The application of Australian Bureau of Statistics’ socio-economic indicators to the national VET collection

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Abstract
Research in a number of western countries has established a strong link between education participation and achievement and socioeconomic status. However, most of this research has concentrated on the effect of socioeconomic status in school and higher education, with little focus on the vocational education and training sector. In Australia, there has only been limited research directed at the socio-economic status of sections of the VET population, such as McIntyre’s (2000a, 2000b) research on VET participation in Melbourne and Sydney and McIntyre et al’s (2000) application of SEIFA indexes to VET in Western Australia. Researchers have yet to examine the relationship between socio-economic status and VET students at the national level.

This paper presents a work-in-progress report on research that is currently being undertaken at NCVER examining the relationship between socio-economic status and participation and achievement in the public VET system. The 2001 national VET collection data is being analysed at the postcode level and matched to area-based indexes of socio-economic status produced by the Australian Bureau of Statistics (SEIFA 2001). The paper reports on the extent of the relationship between participation and achievement in the public VET system, on the one hand, and ‘socioeconomic level’ (as measured by the Australian Bureau of Statistics), on the other. The paper details the extent that training opportunities provided by the public VET system are taken up by people from different socioeconomic backgrounds, and what are the achievements and outcomes for different groups in the VET population.
Introduction

There is a considerable body of research that has found that socio-economic status (SES) plays an important role in educational participation and achievement.

Research on socio-economic status and the school sector in Australia has found strong relationship between socio-economic status and secondary education. Western et al. (1998:11) claimed that

the school system one gets into, reactions to the school experience, the completion of secondary school to Year 12, aspirations for higher education or other activity on leaving school, and what the individual in fact does at the completion of schooling are all, if not determined by one's socioeconomic status, then at least significantly influenced by it.

An extensive body of literature on students in Australian higher education that has found indisputable evidence of a socioeconomic imbalance. Students from low socioeconomic backgrounds display the lowest access and participation rates, and remain under-represented in virtually all fields and levels of study (Skuja 1995; Martin 1994). Only last week *The Age* newspaper (Alcorn and Rood, 2004) reported that students from disadvantaged backgrounds are increasingly being 'channelled to less elite institutions and clustered in less prestigious courses, if they get to university at all”.

The majority of the research on socio-economic status has focussed on the impact role of SES on students in the school and higher education sectors. Unfortunately, there has been considerably less focus on the impact of SES on students in the VET sector. The limited research that has been conducted on socio-economic status and the VET sector has called for further research to be conducted at the national level.

This conference paper is a work-in-progress report of research that is currently being undertaken at the National Centre for Vocational Education Research that is applying socio-economic indicators to the national VET collection. The first section of this paper presents some details on the definition of socio-economic status and the ABS's Socio-Economic Indexes for Areas. The second section of the paper presents some findings from the application of these indexes to the national VET collection.

Defining socio-economic status

Generally speaking, socioeconomic status is a broad concept that is typically used as a measure of an individual’s or group’s social position in the community, usually in some hierarchical order. For example, we often talk about upper class, middle class and lower class or working class groups in society. These examples are very 'loose’ terms that cannot be measured directly.

Ainley (1995) had earlier raised some concern that policy-makers and researchers had used the expression without adequately defining the term or its method of measurement. However, Graetz (1995) argues that there is now less concern about this issue, as the term has become more common and widely accepted. Although the term is widely used, there remains considerable discussion on how socio-economic status can be quantified and the choice of appropriate indicators (Graetz, 1995).

Measuring socio-economic status

There is no single measure of an individual’s or family’s social position. Therefore, it is necessary to calculate a composite measure of socio-economic status using various economic (wealth), social (education and occupation) and physical (location) characteristics of the environments in which individuals live and work, as well as demographic (age) and genetic (ethnic status) factors (Ainley and Long, 1995). However, the composition—and weighting of these variables—remains a matter of discussion.

There are various methods that can be implemented to obtain the data necessary data to calculate the composite socio-economic measures. The first method is to obtain individual data on educational,
occupational and economic attainment. This can be achieved either through specialised participant surveys of students or from information gathered during the enrolment process. These approaches are usually expensive, complex, intrusive, and time consuming.

When individual data is not available—or there are not sufficient resources available to collect it—it is necessary to use aggregate data as a proxy. This approach aggregates data obtained for all residents of a particular area to approximate the characteristics of an individual within the same area. The aggregated area approach 'is based on the assumption that people tend to live in areas of comparable housing quality, amongst others of broadly similar occupational, educational and income attainments' (Linke, et al., 1998). Linke et al. (1988:12) considered three conditions as necessary in order for this approach to be successful:

- regions must be sufficiently small and homogenous to be able to reflect accurately the socioeconomic characteristics of individual constituents
- a valid and reliable measure of socioeconomic status must be established for each region and
- the regional location of individuals must be accurately identified. (Linke et al, 1988:12).

Ainley and Long (1995:33) maintain that the application of aggregate data is a relatively ‘simple and cost effective approach, that is not open to institutional reporting bias and does not rely on intrusive questions on social background’. Furthermore, this approach can be easily applied to existing data sources, such as enrolment data, where an appropriate location identifier (e.g. postcode) is collected.

The major disadvantage with aggregate analyses of socioeconomic status is the issue of heterogeneity within the spatial area. Ainley and Long (1995) argue that assigning a value of socioeconomic status to a student on the basis of the area in which they live will introduce a potential error and the magnitude of the area will be greater when the social background of those living in the area is relatively heterogeneous.

