

# THE DIVERSITY OF THE STUDENT POPULATION AT VICTORIA UNIVERSITY

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George Messinis  
Peter Sheehan  
Zdenko Miholcic

Centre for Strategic Economic Studies  
Faculty of Business and Law  
Victoria University

For further information:  
T +613 9919 1340  
F +613 9919 1350  
GEORGE.MESSINIS@VU.EDU.AU  
WWW.VU.EDU.AU

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## LIST OF ACRONYMS

ABS	Australian Bureau of Statistics
BIC	Bayesian Criterion
CALD	Cultural and Linguistic Diversity
CCD	Census Collectors Districts
DFP	Davidson-Fletcher-Powell
EFTSL	Equivalent Full-Time Student Load
FE	Further Education
GLS	Generalised Least Squares
HED	Higher Education
LOTE	Language other than English
MLCR	Modular Load Completion Rate
NESB	Non-English Speaking Background
NES	Non-English-Speaking
SCH	Student Contact Hours
SEIFA	Socio-economic Indexes for Areas
SES	Socio-economic Status
VE	Vocational Education
VUSIS	Victoria University Student Information Service

## EXECUTIVE SUMMARY<sup>1</sup>

This report maps the diversity of the student body at Victoria University over the period 2003-07. It is based on an analysis of selected data contained in the University's operational database for the period 2003-2007 inclusive. Over this period the data cover 350,000 unit records of student enrolments, involving 130,000 different students. The report summarises aggregate measures of diversity and identifies significant segments of Victoria University's student population in 2007.

### Overall Characteristics of the Student Population

In terms of aggregate measures of student enrolments (uncorrected for student load), the student population has changed sharply over that period. Total enrolments dropped in 2004, but have since recovered steadily; the share of international students has risen from one in six in 2003 to nearly one in four in 2007. Overall the data show a pattern of enrolments strongly affected by demographic and educational changes and by the diverse impact of a strong economic boom, and experiencing of a sharp shock in 2004. Since 2004, substantial progress has been made in rebuilding enrolments of domestic students in full-time degree courses and of international students generally, especially in Certificate III and IV courses. However there are persistent lower levels of postgraduate enrolments.

Other important characteristics of the student body that are documented in this study include:

- Students at Victoria University are heavily involved in the labour market, with over 80% either working or seeking work. Rates of unemployment have declined over the period, but perhaps not as much as might be suggested by strong economic conditions.
- In addition to the rising role of international students there is a strong influence of migration on the Australian citizen or resident student body: more than half of all students at Victoria University speak a language other than English at home and have a father born outside Australia.
- Students at Victoria University on average come from socio-economic backgrounds well below the Melbourne average and, as is common through the educational system, the level of family disadvantage is considerably higher in TAFE courses than in higher education courses. About 75% of students in the University come from families in the bottom half of Melbourne's socio-economic distribution.

### Key Segments within the Student Population

The initial cluster analysis has revealed evidence of three main segments within the Australian student body. The first segment (young, full-time Australian degree students) has a much higher than average share of females and of students working part-time, and is heavily focused on full-time study for an undergraduate degree. Students in this segment tend to be much younger than the student mean, and to come from families with a higher than average share of fathers born in Australia and of addresses in the east of Melbourne. The three SEIFA indexes produced by the Australian Bureau of Statistics (ABS)

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<sup>1</sup> The authors would like to acknowledge the key role of Elizabeth Harman in initiating and supporting this project, and the ongoing management oversight of Stephen Weller. We are also most grateful for the enthusiastic and skilled support provided by Steven Wojnarowski, particularly in relation to the provision of the data through Business Objects and spatial mapping of clusters and socio-economic status, and vital inputs from Peter Davenport and Jim Lang. Comments from Conor King, Roger Gabb and others within the University community have also been most helpful.

to measure socio-economic position (economic disadvantage, economic resources and occupational and educational structure) are used to assess the position of the student's family, by geo-coding family addresses to ABS collector districts. For this first segment, the mean values are higher than the student mean but still below the Melbourne average for all three SEIFA indexes. Of the three segments, this is the strongest group in terms of the SEIFA index on education and occupation. However, this segment remains well below the overall University average in terms of postgraduate study.

Relative to other students, those in the second cluster (disadvantaged Australian students) tend to have lower labour force attachment; study part-time in non-degree courses (but are well represented at the postgraduate level); be considerably older than the student mean; have a higher proportion of fathers born in Asia or Africa; speak a language other than English or Chinese at home; and have much lower scores on all SEIFA indexes than both the student mean and the Greater Melbourne mean. This segment appears to consist of a large group of students from a second generation migrant background, whose families have not established a strong position in Australia but for which the University's programs (other than the undergraduate degree program) offer an important entry into post-secondary education.

The third cluster (working, third-generation Australian students) tends to be heavily involved in part-time study and full-time work. They also have an above-average share in diplomas or TAFE courses, their fathers are predominantly born in Australia, they speak English at home, and are concentrated in other campuses in the West other than Footscray Park and at the City campus. They show the highest mean value of the three clusters for the SEIFA index for socio-economic disadvantage, but are below the second cluster on the SEIFA index of education and occupation status.

In terms of international students, which might be considered as a fourth segment, we utilise a limited set of information on international students to examine whether these are a homogeneous group, using the same methodology as for the Australian students. The two-stage cluster analysis revealed that there exist three distinct groups of international students. The first group is identified as 'onshore, full-time, full-fee paying' students, the second as 'offshore TAFE' students and the third as 'offshore higher education full-fee paying' students. The offshore TAFE group is the largest segment amongst international students.

## 1 INTRODUCTION

The report presents some results of a project to analyse the diversity within the student body at Victoria University and to identify the main clusters or segments within that population. It is intended that this work will add to the University's knowledge base about its students and their place within the community, and hence contribute to improved learning and performance outcomes, to more effective equity programs and to marketing activities.

The study is based on data from the Victoria University Student Information Service (VUSIS), accessed in February 2008. VUSIS is an operational database in regular use, updated on a daily basis, so that the information used is specific to the date of access. The project database contains 350,000 unit records of student enrolments for the period 2003-2007 inclusive, covering 130,000 different students. Given the operational focus of VUSIS, different types of enrolments are treated differently, but for higher education students the basic unit of record is the enrolment for a given course for a semester. The central measure used in this analysis is unique student enrolments in each year, where the enrolment activity of a given student in a particular year is the unit of analysis. Unique student enrolments are close to but differ in some respects from reportable enrolments, a measure commonly used for reporting purposes, and are quite different from student load, as no attempt has been made to adjust to a full-time equivalents basis. Of the 130,000 students with records on the database, 108,000 have provided an Australian home address (which may differ from the address at which they live during the academic year), and some 92,000 of these have been successfully geocoded to Census Collectors Districts (CCDs) for the 2006 Census year. This allows the full range of economic and social information on individual CCDs available from the Census to be utilised in the analysis.

This report is in three parts subsequent to this introduction. In Section 2 we report the results of a two-variable cross-tabulation analysis of the student data set, both for Australian and international students in aggregate and for the major course categories. In Section 3 we report results of a cluster analysis of the student population, to identify the characteristics of three main clusters into which the students of Victoria University fall. Further, we discuss aspects of the geographical distribution of students, based on home address, and some of the characteristics of the neighbourhoods from which Australian students are drawn with special emphasis on the distribution of student clusters and socio-economic disadvantage. Section 4 concludes.

## 2 SOME KEY CHARACTERISTICS OF THE STUDENT POPULATION, 2003-07

### 2.1 COMPOSITION AND TRENDS BY NATIONAL STATUS, AGE, GENDER AND COURSE TYPE

In 2003 five out of six students enrolled were Australian and only 16.4% were international students. The composition has changed sharply over the period to 2007, when international students provided one quarter (24.3%) of all enrolments, while the Australian share has fallen to three quarters (75.7%).

In terms of Australian students, the main change in the period under study was in 2004, when enrolments fell by 11.0%. As shown in Table 1, this decline was spread across all age-groups, with the younger students (21-25) group being the least affected, only 5.3%, and was evident for both males and females. Domestic enrolments fell further over 2004-06, especially in the above 25 years age groups and for males, but at a much slower annual rate of 2.2%. The decline in the female group stopped, and the 21-25 age group increased slightly. In 2007 enrolments of Australian students began to rise, with overall growth of 1.4% driven entirely by increase in female enrolments. In conclusion, despite the recovery in the recent period, the Australian student numbers in 2007 have not yet reached the 2003-2005 levels.

