html&sCatTitle=California+-+The+Dream+-+The+Challenge&BV_SessionID=@@@@1008979060.0995786180@@@&BV_EngineID=callhijeghjbemfcfkmchcng.0, downloaded 22.7.2001.
- STATE OF VICTORIA (DEPARTMENT OF EDUCATION & TRAINING) (2002) *Local Learning and Employment Networks*, <http://www.llen.vic.gov.au/llen/>.
- STATISTICS CANADA (2003) *Statistics - higher education*, <http://www.statcan.ca/english/Pgdb/educ02a.htm>, Date modified: 2003-09-05.

- STEPHEN F AUSTIN STATE UNIVERSITY, Department of Accounting (2001) *General information*,
<http://www.collegefortexas.com/cfbin/extpage.cfm?SiteURL=http://www.sfasu.edu>,
 downloaded 17 December 2001.
- STEVENSON, JOHN C (1988) Dismantling the barricades: the interface between TAFE and higher education, in Candy, Philip C (ed) *TAFE at the crossroads: relationships with government, secondary and higher education*, Department of Administrative and Higher Education Studies, University of New England, Armidale, pp 131-144.
- STEVENSON, JOHN (1992) 'Australian vocational education: learning from past mistakes', *The Vocational Aspects of Education*, volume 44, number 2, pp 236-7.
- STEVENSON, JOHN (1995) 'The political colonisation of the cognitive construction of competence', *The Vocational Aspect of Education*, volume 47, no 4, pp 353-364.
- STEVENSON, JOHN (1996) 'The metamorphosis of the construction of competence', *Studies in Continuing Education*, vol 18, no 1, pp 24-42.
- STEVENSON, JOHN (1997) 'Legitimate learning', *Australia and New Zealand Journal of Vocational Education Research*, 5 (2), pp 1-43.
- STEVENSON, JOHN (1998a) 'Finding a basis for reconciling perspectives on vocational education and training', *Australia and New Zealand Journal of Vocational Education Research*, 6 (2), pp 134-165.
- STEVENSON, JOHN C (1988b) 'Dismantling the barricades: the interface between TAFE and higher education', in Candy, Philip C (ed) *TAFE at the crossroads: relationships with government, secondary and higher education*, Department of Administrative and Higher Education Studies, University of New England, Armidale, pp 131-144.
- STEVENSON, JOHN (2000) 'Working knowledge', *Journal of Vocational Education and Training*, volume 52, number 3, pp 503-519.
- STEVENSON, JOHN (2003) 'The implications of learning theory for the idea of general knowledge', paper presented to the Journal of Vocational Education and Training's fifth international conference, University of Greenwich, London, 16-18 July 2003.
- STRIPLIN, J J (1999) 'Facilitating transfer for first-generation community college students', ERIC Digest, Los Angeles, California: ERIC Clearinghouse for Community Colleges. (ERIC Reproduction Service Document No. ED 430 627).
- STROM-MARTIN, VIRGINIA & VASCONCELLOS, JOHN (2001) *2001 democratic education package*,
http://www.senate.ca.gov/ftp/SEN/COMMITTEE/STANDING/EDUCATION/_home/2001_DEMO_ED_PACKAGE.DOC.
- STUDENT AWARDS AGENCY FOR SCOTLAND (2004) *Support information*,
<http://www.student-support-saas.gov.uk/>
- STUMPF, ROLF (2003) 'Comprehensives: where from and where to?', *izwi Voice of HE leadership*, 4th quarter vol 2, South African Universities Vice-Chancellors Association,
http://www.sauvca.org.za/download_files/whats_new/izwi_newsletter_22003.pdf.
- SUMMERFIELD, PENNY & EVANS, ERIC (1990) 'Introduction: technical education, the state and the labour market' in Summerfield & Evans (eds) *Technical education and*

the state since 1850: historical and contemporary perspectives, Manchester University Press, Manchester, pp 1 - 18.

SWANSON, CHESTER & KRAMER, ERNEST G (1965) 'Vocational education beyond high school' in Barlow, Melvin G (ed) *64th yearbook of the National Society for the Study of Vocational Education*, University of Chicago Press, Chicago, pp 168-185.