Despite this important disadvantage, aggregate analysis has been widely adopted for the determination of socio-economic status of students. It is has been applied to student data in the school, higher education and—to a limited extent—the VET sectors.

There have been various attempts to quantify socio-economic status in Australia (Linke et al. 1988; Ross, 1983, 1984; Ross et al. 1985, 1988; and the Australian Bureau of Statistics). The Australian Bureau of Statistics (ABS) first constructed an area-based index of socio-economic disadvantage after the 1971 Census of Population and Housing. Since then it has produced the Socio-Economic Indexes for Areas (SEIFA) from the 1986, 1991, 1996 and 2001 Censuses of Population and Housing.

**Socio-Economic Indexes for Areas (SEIFA)**

The Australian Bureau of Statistics (ABS) base their Socio-Economic Indexes for Areas on the concept of disadvantage, which they view as an extension to socioeconomic status, which in turn is measured through education, occupation and income. The ABS (2004) defined aspects of socioeconomic disadvantage as ‘those factors that put someone at a disadvantage compared to someone else.’ They identified examples as wealth, residential conditions, health, access to services, and language.

For SEIFA 2001, the Australian Bureau of Statistics undertook a comprehensive review of the SEIFA methodology, including the variable selection process and principal component analysis of variables. As a result of this review process, SEIFA implemented a different variable selection process that produced four socio-economic indexes for areas (compared to the five indexes produced for SEIFA 1996). The review process and methodology is described in full in the ABS Technical Paper on SEIFA (ABS, 2004). The following section briefly summarises some of the more salient points concerning the SEIFA 2001 methodology.
SEIFA 2001 Methodology

SEIFA 2001 is based on data collected in the 2001 Census on Housing and Population. The core unit of analysis for SEIFA 2001 is the collector district, which is the smallest geographic area of both the Australian Standard Geographical Classification (ASGC) and Census Geographic Areas. Collector districts are defined only in a census year, and comprise approximately 220 dwellings in urban areas, and slightly fewer in rural areas. In 2001 there were 37,209 collector districts throughout Australia. However, some 1,514 CDs were excluded from SEIFA 2001, due to collector districts having:

- low (<10) population,
- low numbers (<5) of employed persons,
- large proportion (70+%) of CD population who did not respond to questions on
  - family income,
  - occupation,
  - labour force status,
  - type of education institution being attended, and
  - qualifications; and
- large proportion non-private dwellings, etc.

Consequently, SEIFA 2001 is based on 35,695 collector districts.

A new variable selection strategy was incorporated into SEIFA for 2001, based on a theoretical model of disadvantage. This theoretical model grouped potential variables into three levels:

1. Level one variables are core variables of Education (or qualification), Income and Occupation. These variables are always included in the SEIFA indexes because they are fundamental to measuring socio-economic status. The Index of Education and Occupation only uses level one variables.

2. Level two variables are direct measures of an aspect of disadvantage. These aspects relate to things like wealth (number of motor vehicles, number of rooms in house), living conditions (type of residence; number of bedrooms), employment status (unemployment), language disadvantage (low fluency in English) and access to services (access to the Internet).

3. Level three variables are those that reflect disadvantage, but do not directly measure disadvantage. Examples include Indigenous status (which may be associated with poor health or living conditions) and divorced/separated (which may be associated with low income). Some components of the disadvantage may have already been captured by level one and level two variables. Level three variables have been included where it appeared that some additional aspect of disadvantage still remained to be measured over and above that from level one and two variables. Level three variables can be thought of as indicators which signal that an area has some disadvantage. Only the Index of Disadvantage has level three variables (ABS, 2003; 2004:2-3).

SEIFA 2001 then used Principal Components Analysis (PCA) to summarise these variables. Principal component analysis is a technique that is often used to summarise a large number of related variables (see Census of Population and Housing: Socio-EconomicIndexes for Area’s (SEIFA), Australia – Technical Paper (2004) for details of this methodology).

The analysis undertaken by the Australian Bureau of Statistics has resulted in four distinctive socio-economic indicators, which use different combinations of variables from the 2001 Census. For each of the four SEIFA indexes, the ABS analysis produces a socio-economic score for each collector district in Australia. These collector district index scores have been standardised to have a mean of 1,000 and a standard deviation of 100 across all collector districts in Australia (to enable easy recognition of high and low scores.) This results in around 95 per cent of index scores being between 800 and 1,200. The range of SEIFA 2001 scores at the collector district level are shown in Table 1.
Table 1

Range of SEIFA 2001 index scores for Australia at the collector district level.

<table>
<thead>
<tr>
<th>Index (at collector district level)</th>
<th>Minimum</th>
<th>Median</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of Disadvantage</td>
<td>231.8069364</td>
<td>1014.73999</td>
<td>1213.299742</td>
</tr>
<tr>
<td>Index of Advantage/Disadvantage</td>
<td>597.3085229</td>
<td>997.6330025</td>
<td>1312.467946</td>
</tr>
<tr>
<td>Index of Economic Resources</td>
<td>701.2207764</td>
<td>998.1520567</td>
<td>1371.915028</td>
</tr>
<tr>
<td>Index of Education and Occupation</td>
<td>565.0391480</td>
<td>989.6861292</td>
<td>1306.033459</td>
</tr>
</tbody>
</table>