Table 1: Australian Students by Age and Gender

		YEAR					PER CENT CHANGE OVER:		
		2003	2004	2005	2006	2007	2003-04 (%)	2004-06 (%)	2006-07 (%)
AGE	16-20	17759	15644	16008	15114	15413	-11.9	-3.4	2.0
	21-25	8783	8317	8476	8639	8701	-5.3	3.9	0.7
	26-36	9105	8010	7552	7229	7210	-12.0	-9.8	-0.3
	37+	10528	9110	8504	8289	8490	-13.5	-9.0	2.4
GENDER	Female	22502	20105	20269	20072	20634	-10.7	-0.2	2.8
	Male	23673	20976	20271	19199	19180	-11.4	-8.5	-0.1
<b>TOTAL</b>		<b>46175</b>	<b>41081</b>	<b>40540</b>	<b>39271</b>	<b>39814</b>	<b>-11.0</b>	<b>-4.4</b>	<b>1.4</b>

Trends in enrolments of international students have been quite different, with strong growth near or above 10% per annum evident in all four years (Table 2). The growth has been particularly marked among those aged 16-20 years (perhaps reflecting the rapid growth in offshore delivery of TAFE programs), and among female students, who now outnumber males in both international and Australian student categories.

Table 2: International Students by Age and Gender

		YEAR					PER CENT CHANGE OVER:		
		2003	2004	2005	2006	2007	2003-04	2004-06	2006-07
							(%)	(%)	(%)
AGE	16-20	2367	3348	3245	4889	6185	41.4	46.0	26.5
	21-25	4104	4456	4606	4398	4244	8.6	-1.3	-3.5
	26-36	2095	1981	1930	1629	1655	-5.4	-17.8	1.6
	37+	492	466	556	437	526	-5.3	-6.2	20.4
GENDER	Female	3734	4464	4656	5605	6373	19.6	25.6	13.7
	Male	5324	5787	5681	5748	6237	8.7	-0.7	8.5
<b>TOTAL</b>		<b>9058</b>	<b>10251</b>	<b>10337</b>	<b>11353</b>	<b>12610</b>	<b>13.2</b>	<b>10.8</b>	<b>11.1</b>

Reflecting these diverse trends, total university enrolments fell by 7.1% in 2004, stabilised over 2005 and 2006 and then increased strongly (by 3.6%) in 2007 (Table 3). Comparing 2007 with 2003, the number of students 25 years or less and the number of female students have risen, partially offsetting a sharp fall in the number of students over 25 years and in male students.

Table 3: All Students by Age and Gender

		YEAR					PER CENT CHANGE OVER:		
		2003	2004	2005	2006	2007	2003-04	2004-06	2006-07
							(%)	(%)	(%)
AGE	16-20	20126	18992	19253	20003	21598	-5.6	5.3	8.0
	21-25	12887	12773	13082	13037	12945	-0.9	2.1	-0.7
	26-36	11200	9991	9482	8858	8865	-10.8	-11.3	0.1
	37+	11020	9576	9060	8726	9016	-13.1	-8.9	3.3
GENDER	Female	26236	24569	24925	25677	27007	-6.4	4.5	5.2
	Male	28997	26763	25952	24947	25417	-7.7	-6.8	1.9
<b>TOTAL</b>		<b>55233</b>	<b>51332</b>	<b>50877</b>	<b>50624</b>	<b>52424</b>	<b>-7.1</b>	<b>-1.4</b>	<b>3.6</b>

These trends conceal considerable variation by sector and by broad course type. The fall in 2004 was heavily concentrated in the TAFE sector (10.3%), with higher education enrolments decreasing by only 2.0% (Table 4). In 2007 both sectors have improved significantly, with an increase of 2.8% in higher education and 4.1% in TAFE.

The strongest improvement has been with full-time degree students, whose enrolments were 19.5% higher in 2007 than in 2003. By comparison, part-time enrolments have fallen steadily, dropping by 24.6%. In 2004 all enrolments in all course types other than the full-time degree students fell, but from 2005 onwards trends were varied: postgraduate enrolments continued decreasing in 2005 and 2006 before stabilising in 2007; diploma enrolments increased remarkably in 2005, fell again in 2006 before increasing strongly in 2007; Certificate I and II enrolments were lower in 2007 than in any preceding

year; and Certificate III and IV enrolments rose by 16.2% over 2005 and were higher in 2007 than in 2003.

**Table 4: Student Enrolments by Sector and Course Type**

	YEAR					PER CENT CHANGE OVER:		
	2003	2004	2005	2006	2007	2003-04 (%)	2004-06 (%)	2006-07 (%)
<b>Higher education</b>	21467	21035	21191	21155	21745	-2.0	0.6	2.8
<b>TAFE</b>	33766	30297	29686	29469	30679	-10.3	-2.7	4.1
<b>Postgraduate</b>	5703	5551	4971	4291	4297	-2.7	-22.7	0.1
<b>Degree/Honours FT</b>	11235	11507	12095	12844	13422	2.4	11.6	4.5
<b>Degree/Honours PT</b>	3764	3117	3199	2976	2839	-17.2	-4.5	-4.6
<b>Diplomas</b>	12048	10865	12254	10342	11490	-9.8	-4.8	11.1
<b>Certificate III &amp; IV</b>	14243	13658	12306	13365	14548	-4.1	-2.1	8.9
<b>Certificate I &amp; II</b>	7725	6102	5570	6302	5317	-21.0	3.3	-15.6
<b>TOTAL</b>	<b>55233</b>	<b>51332</b>	<b>50877</b>	<b>50624</b>	<b>52424</b>	<b>-7.1</b>	<b>-1.4</b>	<b>3.6</b>

Overall these data show a pattern of enrolments strongly affected by demographic and educational changes and by the diverse impact of a strong economic boom, and experiencing a sharp shock in 2004. Since 2004 enrolments of domestic students in full-time degree courses and of international students generally, especially in Certificate III and IV courses, have substantially improved. The trend of diminishing postgraduate enrolments appears to have been halted in 2007, and may take some time to revert to previous levels.

## 2.2 LABOUR FORCE STATUS

Summary data on the labour force status of Australian students are provided in Table 5. No reliable data are available on international students, as more than half report their status as 'unknown'. The labour market status of Australian students appears to be most closely related to the type of course undertaken and to prevailing economic conditions. In the TAFE sector, full-time employed students predominate, at a stable level of around 30% through the period, followed by part-time employed students at around 27-28%. Interestingly, the proportion of students not in the labour force was practically identical at the beginning of the period in both sectors (about 16%), but has since steadily diverged, and was much higher in TAFE sector, with 21.3% in 2007. The proportion of TAFE students unemployed and seeking full-time work has fallen over 2003-07, but the share seeking part-time work has risen. In the higher education sector, the decrease in both students seeking work and those not in labour force was accompanied by a remarkable increase of part-time employed students.

Table 5: Labour Force Status of Australian Students

	YEAR				
	2003	2004	2005	2006	2007
(PER CENT OF STUDENTS)					
<b>TAFE STUDENTS</b>					
Full-time employee	30.5	31.0	30.7	30.2	29.0
Part-time employee	28.0	28.5	28.0	26.8	27.0
Unemployed – seeking full-time work	10.1	9.5	8.1	8.0	7.4
Unemployed – seeking part-time work	14.5	14.7	15.7	15.5	15.3
Not in labour force	16.9	16.3	17.5	19.5	21.3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>HIGHER EDUCATION STUDENTS</b>					
Full-time employee	16.8	16.2	15.6	15.7	16.3
Part-time employee	41.0	42.0	44.5	47.5	47.0
Unemployed – seeking full-time work	2.4	2.1	1.8	1.7	1.6
Unemployed – seeking part-time work	23.7	23.5	22.4	20.1	20.4
Not in labour force	16.1	16.1	15.7	14.9	14.7
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

## 2.3 LANGUAGE SPOKEN AT HOME AND FATHER’S REGION OF BIRTH

One central aspect of Victoria University’s diversity is clearly ethnicity, as reflected both in terms of the country of origin of the Australian students and their families and in terms of the language spoken at home. There are some difficulties in getting complete data from the VUSIS database on language spoken at home, due to the inability to distinguish multi-lingual households from those for which a language other than English is the main language.

It is evident from Table 6 that in 2007, excluding those students for which the language situation is unknown, over 40% of Australian students reported use of a language other than English at home, and that this share has been increasing, especially since 2005. The growth in African and Asian languages is particularly striking.