SYMES, COLIN (1999) "'Working for your future": the rise of the vocationalised university', *Australian Journal of Education*, 43, 3, pp 241-56.

TAFE DIRECTORS AUSTRALIA (2002) *Submission to the higher education review by Tafe Directors Australia*, <http://www.detya.gov.au/crossroads/submissions/pdf/322.pdf>.

TARLTON STATE UNIVERSITY Department of Accounting (2001) *150 hour requirement/program*, <http://www.tarleton.edu/~acct/150hr.html>, downloaded 18 December 2001.

TECHNICAL AND FURTHER EDUCATION (TAFE) COMMISSION (1976) *Report for the triennium 1977-1979*, Australian Government Publishing Service, Canberra.

TEICHLER, ULRICH (1988) *Changing patterns of the higher education system*, Jessica Kingsley, London, cited in Kerr (1994, pp 97-8).

TEMPLE, PAUL (2001) 'The HE/FE divide: is the end in sight?', *Perspectives*, vol 5, no 3, pp 78-82.

TERTIARY EDUCATION COMMISSION TE AMORANGI MATAURANGA MATUA (2004) *The distinctive contributions of tertiary education organisations: a Tertiary Education Commission consultation paper*, http://www.tec.govt.nz/downloads/a2z_publications/consultation-distinctive-contributions-paper.pdf

TEUFEL, ERWIN (2005) *Welcome to the regional service for Baden Württemberg*, <http://www.cordis.lu/baden-wuerttemberg/home.html>

TEXAS A&M UNIVERSITY (2002) *About Texas A&M University*, <http://www.tamu.edu/00/data/about.html>, downloaded 12.01.02.

TEXAS DEPARTMENT OF ECONOMIC DEVELOPMENT (2001) *The Texas economy*, <http://www.bidc.state.tx.us/overview/2-2te.htm>, last updated on 08/28/01, downloaded 17.9.01.

TEXAS HIGHER EDUCATION COORDINATING BOARD, Community and Technical Colleges Division (2000) *2000 College Profiles*, Public Community and Technical Colleges of Texas, <http://www.thecb.state.tx.us/reports/pdf/0328.pdf>, downloaded 18.11.01.

TEXAS HIGHER EDUCATION COORDINATING BOARD (2001a) *2001 Statewide Annual Licensure Report*, <http://www.thecb.state.tx.us/reports/pdf/0431.pdf>, downloaded 18.11.01.

TEXAS HIGHER EDUCATION COORDINATING BOARD (2001b) *Report on the Performance of Texas Public Universities*, www.thecb.state.tx.us, downloaded 18.11.01.

TEXAS HIGHER EDUCATION COORDINATING BOARD (2001c) *Lower division academic course guide manual*, http://www.thecb.state.tx.us/CTC/IP/ACGM2k/0407.htm#_Toc517231229, downloaded 7 Feb 02.