The Australian Bureau of Statistics (2003:14) emphasises that the SEIFA indexes are 'ordinal measures' and not 'interval measures'. They stated:

the indexes can be used to order areas in terms of disadvantage; but any other arithmetic relationships between index values may not be meaningful. For example, a CD with an index value of 1,200 does not have twice the wellbeing of a CD with an index value of 600. Similarly, the socio-economic difference between two CDs with index values of 800 and 900, is not necessarily the same as the difference between two CDs with index values of 1,050 and 1,150. Australian Bureau of Statistics, 2003

The SEIFA 2001 scores at the collector district can be aggregated up from collector districts into higher units of analysis. SEIFA 2001 is available at various Australian Standard Geographical Classification (ASGC) areas such as:

- Statistical Local Area (SLA)
- Statistical Subdivision (SSD)
- Statistical Division (SD)
- State/Territory (S/T)
- Local Government Area (LGA).

and different Census Geographic Areas such as:

- Postal Area (POA)
- State Suburbs (SSC)
- State Electoral Division (SED)
- Commonwealth Electoral Division (CED).

Importantly, the indexes for these higher level areas have not been standardised.
Index of disadvantage

The Index of Disadvantage is the most general measure of disadvantage of all four indexes. This index includes all variables that either reflect or measure disadvantage (level one to level three variables). The inclusion of level three variables means that while it may reflect an area's disadvantage, it is not possible to identify all aspects of disadvantage being represented. This index is derived from variables such as low income, low educational attainment, high unemployment and jobs in low skilled occupations. The Index of Disadvantage is the most comparable of all 2001 indexes to its 1996 counterpart. It uses the same method, and the same variables as the 1996 Index of Disadvantage.

Table 2

Index of Disadvantage variables

The Index of Disadvantage was determined by 20 variables. The following list shows the variables grouped by the value of their weight, to indicate the contribution of each variable to the index.

- % Persons aged 15 years and over with no qualifications (0.31)
- % Families with offspring having parental income less than $15,600 (0.29)
- % Females (in labour force) unemployed (0.27)
- % Males (in labour force) unemployed (0.27)
- % Employed Males classified as 'Labourer & Related Workers' (0.27)
- % Employed Females classified as 'Labourer & Related Workers' (0.27)
- % One parent families with dependent offspring only (0.25)
- % Persons aged 15 years and over who left school at or under 15 years of age (0.25)
- % Employed Males classified as 'Intermediate Production and Transport Workers' (0.24)
- % Families with income less than $15,600 (0.23)
- % Households renting (government authority) (0.22)
- % Persons aged 15 years and over separated or divorced (0.19)
- % Dwellings with no motor cars at dwelling (0.19)
- % Employed Females classified as 'Intermediate Production & Transport Workers' (0.19)
- % Persons aged 15 years and over who did not go to school (0.18)
- % Aboriginal or Torres Strait Islanders (0.18)
- % Lacking fluency in English (0.15)
- % Employed Females classified as 'Elementary Clerical, Sales & Service Workers' (0.13)
- % Occupied private dwellings with two or more families (0.13)
- % Employed Males classified as 'Tradespersons' (0.11)

Index of Disadvantage scores

Index of Disadvantage scores—at the Collector District level—range from 231.81 to 1213.30, while postcode level scores range from 406.42 (POA6646—Lake Carnegie/Little Sandy Desert/Wiluna [WA]) to 1172.81 (POA2625—Thredbo/Thredbo Village [NSW]). Summary results of the disadvantage index scores at collector district and postcode levels are shown in Table 3.

High scores on the Index of Disadvantage occur when the area has few families of low income and few people with little training and in unskilled occupations. Low scores on the index occur when the area has many low income families and people with little training and in unskilled occupations. It is important to understand that a high score here reflects lack of disadvantage rather than high advantage, a subtly different concept.

To maintain consistency with the other indexes, the higher an area's index value for the Index of Disadvantage, the less disadvantaged that area is compared with other areas. For example, an area that has a Disadvantage Index score of 1200 is less disadvantaged than an area with an index score of 900. However, you cannot say that the 1200 area is one-third more advantaged than the 900 area.
Table 3

Index of Disadvantage state summary, at Collector District and postcode levels

<table>
<thead>
<tr>
<th>Collector Districts</th>
<th>Postcodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Average</td>
</tr>
<tr>
<td>NSW</td>
<td>1 000</td>
</tr>
<tr>
<td>Vic</td>
<td>1 016</td>
</tr>
<tr>
<td>Qld</td>
<td>989</td>
</tr>
<tr>
<td>SA</td>
<td>994</td>
</tr>
<tr>
<td>WA</td>
<td>996</td>
</tr>
<tr>
<td>Tas</td>
<td>969</td>
</tr>
<tr>
<td>NT</td>
<td>903</td>
</tr>
<tr>
<td>ACT</td>
<td>1 076</td>
</tr>
<tr>
<td>OT</td>
<td>834</td>
</tr>
<tr>
<td>Australia</td>
<td>1 000</td>
</tr>
</tbody>
</table>
The index of advantage/disadvantage includes variables that measure both advantage and disadvantage. The index ranks an area in terms of both advantage and disadvantage. Areas with higher values are considered to be 'more advantaged' than areas with lower scores. The areas with higher scores are more likely to have a relatively high proportion of people with high incomes or a skilled workforce than lower, and a low proportion of people with low incomes and relatively few unskilled people in the workforce.

An area with a low score on the index is more likely to have a higher proportion of individuals with low incomes, more employees in unskilled occupations, etc. and a lower proportion of people with high incomes or in skilled occupations.