Table 6: Australian Students by Language Spoken at Home

	YEAR					PER CENT CHANGE OVER:	
	2003	2004	2005	2006	2007	2003-05 (%)	2005-07 (%)
English	29802	25600	25184	23734	23633	-15.5	-6.2
Other than English	16373	15481	15356	15537	16181	-6.2	5.4
Of which:							
Chinese	1326	1153	1123	1140	1270	-15.3	13.1
Vietnamese	2643	2490	2434	2527	2664	-7.9	9.5
Other Asian	2630	2513	2489	2583	2808	-5.4	12.8
Greek	1078	994	943	947	903	-12.6	-4.3
Italian	1201	1086	938	900	822	-21.9	-12.3
Spanish	838	777	820	828	815	-2.2	-0.6
Other European	3885	3586	3448	3296	3263	-11.3	-5.4
Arabic	1284	1238	1417	1394	1463	10.4	3.2
Turkish	742	717	761	772	740	2.6	-2.8
African language	675	858	916	1108	1390	35.8	51.7
<b>TOTAL</b>	<b>46175</b>	<b>41081</b>	<b>40540</b>	<b>39271</b>	<b>39814</b>	<b>-12.2</b>	<b>-1.8</b>
Unknown <sup>1</sup>	6905	7027	8157	8995	8539	18.1	4.7

Note: <sup>1</sup>Unknown values in this table have been distributed pro-rata across language groups; this item shows the total number of students for which language at home is unknown.

Table 7 shows that for the majority of international students, Chinese or another Asian language is spoken at home. Overall, more than half of the University's students come from a home which is either multi-lingual or in which a language other than English is spoken.

Table 7: International Students by Language Spoken at Home

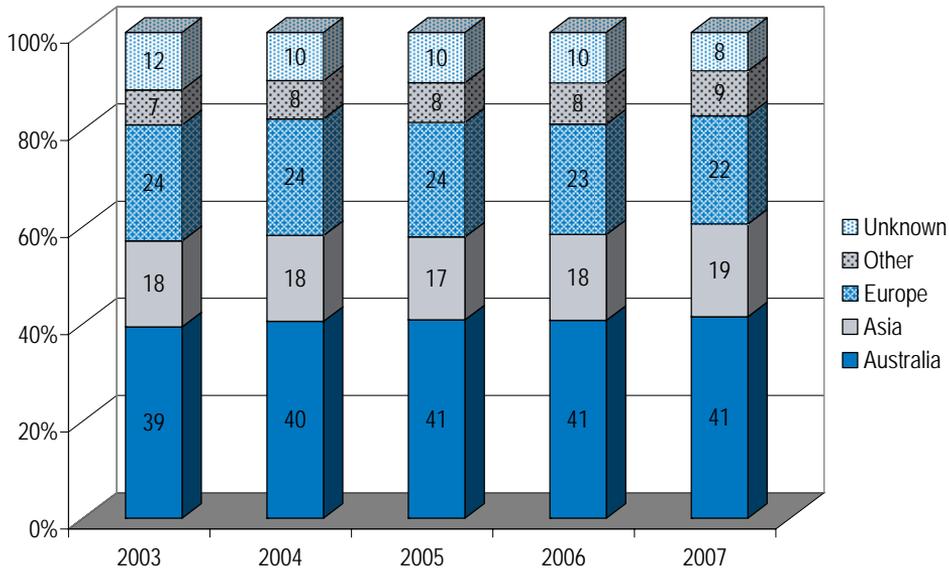
	YEAR					PER CENT CHANGE OVER:	
	2003	2004	2005	2006	2007	2003-05 (%)	2007-05 (%)
English	656	600	626	574	634	-4.6	1.3
Chinese	4147	5616	5467	7064	7831	31.8	43.2
Vietnamese	709	189	208	185	253	-70.7	21.6
Other Asian	2417	2572	2458	1849	2110	1.7	-14.2
Other European	260	346	324	307	402	24.6	24.1
Middle Eastern	154	181	201	166	196	30.5	-2.5
African	41	43	94	135	162	129.3	72.3
Other	10	5	3	11	16	-70.0	433.3
Unknown	664	699	956	1062	1006	44.0	5.2
<b>TOTAL</b>	<b>9058</b>	<b>10251</b>	<b>10337</b>	<b>11353</b>	<b>12610</b>	<b>14.1</b>	<b>22.0</b>

Note: As for Table 6, except that the unknown values have not been distributed.

The data on father's region of origin is summarised in Figure 1. After including those for which this region of origin is not known, the share of Australian students with fathers born in Australia is stable at

44%, with 56% of students having fathers born overseas. Within this latter group, the proportion of students with fathers born in Europe has decreased, and of those with fathers born in Asia has increased. One category that has been increasing rapidly from a low base is Australian students with fathers born in Africa.

Figure 1: VU Australian Students by Father's Region of Origin



## 2.4 SOCIO-ECONOMIC STATUS

To facilitate the analyses of the students' socio-economic status, and that of their families, we have assigned to each family the average characteristics of the Census Collection Districts (CCDs) in which they live, and aggregated the results over the full set of students for which geocoding results are available (92,000 unique students over five years) or over the subset of the data for which the analysis is being undertaken. Specifically, we have utilised a number of Socio-economic Indexes for Areas (SEIFA) products created by the Australian Bureau of Statistics. The indexes provide a ranking of CCDs on various dimensions, and are used as measures of the socio-economic status (SES) of the families.

Three SEIFA indexes are used:

- Index 1 measures unemployment and other forms of socio-economic disadvantage;
- Index 2 measures the economic resources available to families; and
- Index 3 measures education and occupation.

Some results from this analysis are summarised in tables 8-10, for each of the three SEIFA indexes. Further details of these indexes are provided in the Appendix.

**Table 8: Family Backgrounds of Australian Students, by Course Type and SEIFA Index of Relative Socio-economic Disadvantage, 2006**

COURSE TYPE	Value of the SEIFA Index at:			Greater Melbourne mean	Ratio to Greater Melbourne level at:		
	Percentile				Percentile		
	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>		25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>
	<b>SEIFA Index 1: Economic Disadvantage</b>						
Postgraduate	967	1027	1077	1040	0.989	0.988	0.992
Degree/Honours FT	947	1013	1065	1040	0.968	0.973	0.982
Degree/Honours PT	934	1006	1058	1040	0.955	0.967	0.975
Diplomas or Certificate IV	924	995	1045	1040	0.945	0.957	0.963
Certificate III	923	991	1038	1040	0.943	0.953	0.956
Certificate I & II	889	967	1016	1040	0.909	0.929	0.936

Note: Overall VU student mean is 980, 94.2% of the Greater Melbourne mean.

Three main points are evident from these results. First the families of VU students are markedly below the Greater Melbourne mean on all three SEIFA indexes. The exception to this, for some indexes, is postgraduate students.

**Table 9: Family Backgrounds of Australian Students, by Course Type and SEIFA Economic Resources Index, 2006**

COURSE TYPE	Value of the SEIFA Index at:			Greater Melbourne mean	Ratio to Greater Melbourne level at:		
	Percentile				Percentile		
	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>		25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>
	<b>SEIFA Index 2: Economic Resources</b>						
Postgraduate	955	1004	1051	1018	0.992	0.986	0.983
Degree/Honours FT	954	1004	1050	1018	0.990	0.986	0.982
Degree/Honours PT	948	997	1043	1018	0.984	0.979	0.975
Diplomas or Certificate IV	936	987	1031	1018	0.972	0.970	0.965
Certificate III	936	986	1031	1018	0.972	0.968	0.964
Certificate I & II	920	967	1013	1018	0.955	0.950	0.948

Note: Overall VU student mean is 986, 96.9% of the Greater Melbourne mean.

Second, there are persistent differences in the SES characteristics of students across course types, generally running from highest SES levels for postgraduate students to lowest for Certificate I and II students. This reflects both the role of SES in shaping access to higher education and the characteristics of VU's catchment areas. Third, many VU students come from very low SES backgrounds, with low SEIFA index scores for course types at the 25<sup>th</sup> percentile, especially for disadvantage and education and occupation indexes.