- TEXAS HIGHER EDUCATION COORDINATING BOARD (2002a), *About Us*, <http://www.thecb.state.tx.us/about/>, downloaded 12.01.02.
- TEXAS HIGHER EDUCATION COORDINATING BOARD (2000b) *Closing the gaps: the Texas higher education plan*, <http://www.thecb.state.tx.us/AdvisoryCommittees/HEP/HEplanFinal.PDF>.
- TEXAS HIGHER EDUCATION COORDINATING BOARD (2004a) *Doctoral education in Texas*, <http://www.thecb.state.tx.us/UHRI/DocStudyFinal102804.pdf>
- TEXAS HIGHER EDUCATION COORDINATING BOARD (2004b) Consideration of the accountability system for Texas higher education, AGENDA ITEM III-C, October, <http://www.thecb.state.tx.us/about/agendaminutes/Ag1004/IIIC/>
- TEXAS HIGHER EDUCATION COORDINATING BOARD (2005) *Texas charter for public higher education*, <http://www.thecb.state.tx.us/reports/PDF/0081.PDF>
- TEXAS LEGISLATIVE COUNCIL (2001), *Texas Statutes, Education Code, subtitle B. State coordination of higher education. Chapter 61. Texas Higher Education Coordinating Board. Subchapter C. Powers and duties of board. Sec. 61.051. Coordination of institutions of public higher education.* <http://www.capitol.state.tx.us/statutes/statutes.html>, downloaded 3.12.01.
- TEXAS LEGISLATIVE COUNCIL (2002) *Education Code*, http://www.thecb.state.tx.us/CTC/IP/Core11_00/EduCode.htm, downloaded 7 Feb 02.
- THE UNIVERSITY OF TEXAS AT BROWNSVILLE (2003) *The University of Texas at Brownsville and Texas Southmost College*, <http://www.utb.edu/>.
- THOMPSON, E P (1980) [1963] *The making of the English working class*, Penguin Books, London.
- THOMPSON, JOHN F (1973) *Foundations of vocational education*, Prentice-Hall Inc, Englewood Cliffs.
- TIGHT, MALCOLM (1996) 'Changing concepts in adult education', *Studies in Continuing Education*, vol 18, no 1, pp 59-72.
- TIMES HIGHER EDUCATION SUPPLEMENT (1973) 'Wearing of the green', 2 February, p.1, quoted in Hermann et al (1976).
- TONER, PHILLIP (2005) 'The survival and decline of the apprenticeship system in the Australian and UK construction industries', *acirrt working paper 96*, University of Sydney, <http://www.acirrt.com/pubs/WP96.pdf>
- TOWNSEND, BARBARA K (1999) *Understanding the impact of reverse transfer students on community colleges: new directions for community colleges*, vol 106 (Summer), pp 15-26, San Francisco, Jossey-Bass.
- TOWNSEND, BARBARA K (2000) 'Transfer students' institutional attendance patterns: a case study', *College and University*, vol 76, issue 1, pp 21-5.
- TOWNSEND, B K & DEVER, J (1999, Summer) 'What do we know about reverse transfer students?', in B K Townsend (ed) *Understanding the impact of reverse transfers upon community colleges* (pp. 5-14), New Directions for Community Colleges, no 106, Jossey-Bass, San Francisco.
- TRETHERWEY, ALAN ROBERT (1976) *Introducing comparative education*, Pergamon Press, Rushcutters Bay.

- TROW, MARTIN (1974) 'Problems in the transition from elite to mass higher education', in Organisation for Economic Co-operation and Development (OECD) *Policies for Higher Education*, OECD, Paris, pp 51-101.
- TROW, MARTIN (1976) 'Elite higher education: an endangered species?', *Minerva*, 14, pp 355-76.
- TROW, MARTIN (2005) 'The decline of diversity, autonomy and trust in post-war British higher education: an [North] American perspective', *Perspectives*, volume 9, number 1 (January), pp 7-11.
- UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANISATION (UNESCO) (1986) *The integration of general and technical and vocational education*, UNESCO, Paris.
- UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANISATION (UNESCO) (1997) *International Standard Classification of Education* http://www.unesco.org/education/docs/isced_1997.htm.
- US CENSUS BUREAU (2000a) (CO-99-1) County Population Estimates for July 1, 1999 and Population Change for July 1, 1998 to July 1, 1999, *Population Estimates Program, Population Division*, U.S. Census Bureau, Washington, DC 20233. Internet Release Date: March 9, 2000
- US CENSUS BUREAU (2000b) (ST-99-32) *Population estimates for states by race and Hispanic origin: July 1, 1999* www.census.gov/population/estimates, internet release date 30 August 2000, downloaded 27.5.2001.
- US DEPARTMENT OF COMMERCE, Economics and Statistics Administration, U.S. Census Bureau (2001) *Money income in the United States: 2000*, Table E. Income of Households by State Using 2-and 3-Year-Average Medians (Income in 2000 dollars), <http://www.census.gov/prod/2001pubs/p60-213.pdf>, Issued September 2001, downloaded 14.1.02.
- US DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS (1991) *Digest of education statistics 1991*, US Government Printing Office Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328, <http://nces.ed.gov/pubs91/91697.pdf>
- US DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS (1998) *Fall enrollment in higher education, various years*, 'Fall enrollment in colleges and universities' survey; and Integrated Postsecondary Education Data System (IPEDS), 'Fall enrollment' surveys (table was prepared May 1998), <http://nces.ed.gov/programs/digest/d98/d98t181.asp>
- US DEPARTMENT OF EDUCATION NATIONAL CENTER FOR EDUCATION STATISTICS (2000) Higher Education General Information Survey (HEGIS), 'Fall Enrollment in Colleges and Universities' surveys; and Integrated Postsecondary Education Data System (IPEDS), 'Fall Enrollment' surveys, <http://nces.ed.gov/pubs2001/digest/dt201.html>, downloaded 13.01.02.
- US DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS (2002) Integrated Postsecondary Education Data System (IPEDS), 'Fall enrollment' survey (table prepared May 2002), <http://nces.ed.gov/pubs2003/digest02/tables/XLS/Tab177.xls>.