Table 4

Index of advantage/disadvantage variables

% Persons aged 15 years and over with degree or higher (0.24)
% Couple families with dependent child(ren) only with annual income greater than $77,999 (0.24)
% Couple families with no children with annual income greater than $77,999 (0.23)
% Employed Males classified as 'Professionals' (0.23)
% Persons aged 15 years or over having an advanced diploma or diploma qualification (0.21)
% Employed Females classified as 'Professionals' (0.21)
% Single person households with annual income greater than $36,399 (0.20)
% Persons using Internet at home (0.19)
% Couple families with dependents and non-dependents or with non-dependents only with annual income greater than $103,999 (0.18)
% Single parent families with dependent child(ren) only with annual income greater than $36,399 (0.17)
% Persons aged 15 years and over at university or other tertiary institution (0.15)
% Employed Males classified as 'Associate Professionals' (0.14)
% Single parent families with dependents and non-dependents or with non-dependents only with annual income greater than $62,399 (0.13)
% Employed Females classified as 'Advanced Clerical & Service Workers' (0.10)
% Dwellings with four or more bedrooms (0.08)
% Single parent families with dependents and non-dependents or with non-dependents only with annual income less than $26,000 (−0.10)
% Employed Females classified as 'Elementary Clerical, Sales & Service Workers' (−0.10)
% Employed Males classified as 'Tradespersons' (−0.13)
% Employed Females classified as 'Intermediate Production & Transport Workers' (−0.13)
% One parent families with dependent offspring only (−0.13)
% Couple families with dependents and non-dependents or with non-dependents only with annual income less than $52,000 (−0.15)
% Females (in labour force) unemployed (−0.16)
% Males (in labour force) unemployed (−0.16)
% Single person households with annual income less than $15,600 (−0.18)
% Employed Males classified as 'Intermediate Production and Transport Workers' (−0.19)
% Employed Males classified as 'Labourers & Related Workers' (−0.19)
% Employed Females classified as 'Labourers & Related Workers' (−0.19)
% Couple families with dependent child(ren) only with annual income less than $36,400 (−0.20)
% Couple only families with annual income less than $20,800 (−0.20)
% Persons aged 15 years and over with highest level of schooling completed being Year 11 or below (−0.24)
% Persons aged 15 years and over with no qualifications (−0.25)
Index of Advantage/Disadvantage scores

Index of Advantage/Disadvantage values—at the Collector District level—range from 597.31 to 1312.47 and from—range from 703.42 (POA6646—Lake Carnegie/Little Sandy Desert/Wiluna [WA]) to 1248.46 (POA2061—Kirribilli/Milson’s Point [NSW]) at the postcode level. Summary results of the advantage/disadvantage index scores at collector district and postcode level are shown in Table 5.

Table 5

Index of Advantage/Disadvantage state summary, at collector district and postcode levels

<table>
<thead>
<tr>
<th>Collector Districts</th>
<th>State</th>
<th>IA/D Average</th>
<th>Postcodes</th>
<th>State</th>
<th>IA/D Average</th>
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</thead>
<tbody>
<tr>
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<td>1 011</td>
<td>NSW</td>
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<tr>
<td></td>
<td>Vic</td>
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<td>Vic</td>
<td>987</td>
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<td>Qld</td>
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<td>Qld</td>
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<td></td>
<td>SA</td>
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<td>SA</td>
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<td>Tas</td>
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<td>980</td>
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</tr>
<tr>
<td></td>
<td>Australia</td>
<td>1 000</td>
<td>Australia</td>
<td>978</td>
<td></td>
</tr>
</tbody>
</table>
**Index of education and occupation**

The Index of Education and Occupation is a specific index 'designed to reflect the educational and occupational structure of communities'. It includes education indicators, such as the level of qualification achieved or whether further education is being undertaken, and occupation variables, which have classified the workforce into Australian Standard Classification of Occupations (ASCO), and the unemployed.

**Table 6**

**Index of Education and Occupation Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Index Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Persons aged 15 years and over with degree or higher</td>
<td>(0.33)</td>
</tr>
<tr>
<td>% Employed Males classified as 'Professionals'</td>
<td>(0.31)</td>
</tr>
<tr>
<td>% Employed Females classified as 'Professionals'</td>
<td>(0.29)</td>
</tr>
<tr>
<td>% Persons aged 15 years or over having an advanced diploma or diploma qualification</td>
<td>(0.28)</td>
</tr>
<tr>
<td>% Employed Males classified as 'Associate Professionals'</td>
<td>(0.18)</td>
</tr>
<tr>
<td>% Employed Males classified as 'Advanced Clerical &amp; Service Workers'</td>
<td>(0.12)</td>
</tr>
<tr>
<td>% Employed Females classified as 'Elementary Clerical, Sales &amp; Service Workers'</td>
<td>(-0.14)</td>
</tr>
<tr>
<td>% Males (in labour force) unemployed</td>
<td>(-0.17)</td>
</tr>
<tr>
<td>% Females (in labour force) unemployed</td>
<td>(-0.18)</td>
</tr>
<tr>
<td>% Employed Females classified as 'Intermediate Production &amp; Transport Workers'</td>
<td>(-0.18)</td>
</tr>
<tr>
<td>% Employed Males classified as 'Tradespersons'</td>
<td>(-0.19)</td>
</tr>
<tr>
<td>% Employed Males classified as 'Labourers &amp; Related Workers'</td>
<td>(-0.24)</td>
</tr>
<tr>
<td>% Employed Females classified as 'Labourers &amp; Related Workers'</td>
<td>(-0.25)</td>
</tr>
<tr>
<td>% Employed Males classified as 'Intermediate Production &amp; Transport Workers'</td>
<td>(-0.26)</td>
</tr>
<tr>
<td>% Persons aged 15 years and over with highest level of schooling completed being Year 11 or below</td>
<td>(-0.32)</td>
</tr>
<tr>
<td>% Persons aged 15 years and over with no qualifications</td>
<td>(-0.32)</td>
</tr>
</tbody>
</table>