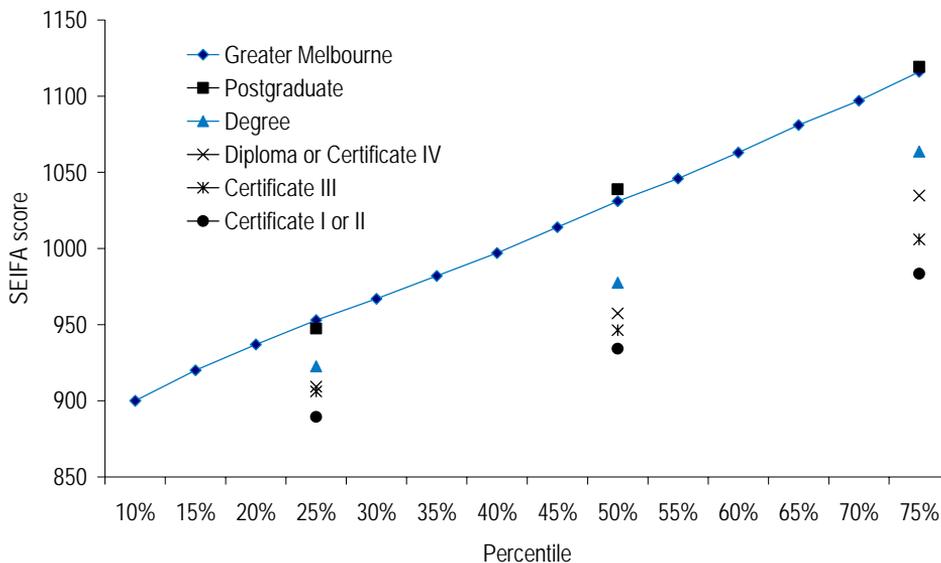
Table 10: Family Backgrounds of Australian Students, by Course Type and SEIFA Education and Occupation Index, 2006

COURSE TYPE	Value of the SEIFA Index at:			Greater Melbourne mean	Ratio to Greater Melbourne level at:		
	Percentile				Percentile		
	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>		25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>
	<b>SEIFA Index 3: Educational and Occupational Structure</b>						
Postgraduate	947	1039	1119	1030	0.994	1.008	1.003
Degree/Honours FT	926	982	1062	1030	0.972	0.953	0.951
Degree/Honours PT	919	973	1066	1030	0.965	0.944	0.955
Diplomas or Certificate IV	909	957	1035	1030	0.954	0.929	0.927
Certificate III	906	946	1006	1030	0.951	0.918	0.901
Certificate I & II	889	934	984	1030	0.934	0.907	0.881

Note: Overall VU student mean is 990, 96.1% of the Greater Melbourne mean.

These central facts are illustrated in Figure 2, which compares the figures for the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles for the students in various courses with the full household distribution for Greater Melbourne for SEIFA Index 2. This figure shows the joint impact of the lower than average socio-economic background of VU students (other than postgraduate students) and the systematic variation in socio-economic background by course type. These data imply that about 75% of VU Australian students come from backgrounds in the lower half of the socio-economic distribution in Melbourne.

Figure 2: Distribution of Households by SEIFA Education and Occupation Index, Greater Melbourne and VU Students, by Course, 2006



## 3 EXPLORATORY SEGMENT ANALYSIS

### 3.1 INTRODUCTION

This section reports the results of a two-step segment analysis. The procedure is an exploratory tool designed to reveal natural groupings (i.e. segments). The algorithm considers both categorical and continuous variables, and also determines the optimal number of segments. The maximum number of segments was set to six, the distance measure that determines the similarity between segments was the log-likelihood measure, and the Schwartz's Bayesian Criterion (BIC) was used by the automatic segmenting algorithm. In this report, both the Australian and international student populations enrolled in 2007 were analysed in the segment analyses.

We first present the initial results of student segment analysis for unique student enrolments in 2007. We begin with Figure 3 that has the results of segment analysis. This clearly shows the presence of four distinct segments. In the accompanying legend, we have summarised the segments as follows:

- segment 1 – young, full-time degree Australian students;
- segment 2 – disadvantaged Australian students;
- segment 3 – working, third-generation Australians; and
- segment 4 – international students.

Note that the disadvantaged students made up 32% of the total VU student population in 2007. Further cluster analysis of international students also reveals the presence of three different segments, and is summarised in Figure 4. These segments are as follows:

- segment 1 – full-fee paying students studying full-time in Australia;
- segment 2 – offshore TAFE students; and
- segment 3 – offshore higher education full-fee paying students.

The offshore TAFE group is the largest group comprising of 40% of international students.

Figure 3: VU Student Segments, All Students, 2007

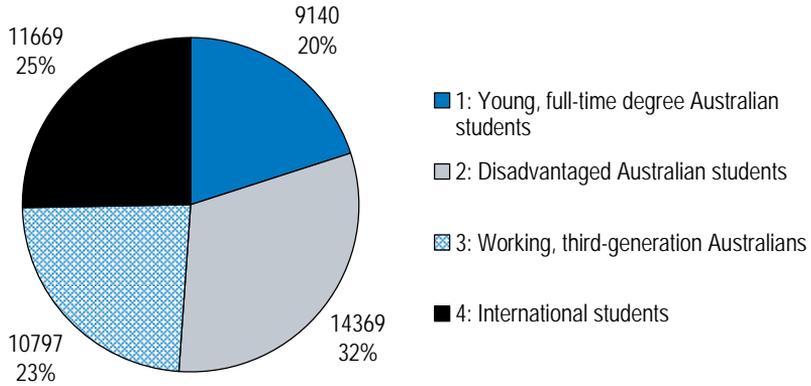
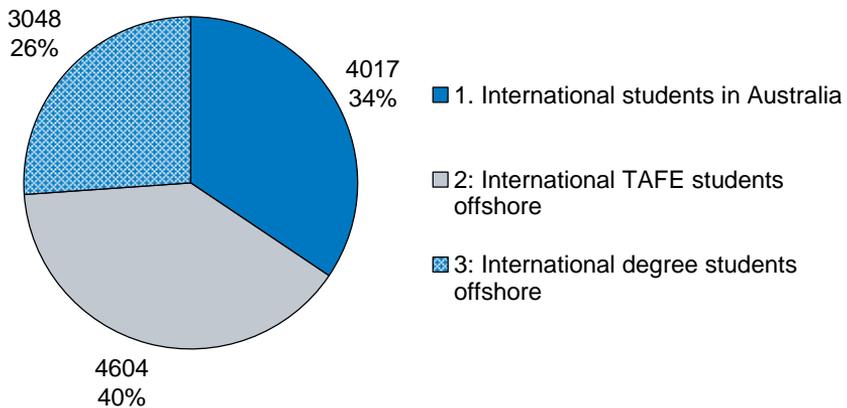


Figure 4: VU International Student Segments, 2007



## 3.2 AUSTRALIAN STUDENT SEGMENTS

Cluster analysis involves a multivariate analysis of student characteristics, including demographics, socio-economic background, ancestry and educational preferences. For Australian students, we considered the following ten variables: gender; age; an ABS SEIFA index; labour force status; attendance mode; course type/level; two indicators of parents' place of birth; language spoken at home;<sup>2</sup> and region.<sup>3</sup>

Table 11 summarises the distribution of segments across the three key VU sectors: higher education (HE), vocational education (VE) and further education (FE). The table shows that more than two thirds of the higher education sector is made up of 'young, full-time degree Australian students'. It is also encouraging to find that 17.1% and 54.1% of students in the higher education and VE sectors come from the disadvantaged segments. Disadvantaged students constitute 84.7% of students in the FE sector.

**Table 11: Segment Distribution by VU Sector, Australian Students, 2007 SEIFA**

SEGMENT	HE SECTOR		VE SECTOR		FE SECTOR	
	Count	%	Count	%	Count	%
1. Young, full-time degree Australian students	8821	69.3	283	1.4		
2. Disadvantaged Australian students	2174	17.1	10671	54.1	1524	84.7
3. Working, third-generation Australians	1734	13.6	8788	44.5	275	15.3

Figures 5 and 6 depict the segment means for the two continuous variables used in the analysis: age, and the SEIFA index of relative educational and occupational status.<sup>4</sup> Note that lower score values in both of the SEIFA indices indicate a disadvantage. Figure 5 shows that students in segments 2 and 3 are older than those observed in segment 1.

<sup>2</sup> This is defined as 'The main language spoken at home, or if the student listed more than one language, the first language other than English listed by the student.' Thus, a language other than English does not necessarily imply that English is not spoken at home.

<sup>3</sup> On the basis of ABS statistical subdivisions, this variable classified regions into four main groups: 'Inner', 'East', 'North' and 'West'. The first consists of the subdivisions of 'Inner Melbourne' and 'Eastern Middle Melbourne'. The second group consists of, 'Moreland City', 'Boroondara City', 'Eastern Outer Melbourne', 'Yarra Ranges Shire Part A', 'Southern Melbourne', 'South Eastern Outer Melbourne', 'Frankston City', 'Greater Dandenong City' and 'Mornington Peninsula Shire'. The third includes 'Northern Middle Melbourne' and 'Northern Outer Melbourne'. Finally, the Western region consists of all other subdivisions.