- US DEPARTMENT OF EDUCATION, NATIONAL CENTER FOR EDUCATION STATISTICS (2003), *The condition of education 2003*, NCES 2003-067, U.S. Government Printing Office, Washington, DC, http://nces.ed.gov/programs/coe/2003/pdf/19_2003.pdf.
- US NEWS & WORLD REPORT (2001) *America's Best Colleges*, <http://www.usnews.com/usnews/edu/college/rankings/rankindex.htm>, downloaded 27.5.2001.
- VENABLES, PETER (1978) *Higher education developments: the technological universities 1956 – 1976*, Faber and Faber, London.
- VENN, GRANT (1964) *Man, education and work*, American Council on Education, Washington, DC.
- VLAEMINKE, MERIEL (1990) 'The subordination of technical education in secondary schooling, 1870-1914' in Summerfield & Evans (eds) *Technical education and the state since 1850: historical and contemporary perspectives*, Manchester University Press, Manchester, pp 55 - 96.
- VON TUNZELMANN, NICK, RANGA, MARINA, MARTIN BEN & GEUNA ALDO (2003) *The effects of size on research performance: a SPRU review*, June, <http://www.sussex.ac.uk/spru/documents/geunaost.pdf>
- WASSMER, ROBERT, MOORE, COLLEEN, & SHULOCK, NANCY (2003) 'A quantitative study of California community college transfer rates: policy implications and a future research agenda', *Policy issue report*, California State University, Sacramento, <http://www.csus.edu/ihe/PDFs/02-03.pdf>.
- WATERHOUSE, R (1998) 'A university for life', in Mitchell, P (ed) *Beyond the universities: the new higher education*, Ashgate Publishing, Aldershot.
- WATERHOUSE, R (2000) The distributed university, in Scott, Peter (ed) *Higher education re-formed*, Falmer Press, London, pp 45-57.
- WATSON, KEITH (1994) 'Technical and vocational education in developing countries: western paradigms and comparative methodology', *Comparative Education*, volume 30, no 2, 85-97.
- WATSON, KEITH (1996) 'Comparative education' in Gordon, Peter (ed) *A guide to educational research*, The Woburn Press, London.
- WATSON, LOUISE (2000) *Survey of private providers in Australian higher education 1999*, Department of Education, Training and Youth Affairs, Canberra, http://www.detya.gov.au/archive/highered/eippubs/eip00_4/survey.pdf.
- WATERHOUSE, R (1998) 'A university for life' in Mitchell, P (ed) *Beyond the universities: the new higher education*, Ashgate Publishing, Aldershot.
- WATERHOUSE, R (2000) 'The distributed university', in Scott, Peter (ed) *Higher education re-formed*, Falmer Press, London, pp 45-57.
- WELLINGTON, J J (1993) *The work related curriculum*, Kogan Page, London.
- WELLMAN, JANE V (2002) 'State policy and community college-baccalaureate transfer', *National Center Report #02-6*, The National centre for Public Policy and Higher Education, <http://www.highereducation.org/reports/transfer/transfer.shtml>.