**Index of Education and Occupation scores**

Index of Education and Occupation values—at the collector district level—range from 565.04 to 1306.03 and from 690.28 (POA 6646—Lake Carnegie/Little Sandy Desert/Wiluna [WA]) to 1236.00 (POA2060—North Sydney/Lavender Bay/McMahons Point/Waverton [NSW]) at the postcode level. Summary results of the Education and Occupation index scores at Collector District and postcode level are shown in Table 7.
Table 7

Index of Education and Occupation state summary, at collector district and postcode levels

<table>
<thead>
<tr>
<th>Collector Districts</th>
<th>Postcodes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td><strong>E&amp;O Average</strong></td>
</tr>
<tr>
<td>NSW</td>
<td>1 019</td>
</tr>
<tr>
<td>Vic</td>
<td>1 012</td>
</tr>
<tr>
<td>Qld</td>
<td>980</td>
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<td>SA</td>
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<tr>
<td>WA</td>
<td>998</td>
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</tr>
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<td>OT</td>
<td>959</td>
</tr>
<tr>
<td>Australia</td>
<td>1 000</td>
</tr>
</tbody>
</table>
Index of economic resources

The Index of Economic Resources is a specific index, which is intended to reflect 'the profile of economic resources of families within the area'. The IER only includes variables that measure economic disadvantage. It includes those variables that reflect the income (income specified by family structure, to determine disposable income), expenditure (rent) and wealth (home ownership, dwelling size) of families.

A higher Index of Economic Resources score signifies that an area has a higher proportion of families on high income, a lower proportion of low income families, and more households living in large houses i.e. four or more bedrooms. In contrast, a low ERI score indicates an area has a relatively high proportion of households on low incomes and living in small dwellings.

Table 8

Variables included in the Index of Economic Resources

- % Couple families with dependent child(ren) only with annual income greater than $77,999 (0.33)
- % Couple families with no children with annual income greater than $77,999 (0.32)
- % Single person households with annual income greater than $36,399 (0.30)
- % Households paying rent greater than $225 per week (0.30)
- % Households paying mortgage greater than $1,360 per month (0.29)
- % Couple families with dependents and non-dependents or with non-dependents only with annual income greater than $103,999 (0.27)
- % Single parent families with dependent child(ren) only with annual income greater than $36,399 (0.24)
- % Single parent families with dependents and non-dependents or with non-dependents only with annual income greater than $62,399 (0.20)
- % Dwellings with four or more bedrooms (0.13)
- % Single parent families with dependents and non-dependents or with non-dependents only with annual income less than $26,000 (~0.16)
- % Households paying rent less than $88 per week (~0.19)
- % Couple families with dependents and non-dependents or with non-dependents only with annual income less than $52,000 (~0.23)
- % Single person households with annual income less than $15,600 (~0.27)
- % Couple only families with annual income less than $20,800 (~0.28)
- % Couple families with dependent child(ren) only with annual income less than $36,400 (~0.28)

Index of Economic Resources scores

Index of Economic Resources values—at the Collector District level—range from 701.22 to 1306.03 and from 701.22 (POA 5601—Iron Knob [SA]) to 1282.27 (POA2061—Kirribilli/Milson's Point [NSW]) at the postcode level. Summary results of the Economic Resources index scores at collector district and postcode level are shown in Table 9.
Table 9

Index of Economic Resources state summary, at collector district and postcode levels

<table>
<thead>
<tr>
<th>Collector Districts</th>
<th>Posts</th>
<th>State</th>
<th>IER Average</th>
<th>State</th>
<th>IER Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td></td>
<td>NSW</td>
<td>1 021</td>
<td>NSW</td>
<td>1 000</td>
</tr>
<tr>
<td>Vic</td>
<td></td>
<td>Vic</td>
<td>1 006</td>
<td>Vic</td>
<td>974</td>
</tr>
<tr>
<td>Qld</td>
<td></td>
<td>Qld</td>
<td>980</td>
<td>Qld</td>
<td>962</td>
</tr>
<tr>
<td>SA</td>
<td></td>
<td>SA</td>
<td>963</td>
<td>SA</td>
<td>946</td>
</tr>
<tr>
<td>WA</td>
<td></td>
<td>WA</td>
<td>997</td>
<td>WA</td>
<td>967</td>
</tr>
<tr>
<td>Tas</td>
<td></td>
<td>Tas</td>
<td>928</td>
<td>Tas</td>
<td>916</td>
</tr>
<tr>
<td>NT</td>
<td></td>
<td>NT</td>
<td>1 002</td>
<td>NT</td>
<td>1 004</td>
</tr>
<tr>
<td>ACT</td>
<td></td>
<td>ACT</td>
<td>1 107</td>
<td>ACT</td>
<td>1 120</td>
</tr>
<tr>
<td>OT</td>
<td></td>
<td>OT</td>
<td>979</td>
<td>OT</td>
<td>990</td>
</tr>
<tr>
<td>Australia</td>
<td></td>
<td>Australia</td>
<td>1 000</td>
<td>Australia</td>
<td>973</td>
</tr>
</tbody>
</table>

A Note about SEIFA Indexes

The SEIFA values reflect the socio-economic wellbeing of an area, not of individuals. Because they are aggregated data for an area (collector district, postcode, statistical local area, etc.), they reflect the characteristics of the area. Because the SEIFA values are aggregated data for an area, it is not appropriate to base inferences about a particular individual on index scores of their area.
The research project

Research objective

The objective of this research project is to determine the extent of the relationship between participation and achievement in the public VET system, on the one hand, and 'socioeconomic level' (as defined and measured by the Australian Bureau of Statistics), on the other.