<sup>4</sup> Earlier analysis included two ABS SEIFA indices: the relative index of socio-economic disadvantage, and the index of relative educational and occupational status. These two indices, however, correlate highly, especially for segments 1 and 3. As a result, we reduced the number of SEIFA indices to one. Note also the SEIFA index was calculated using data at the most disaggregated level available; that is, at the level of the Census Collection District (CCD). Thus, the SEIFA index should be interpreted with caution since the averages of all households in a particular district, rather than a direct characteristic of VU students were used.

Figure 5: 95% Confidence Intervals for Means of Age, 2007

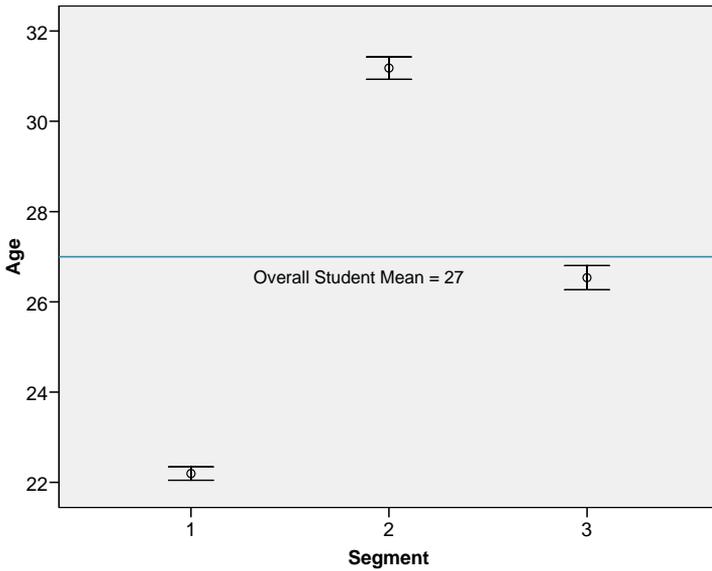
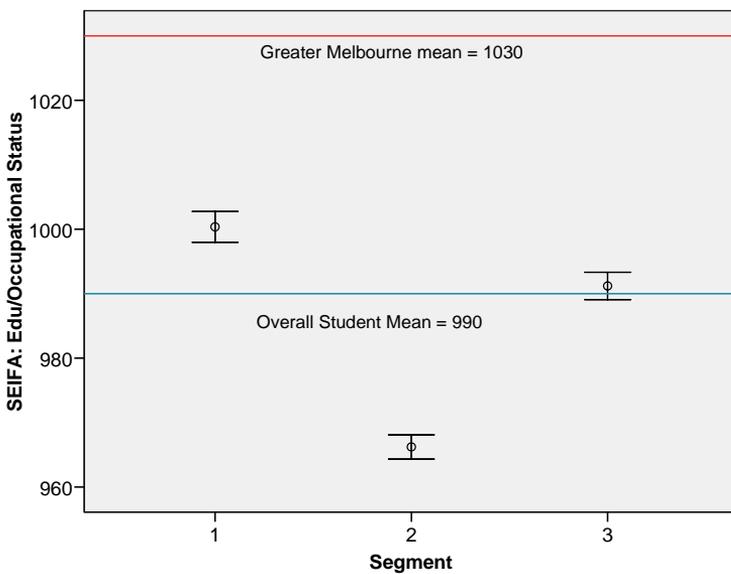


Figure 6 suggests that students in segment 2 face considerable social disadvantage. Segment 1 students seem to be better off in terms of educational and occupational status. The means of all three VU student segments are substantially below the corresponding means of the population in the Greater Melbourne area.

Figure 6: 95% Confidence Intervals for Means of SEIFA Index of Relative Educational / Occupational Status, 2007



Figures 7 to 14 provide further insights on additional key variables that have contributed the identification of the three segments. They present a visual summary of the distribution (in percentages) of eight variables within each segment.

Figure 7 depicts the distribution of gender by cluster. It appears that females predominate among the 'young, full-time degree students' (i.e. segment 1), reflecting in part the higher enrolment of female students discussed earlier.

Figure 7: Within Segment Percentage of Gender, 2007

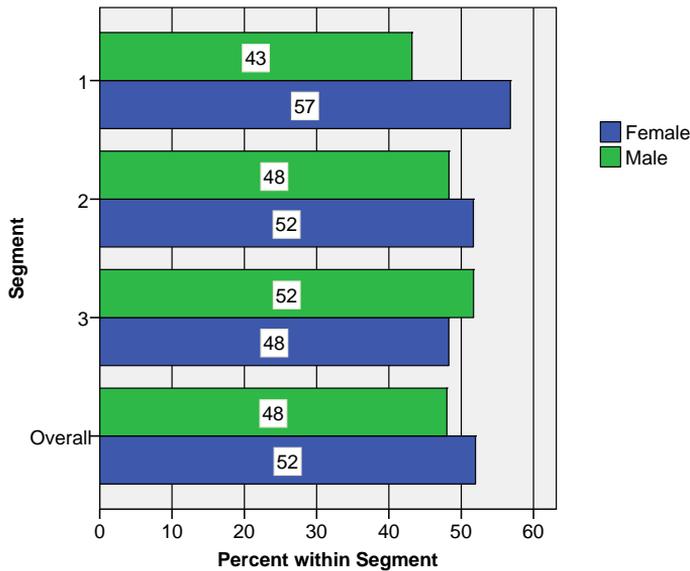


Figure 8 illustrates the differences in labour force status. Note that 69% of 'working, part-time students' (i.e. segment 3) are in full-time or part-time employment. This overall result is similar to that observed amongst 'young, full-time degree students' (i.e. segment 1), although only 8% of the latter are in full-time employment. These two groups contrast sharply with 'disadvantaged students' where only 40% are in employment.

Figure 8: Within Segment Percentage of Labour Force Status, 2007

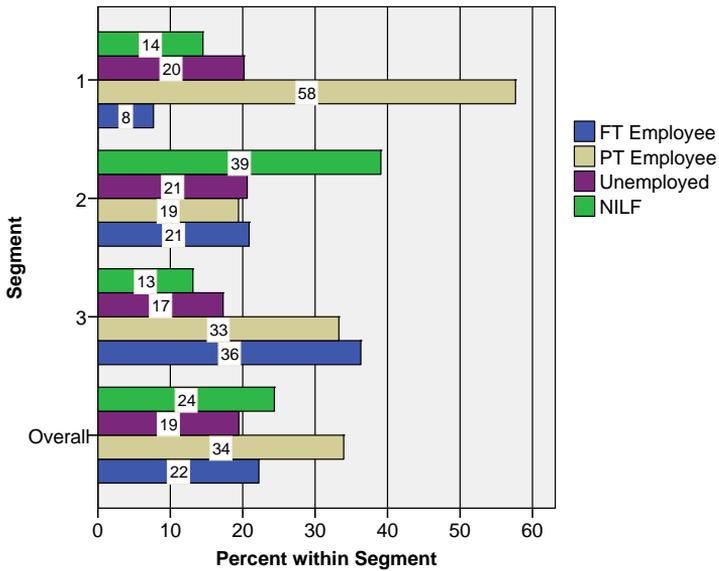


Figure 9 highlights study intensity as a dichotomous variable (i.e. full-time or part-time students). This identifies a clear distinction between entirely full-time students in segment 1 and predominately part-time students in segments 2 and 3.