- WERNER, M C (1998) *Issues regarding higher education graduates in vocational education and training*, National Centre for Vocational Education Research, Adelaide.
- WHEELAHAN, LEESA (2000) *Bridging the divide: developing the institutional structures that most effectively deliver cross-sectoral education and training*, National Centre for Vocational Education Research, Adelaide, <http://www.ncver.edu.au/publications/509.html>
- WHEELAHAN, LEESA (2002) 'They do things differently', *Campus Review*, 29 October, 2002.
- WHEELAHAN, LEESA & MOODIE, GAVIN (2004) Separate post-compulsory education sectors within a liberal market economy: interesting models generated by the Australian anomaly, in Osborne, Michael & Gallacher, Jim (eds) *The extra-university – how Cinderella could get to the academic ball. The role of vocational education and training colleges as providers of higher education – an international review*, NIACE, Leicester (forthcoming).
- WHITE, TONY (2001) *Investing in people: higher education in Ireland from 1960 to 2000*, Institute of Public Administration, Dublin.
- WHITLEY, RICHARD (2003) 'Competition and pluralism in the public sciences: the impact of institutional frameworks on the organisation of academic science', *Research Policy* 32 (2003) 1015–1029, www.elsevier.com/locate/econbase.
- WILKINSON, R H (1970) 'The gentleman ideal and the maintenance of a political elite', in Musgrave, P W (ed) *Sociology, history and education*, Methuen, London.
- WILLIAMS, B (1970) 'A functional differentiation?', *Vestes* pp 121-125.
- WILLIAMS, B R (1979) *Education, training and employment*, report of the committee of inquiry into education and training, Australian Government Publishing Service, Canberra.
- WILLIAMS, H S (1961) 'Technical education - State or national?', *The Australian Journal of Higher Education* (formerly *The Educand*) 1, 1, 98-103.
- WILLIAMS, H S (1963) 'Tertiary technical in Australia', *The Australian University*, 1, 1, 89-119.
- WILLIAMS, H S (1965) 'The technical colleges', in John Wilkes (ed) *Tertiary education in Australia*, pp 66-85, Angus and Robertson, Sydney.
- WINDHAM, PATRICIA, PERKINS, GEORGE R & ROGERS, JON (2001) 'Concurrent-use campuses: part of the new definition of access', *Community College Review* vol 29 iss 3 pp 39-56.
- WINTER, PAUL A & HARRIS, MICHAEL R (1999) 'Community college reverse transfer students: a field survey of a nontraditional student group', *Community College Review*, v 27 i1, p13.
- WIORA, WALTER (1975) *Ergebnisse und Aufgaben vergleichender Musikforschung*, cited in Froese (1982: 307).
- WITTGENSTEIN, LUDWIG (1968) Anscombe, G E M (trns) *Philosophical investigations*, Basil Blackwell, Oxford.

- WOLFE, DAVID A (2002) 'Social capital and cluster development in learning regions', in Holbrook, Adam J & Wolfe, David A (eds) *Knowledge, clusters and learning regions*, Queen's School of Policy Studies and McGill-Queen's University Press, Kingston, http://www.utoronto.ca/isrn/Wolfe_SocialCapital2.pdf
- WOLFE, DAVID A (2004) 'The role of universities in regional development and cluster formation', in Jones, Glen, McCarney, Patricia & Skolnick, Michael (eds) *Creating knowledge, strengthening nations*, University of Toronto Press, Toronto, http://www.utoronto.ca/progris/pdf_files/Higher_Education_UofTPress.pdf
- WOOD, J M & BOYD, G D (1982) 'Loose coupling: towards a new approach for analysing TAFE systems', *Journal of Tertiary Educational Administration*, Volume 4, Number 2, pp 89-96.
- YOUNG, MICHAEL (1993) 'A curriculum for the 21st century? Towards a new basis for overcoming academic/vocational divisions', *British Journal of Educational Studies*, vol XXXXI no 3 (September), pp 203-222.
- YOUNG, M, HOWIESON, C, RAFFE, D & SPOURS, K (1997) Unifying academic and vocational learning and the idea of a learning society, *Journal of Education Policy*, 12 (6), 527-537.
- YUSUF, SHAHID & EVENETT, SIMON J (2002) *Can East Asia compete? Innovation for global markets*, The International Bank for Reconstruction and Development / The World Bank, Washington, [http://lnweb18.worldbank.org/eap/eap.nsf/Attachments/Can+Asia+Compete/\\$File/ca-neastasiacompete.pdf](http://lnweb18.worldbank.org/eap/eap.nsf/Attachments/Can+Asia+Compete/$File/ca-neastasiacompete.pdf)