Research questions

The underlying question is to what extent are the training opportunities provided by the public VET system taken up by people from different socioeconomic backgrounds, and what are the achievements and outcomes for the different groups?

Consequently, there are a number of research questions that this project intends to examine:

- compare the overall socio-economic profile of students in the VET system with the working age population and students in higher education using SEIFA indexes
- compare VET participation rates for different segments of the VET population
- compare subject completion rates and student satisfaction for different segments of the VET population
- map the distribution of identified segments of the VET population using CData2001
- examine participation, achievement and satisfaction of VET students according to socio-economic status
- compare the socioeconomic profile of VET students in various regions (i.e. capital cities, other metropolitan centres, rural and remote).

Research methodology

National VET collection

The national data collection for VET providers is the reporting of training activity from training organisations receiving public funding for infrastructure for the delivery of VET programs. The collection is undertaken within the scope of the Australian Vocational Education and Training Management Information Statistical Standard (AVETMISS), in order to obtain a nationally consistent standard for the collection, analysis and reporting of vocational education and training information throughout Australia. The national data collection reports on training activity in a specific calendar year with the collection period commencing on 1 January and ending on 31 December. The 2001 collection contains information for almost 1.7 million students.

In practice, the scope for the national collection applies to those vocational education and training programs delivered by:

- state and territory technical and further education (TAFE) systems
- higher education institutions
- other public institutions including schools
- registered community education providers
- other registered training organisations
The 2001 collection was selected because it provides a readily comparison with other data used in the study, such as the 2001 Census on Population and Housing. This was deemed to be pertinent when calculating participation rates, as it was considered important to calculate participation rates with the population of postcodes in the same year (2001).

Data from the 2001 national collection for VET providers was extracted for postcode level. This provides a ready comparison to SEIFA values, which can also be extracted at the postcode level. Postcode level data has both advantages and disadvantages.

The advantage of postcode data is that it is readily available from student enrolment forms. However, postcode areas have been criticised as an unreliable measure at the individual level because their can be too much diversity within them. This was illustrated by Western et al. (1998), who noted that “a student of low socioeconomic background living in a postcode area designated as high or medium socioeconomic status would not be recognised as having a low socioeconomic background.

The application of SEIFA to the national VET collection

A number of minor problems occur when the SEIFA indexes are applied to the to the national VET collection.

- Non-compatible postcodes
SEIFA 2001 only uses postcodes applied to suburbs and does not use postcodes for post office boxes and other delivery locations. However, the national collection includes post office boxes, special delivery locations, and other special postcodes. Due to time constraints in the project, postcodes that were not compatible with SEIFA were deleted. Consequently, some 57,000 student records have not been included in the analysis. This will result in a slight under-reporting of participation and achievement in the public VET sector.

- Missing postcodes from national collection
The national collection also includes errors and omissions in the postcode variable. In 2001, there were approximately 28,000 records with missing postcodes.

- Missing collection data
The national collection also includes errors and omissions in most other variables e.g. age. The extent of the missing data variables from variable to variable. However, analysis of the 2001 national VET collection provides extensive information on a large student population—in excess of 1.69 million students.

Selection of SEIFA Index

It was deemed important to select one socio-economic index to apply to the national VET collection. It was decided to apply the Index of Economic Resources. The Index of Economic resources reflects the economic resources of a household, which strongly influences an individual’s ability to undertake VET. It has the strongest correlation of the four socio-economic indicators for areas.

The other indexes place too much emphasis on education and qualifications. In addition, a number of other research projects have applied the Index of Economic Resources.
Calculation of socio-economic groups.

SEIFA 2001 bases its calculations on postcodes. The database breaks postcodes down into quartiles and deciles. These calculations were not considered appropriate for this study as they did not weight for population. For example, the lowest SEIFA quartile of postcodes contains considerably less than a quarter of the country's population.

Instead, it was considered more suitable to calculate the socio-economic groups by using the national population. It was decided to divide the Australian population into three socio-economic groups:

- the highest quartile of the population, based on SEIFA scores for postcodes;
- the lowest quartile of the population, based on SEIFA scores for postcodes;
- the middle group, consisting of the second and third quartiles of the population, based on SEIFA scores for postcodes.

To calculate these groups, the postcode data was ranked according to SEIFA 2001 scores (e.g. Index of Economic Resources ranked in ascending order). The population of each population was determined as a proportion of the total population, and cumulated. The low socio-economic group therefore became the group with 25 per cent of the total population in those postcodes with the lowest SEIFA scores.

Conversely, the highest socio-economic group became that quartile of the national population who lived in postcodes with the highest SEIFA 2001 scores. The middle class group is the residual 50 per cent of the population in postcodes (2nd and 3rd quartiles) based on SEIFA scores. These socio-economic groups are shown in Figure 1.

Figure 1
Socio-economic groups in Australia, by postcode, 2001
Comparison of education sectors

The first task of this project was to compare the socio-economic status of VET students to those in the higher education sector and the working age population in Australia. Data at the postcode level was obtained on higher education students from DEST, and on working age population from the Australian Bureau of Statistics. This was compared to data from 2001 national collection.