Figure 9: Within Segment Percentage of Course Load, 2007

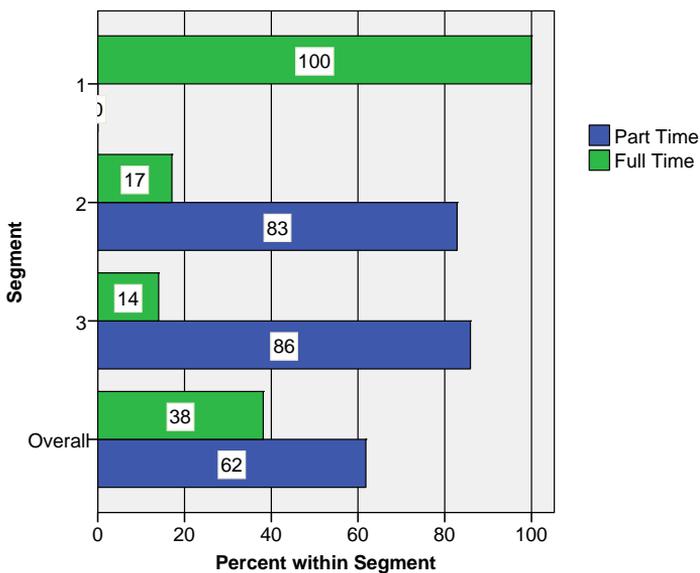
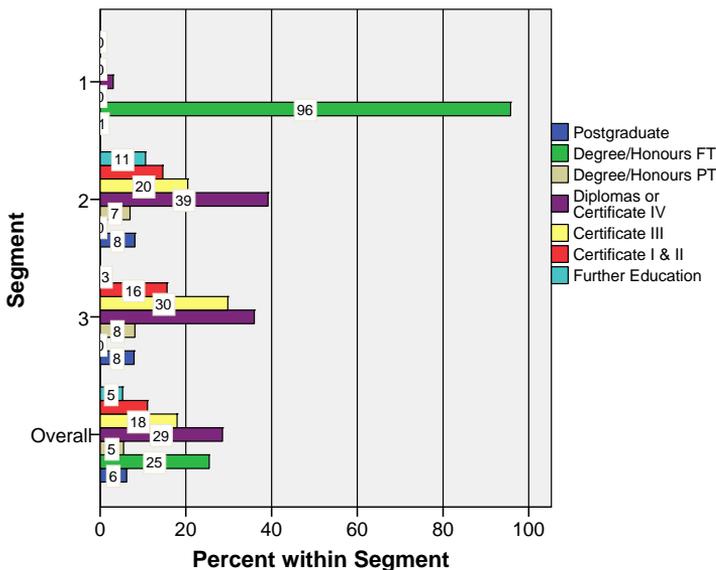


Figure 10 depicts the structure of the segments with regard to the course level. As can be observed, the majority of students in segments 2 and 3 (disadvantaged and working students) are enrolled in non-degree and TAFE courses, in contrast to the young, full-time degree students in segment 1. However, both the disadvantaged and working students are also represented at higher course levels, e.g. at the postgraduate level, for both these segments, the share of postgraduate students is 8%, by comparison with only 1% for segment 1.

Figure 10: Within Segment Percentage of Course Level, 2007



Figures 11, 12 and 13 provide a more detailed picture of ancestry and linguistic diversity. As indicated in Figure 11, working, part-time students in segment 3 are mostly third generation Australians who speak mainly English at home.<sup>5</sup> In contrast, segment 2 consists almost entirely of disadvantaged Australian students both of whose parents were born overseas. It appears that in the disadvantaged group, students with fathers from Asia and Africa are highly represented, with a combined total of 45% (Figure 12).

Figure 13 illustrates the diversity across the three segments in language spoken at home, reflecting this ancestral diversity. One-third of segment 1 students (the full-time degree students) speak a language other than English at home, as do 70% of segment 2 students. But almost all segment 3 students speak only English at home.

<sup>5</sup> We define third generation Australians as those whose parents were born in Australia and speak only English at home. Second-generation Australian migrants are the students whose parents are born overseas and report speaking a language other than English (LOTE) at home.

Figure 11: Within Segment Percentage of Parents Country of Birth, 2007

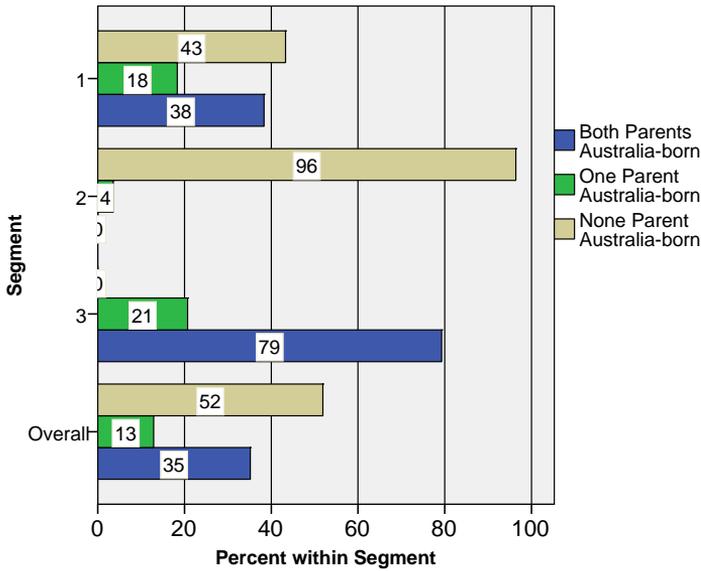


Figure 12: Within Segment Percentage of Father's Birthplace, 2007

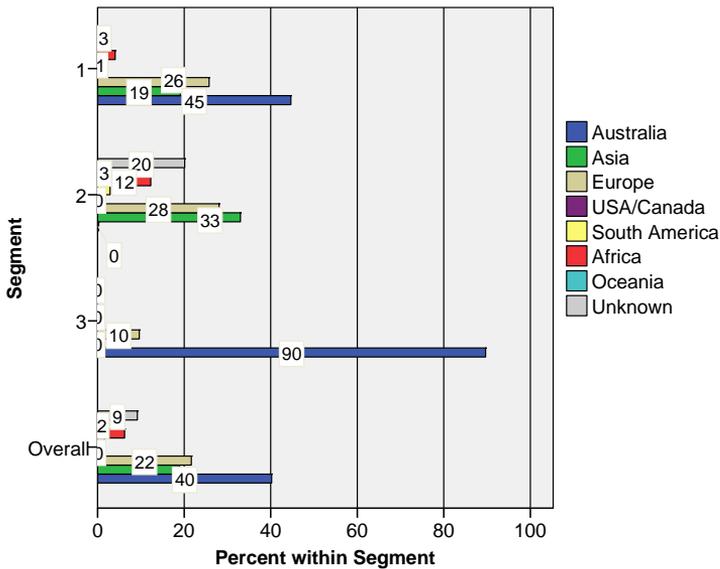


Figure 13: Within Segment Percentage of Language Spoken at Home, 2007

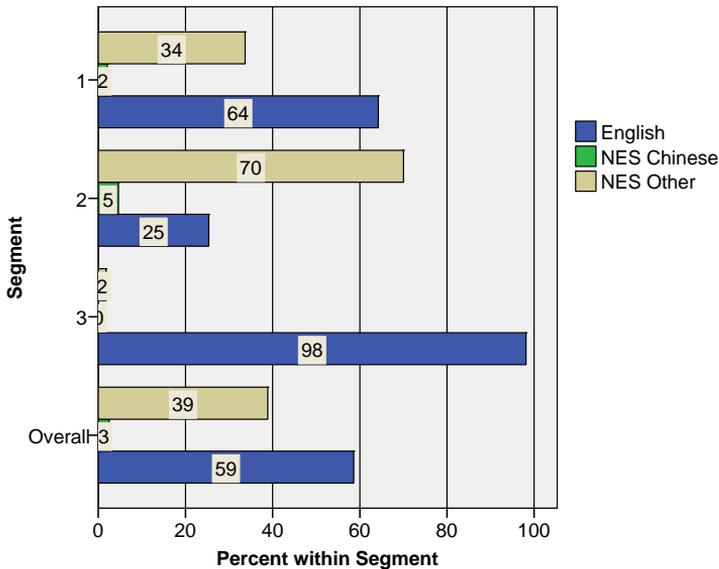
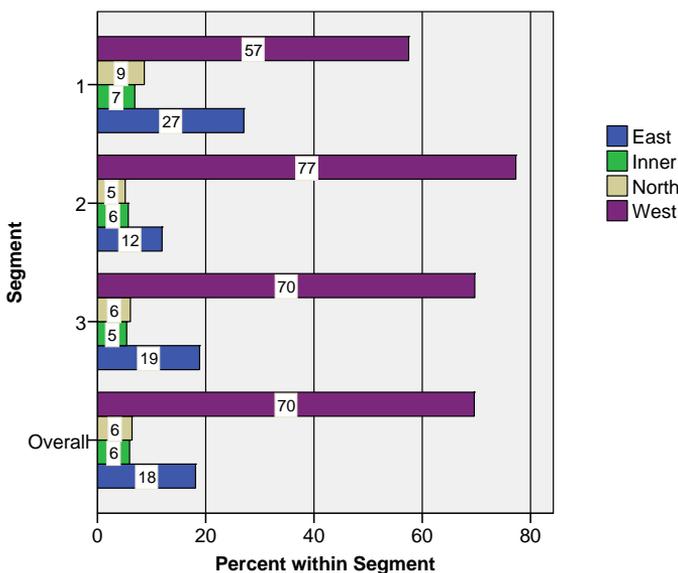


Figure 14 examines the spatial distribution of VU students by region. While the students from western suburbs are a majority in each segment, their proportions are very high among students in segments 1 and 2. A markedly lower proportion, 57%, of the 'young, full-time degree, students come from the West.

Figure 14: Within Segment Percentage of Region, 2007



Finally, we utilise ABS spatial data to map the SEIFA index of relative occupational/educational status by individual student for each segment. The results appear in figures 15 to 17. They confirm the view that VU students of low socio-economic background and of segment 2 (i.e. the disadvantaged) are not evenly distributed across Melbourne. In fact, they closely associate with western suburbs such as St. Albans, Sunshine, Hoppers Crossing and Melton. They also appear to come from suburbs in the north (e.g. Thomastown and Reservoir) as well as from the Dandenongs, Clayton and northern Melbourne. Segment 1 is also heavily located in the west but segment 3 seems more evenly distributed.

Figure 15: Segment 1 Geographical Distribution by Census Collection District, 2007

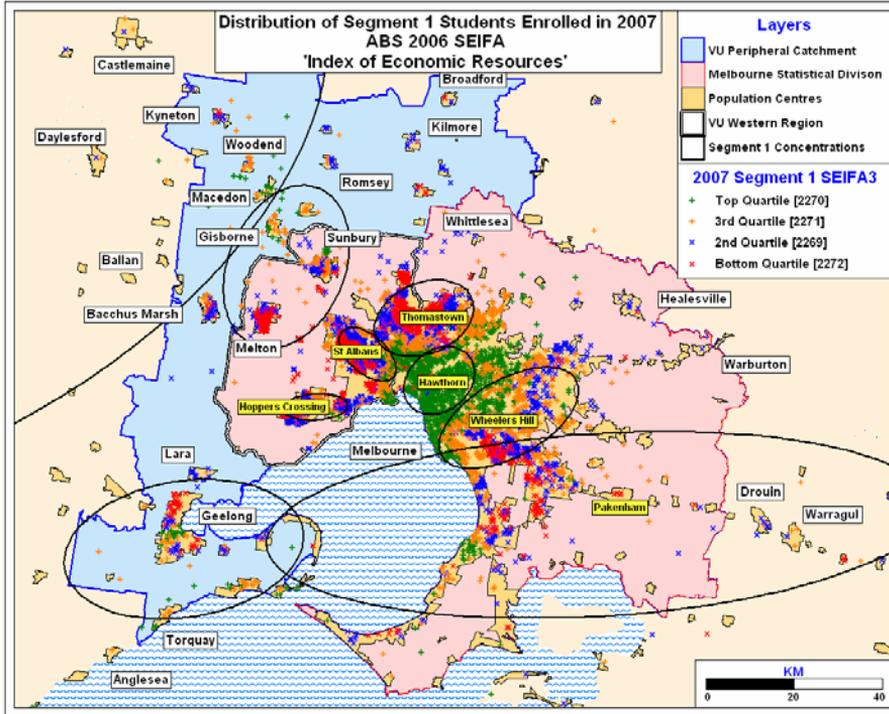


Figure 16: Segment 2 Geographical Distribution by Census Collection District, 2007

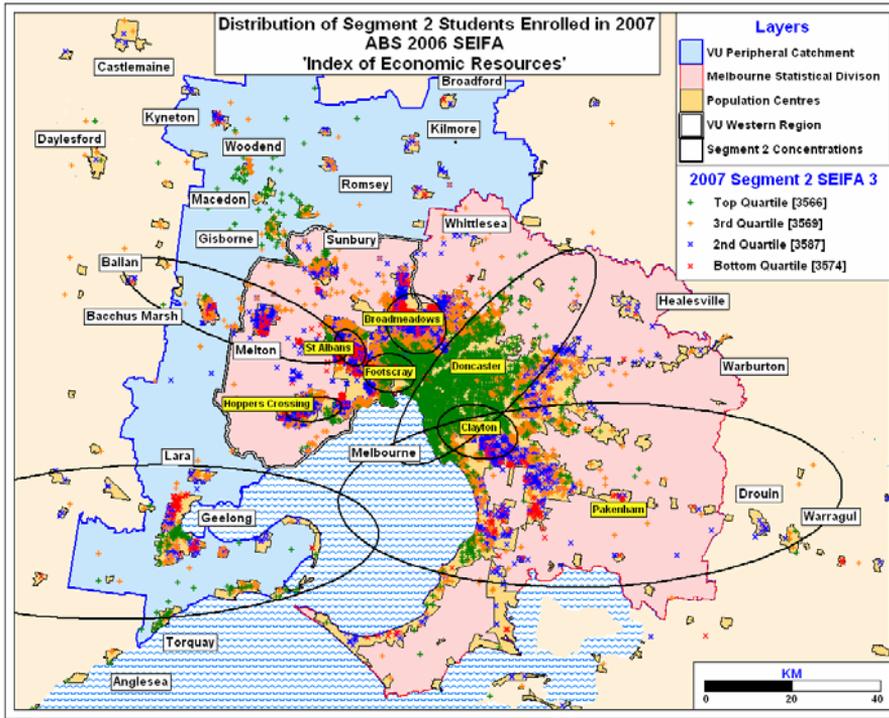
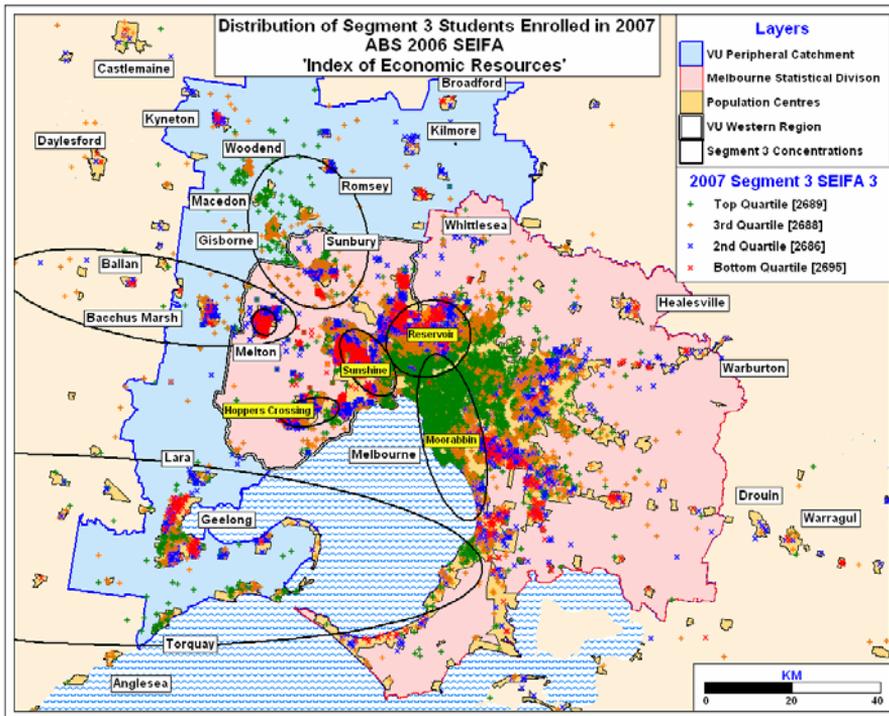


Figure 17: Segment 3 Geographical Distribution by Census Collection District, 2007



In summary, the cluster analysis above indicates the existence of three major segments for VU Australian students. We have identified these segments as follows.

**Segment 1:** *Young, full-time degree Australian students*

- Relatively young
- Relatively high SEIFA score but lower than Melbourne mean
- Predominately part-time employment
- Full-time studies in higher education sector and degree courses
- Evenly distributed between English and LOTE languages

**Segment 2:** *Disadvantaged Australians*

- Relatively mature-aged
- Relatively very low SEIFA score
- Substantially detached from the labour force
- Predominately part-time studies in VE and FE sectors but also postgraduates
- Mainly second-generation Australians and mainly from Asia and Africa
- A LOTE spoken at home

**Segment 3:** *Working, third-generation Australians*

- Relatively high SEIFA score but lower than Melbourne mean
- Employed, mainly on full-time basis
- Predominately part-time studies in VE and FE sectors but also postgraduates
- Third-generation English-speaking Australians

### 3.3 INTERNATIONAL STUDENT SEGMENTS

Finally, we utilise a limited set of information on international students to examine whether these are a homogeneous group. We again employ the same empirical methodology as above. As outlined above, the two-stage cluster analysis revealed that there exist three distinct groups of international students. The first group is identified as 'onshore, full-time, full-fee paying' students, the second as 'offshore TAFE' students and the third as 'offshore higher education full-fee paying' students. We repeat that the offshore TAFE group is the largest segment amongst international students.