Figure 2
Comparison of education sectors by SEIFA scores

Index of Economic Resources

The comparison is shown in Figure 2. It shows the cumulative proportion of population according to SEIFA Index of Economic Resources values for higher education and VET students and the working age population according to their postcode.

Figure 1 shows that higher education students were more likely to live in higher socio-economic areas than either the working age population or VET students. The pattern for VET students closely follows that for the working age population, but at slightly lower socio-economic levels. The difference between VET students and higher education students is far more considerable.
The relationship between socio-economic status and education

The relationship between socio-economic status and education is very apparent when examining the highest school level completed by VET students. The percentage of students in a postcode who completed Year 9 or lower was mapped against SEIFA's Index for Economic Resources score. The resultant graph (Figure 3) shows that a slight tendency for postcodes with higher proportion of students who completed Year 9 or lower to also have lower SEIFA scores.

Figure 3

![Graph showing the relationship between percentage of VET students who completed Year 9 or lower and SEIFA Index of Economic Resources for postcode.](image-url)
A second graph (Figure 4) shows the percentage of students in a postcode who had completed Year 12 against the SEIFA Index of Economic Resources. This shows postcodes with higher SEIFA scores were more likely to have a greater proportion of students who had completed Year 12, whereas postcodes with lower SEIFA scores had a lower proportion of students who had completed year 12.

Figure 4

Percentage of VET students who completed Year 12 by SEIFA Index of Economic Resources for postcode, 2001

\[ y = 0.001x - 0.62 \]

\[ R^2 = 0.4423 \]
VET participation

The study has examined participation rates of VET students, according to the socio-economic area in which students live.

VET student numbers were obtained for all postcodes in the SEIFA database. These student numbers were then divided by the working age population of that postcode to construct participation rates. The participation rates were divided into quartiles, from which three broad groups were created:

- the lowest 25 per cent of VET participation (low participation)
- the highest 25 per cent of participation (high participation)
- the residual 50 per cent of participation (mid participation)

Participation rates were also matched according to the three socio-economic groups: low SES, middle SES and high SES. The calculation produces a nine-cell matrix of postcodes (Table 10), which shows the number of postcodes in each cell, the aggregate population of those postcodes, the proportion of the total Australian population in the postcodes, the total VET student population in postcodes, and the per cent of the total VET population. It is evident from the analysis presented in Table 10 that there are a considerable number of postcodes in Australia where VET participation is high—829 postcodes containing 34.80 per cent of the total VET population. Importantly, more than half of these 829 postcodes are considered to be low socio-economic areas and 343 are medium socio-economic postcodes. In addition, there are also 992 mid participation postcodes, with more than half again considered to be low socio-economic areas. In contrast, of the 592 postcodes in the low participation quartile, slightly more than one-third (202) were low socio-economic postcodes. These 202 postcodes contain 1.7% of the total VET population.
### Table 10
Participation by socio-economic group, by postcode, 2001

<table>
<thead>
<tr>
<th></th>
<th>Low participation</th>
<th>Mid participation</th>
<th>High participation</th>
<th>Grand total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low SES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of postcodes</td>
<td>202</td>
<td>502</td>
<td>425</td>
<td>1129</td>
</tr>
<tr>
<td>% of all postcodes</td>
<td>(8.37%)</td>
<td>(20.80%)</td>
<td>(17.61%)</td>
<td>(46.79%)</td>
</tr>
<tr>
<td>Population in postcodes</td>
<td>515,379</td>
<td>3,303,819</td>
<td>1,078,711</td>
<td>4,897,909</td>
</tr>
<tr>
<td>% Aust population</td>
<td>(2.62%)</td>
<td>(16.82%)</td>
<td>(5.49%)</td>
<td>(24.94%)</td>
</tr>
<tr>
<td>VET population in postcodes</td>
<td>28,908</td>
<td>299,289</td>
<td>161,120</td>
<td>489,317</td>
</tr>
<tr>
<td>% total VET population</td>
<td>(1.70%)</td>
<td>(17.64%)</td>
<td>(9.50%)</td>
<td>(28.84%)</td>
</tr>
<tr>
<td><strong>Middle SES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of postcodes</td>
<td>200</td>
<td>343</td>
<td>343</td>
<td>886</td>
</tr>
<tr>
<td>% of all postcodes</td>
<td>(8.29%)</td>
<td>(14.21%)</td>
<td>(14.21%)</td>
<td>(36.72%)</td>
</tr>
<tr>
<td>Population in postcodes</td>
<td>1,808,752</td>
<td>4,440,618</td>
<td>3,573,869</td>
<td>9,823,239</td>
</tr>
<tr>
<td>% Aust population</td>
<td>(9.21%)</td>
<td>(22.61%)</td>
<td>(18.19%)</td>
<td>(50.01%)</td>
</tr>
<tr>
<td>VET population in postcodes</td>
<td>112,272</td>
<td>360,104</td>
<td>385,006</td>
<td>857,382</td>
</tr>
<tr>
<td>% total VET population</td>
<td>(6.62%)</td>
<td>(21.22%)</td>
<td>(22.69%)</td>
<td>(50.54%)</td>
</tr>
<tr>
<td><strong>High SES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of postcodes</td>
<td>190</td>
<td>147</td>
<td>61</td>
<td>398</td>
</tr>
<tr>
<td>% of all postcodes</td>
<td>(7.87%)</td>
<td>(6.09%)</td>
<td>(2.53%)</td>
<td>(16.49%)</td>
</tr>
<tr>
<td>Population in postcodes</td>
<td>2,541,477</td>
<td>2,037,789</td>
<td>342,086</td>
<td>4,921,352</td>
</tr>
<tr>
<td>% Aust population</td>
<td>(12.94%)</td>
<td>(10.37%)</td>
<td>(1.74%)</td>
<td>(25.05%)</td>
</tr>
<tr>
<td>VET population in postcodes</td>
<td>149,687</td>
<td>155,956</td>
<td>44,264</td>
<td>349,907</td>
</tr>
<tr>
<td>% total VET population</td>
<td>(8.82%)</td>
<td>(9.19%)</td>
<td>(2.61%)</td>
<td>(20.62%)</td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of postcodes</td>
<td>592</td>
<td>992</td>
<td>829</td>
<td>2413</td>
</tr>
<tr>
<td>% of all postcodes</td>
<td>(24.53%)</td>
<td>(41.11%)</td>
<td>(34.36%)</td>
<td>(100%)</td>
</tr>
<tr>
<td>Population in postcodes</td>
<td>4,865,608</td>
<td>9,782,226</td>
<td>4,994,666</td>
<td>19,642,500</td>
</tr>
<tr>
<td>% Aust population</td>
<td>(24.77%)</td>
<td>(49.80%)</td>
<td>(25.42%)</td>
<td>(100%)</td>
</tr>
<tr>
<td>VET population in postcodes</td>
<td>290,867</td>
<td>815,349</td>
<td>590,390</td>
<td>1,696,606</td>
</tr>
<tr>
<td>% total VET population</td>
<td>(17.14%)</td>
<td>(48.06%)</td>
<td>(34.80%)</td>
<td>(100%)</td>
</tr>
</tbody>
</table>
Australian Qualification Framework level and socio-economic status

This study has also analysed student enrolments by Australian Qualification Framework level and SEIFA score. It found very little correlation between socio-economic status and the major AQF levels (Figure 5-12). The strongest correlation (0.2138) was found in students studying at the diploma and higher level (Figure 9). This infers that there is a slightly greater tendency for students studying for diploma or higher level qualification to be from areas of higher socio-economic status. All other qualification levels had very weak correlations between AQF level and SEIFA score. This indicates that students from all socio-economic backgrounds are accessing VET courses at all AQF levels.

Module Completion Rates

Module Completion Rate (MCR) is one means used to determine student success. It is the proportion of VET students who successfully completed a module. It is measured by adding pass and Recognition of Prior Learning (RPL) outcomes and dividing this by pass, fail, withdraw and RPL outcomes. The Module Completion Rate was calculated for all VET students within each Australian postal area. The MCRs was then analysed according to the SEIFA Index of Economic Resources. The results found no significant correlation between Module Completion Rate and socio-economic status.
Figures 5-12
Percentage of VET students by AQF Level and SEIFA Index of Economic Resources, 2001

Fig. 5 Certificate I students by SEIFA index

Fig. 6. Certificate II students by SEIFA

Fig. 7 Certificate III students by SEIFA

Fig. 8. Certificate IV students by SEIFA

Figure 9 Diploma and higher students by SEIFA

Fig. 10. Secondary school by SEIFA

Fig. 11 Other qualification level by SEIFA

Fig. 12 Non Award students by SEIFA
Further research

As stated at the beginning of this presentation, this paper is a work-in-progress report of research that currently is being undertaken at NCVER. There are a number of additional avenues that this research intends to follow. They include:

- Further analysis of the 2001 national VET collection. There are a number of additional variables that could be analysed according the socio-economic status of the area that students live in.

- Application of additional SEIFA indexes to the national VET collection. This paper has present research conducted using SEIFA’s Index of Economic Resources. There are an additional three SEIFA indexes that could be applied to the national VET collection—Index of Disadvantage, Index of Advantage/Disadvantage and Index of education and Occupation. It may be that some different research outcomes arise when using these different indexes.

- Application of the SEIFA 2001 indexes to the 2002 and 2003 national VET collections.

- Apply SEIFA indexes to Apprenticeships and Traineeships data, which is also collected by NCVER. This would provide information on persons undertaking vocational training through a contracted training arrangement.

- Apply SEIFA indexes to the Student Outcomes Survey, which has been conducted by NCVER. This survey provides information about training outcomes for students who have completed their training. It provides information such as general characteristics, employment outcomes, satisfaction with training, whether they undertook further training and reasons for not undertaking more training.
References


McIntyre, J., 1999 A further local participation study: TAFE and ACE in Melbourne postcodes, In Future Research, Research Futures, Proceedings of the third annual conference of the Australian Vocational Education and Training Research Association. Sydney, AVETRA.


Ross, K.N. 1983 Social Area Indicators of Educational Need. ACER, Hawthorn.


Appendices

1. Queensland

The application of Australian Bureau of Statistics socio-economic indicators to the national VET collection

2. New South Wales

The application of Australian Bureau of Statistics socio-economic indicators to the national VET collection
3. Victoria

Socio-economic groups and VET participation

- Low SES: High participation
- Low SES: Mid participation
- Low SES: Low participation

4. Tasmania

Socio-economic groups and VET participation

- Low SES: High participation
- Low SES: Mid participation
- Low SES: Low participation
5. South Australia

The application of Australian Bureau of Statistics socio-economic indicators to the national VET collection

6. south-west Western Australia
7. north-west Western Australia

8. Northern Territory