The following variables were used to define the characteristics set of international students: age; gender; attendance mode; course type/level; father's place of birth; language used at home, and course funding source. Figures 18-23 presents some of the key variables by segment.

Figure 18 clearly shows that 'offshore TAFE' students are much younger than students in the other two segments.

Figure 18: International Students, 95% Confidence Intervals for Means of Age, 2007

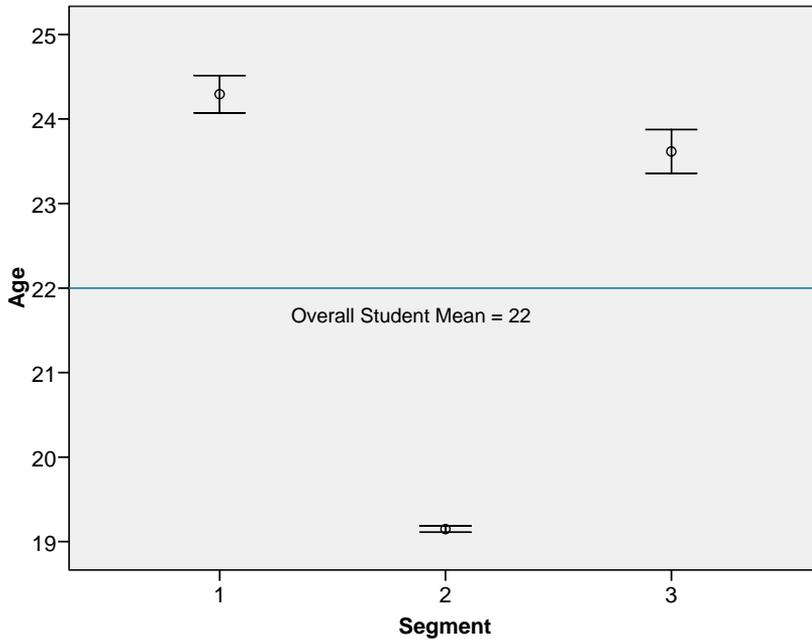


Figure 19 shows that women seems to be over-represented amongst 'offshore TAFE' students, while 10% more men than women come to Australia to study as international students.

Figure 19: International Students, Within Segment Percentage of Gender, 2007

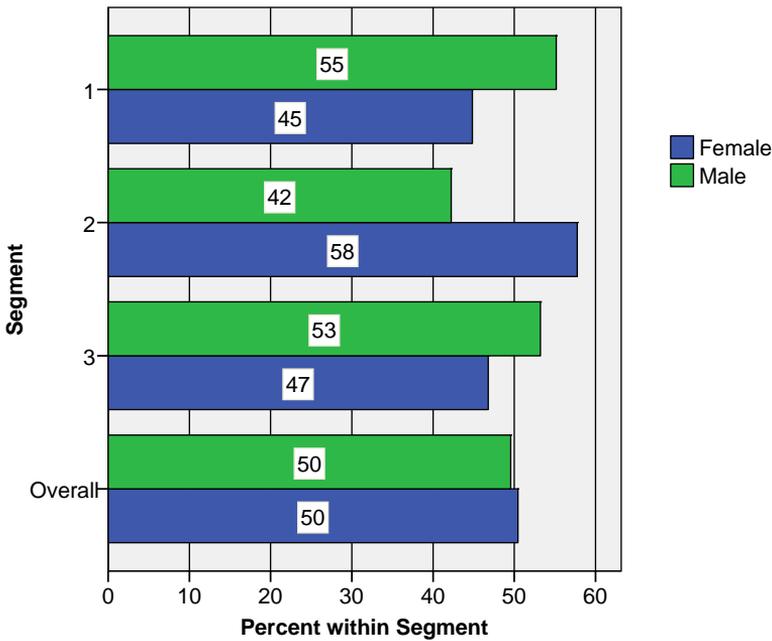


Figure 20 also reveals that full-fee paying international students (both onshore and offshore) focus heavily on full-time studies.

Figure 20: International Students, Within Segment Percentage of Course Load, 2007

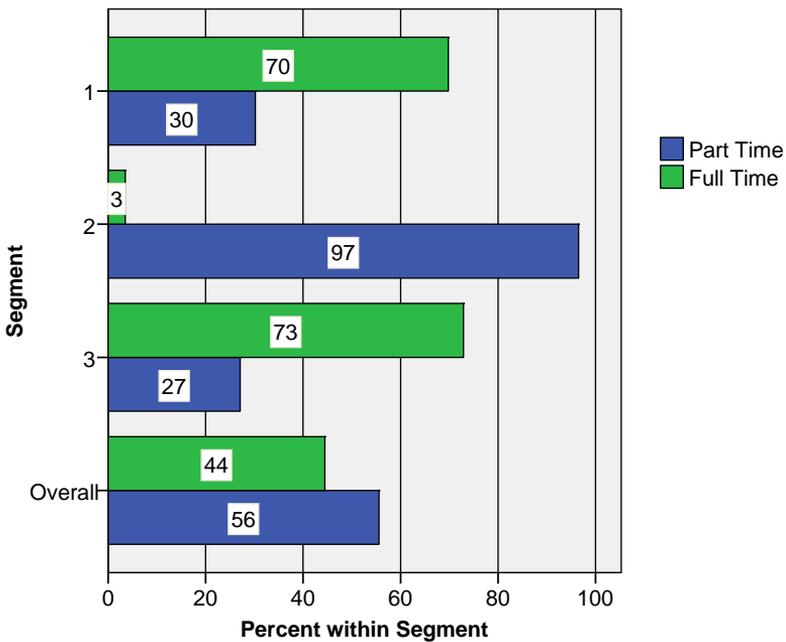
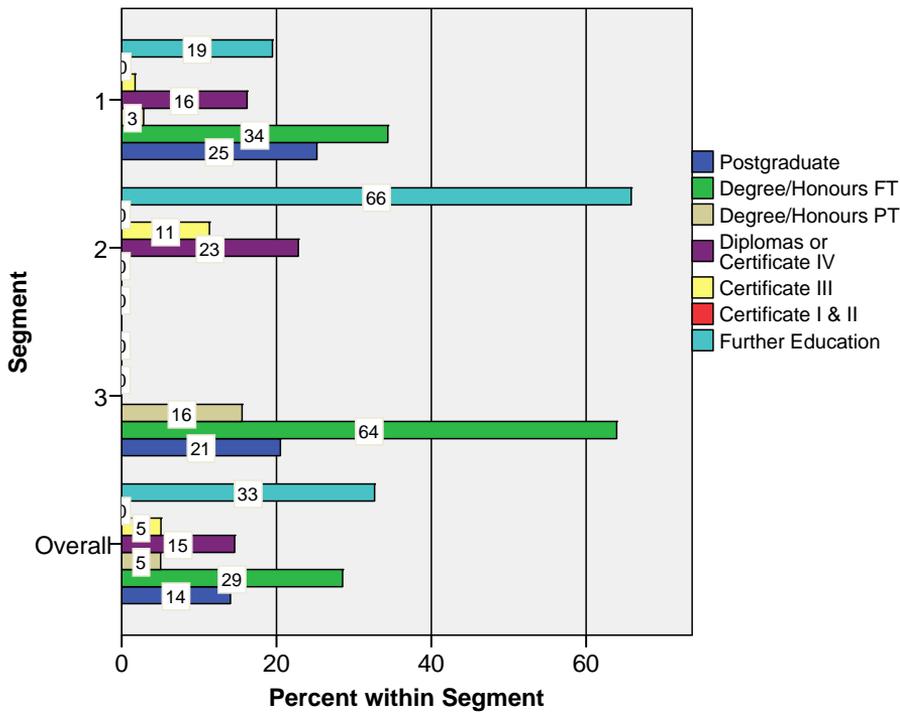


Figure 21 suggests that 19% and 16% of international students who study in Australia are in the FE and VE sectors respectively. On the other hand, 'offshore, TAFE' students mainly appear in the FE sector while the rest are in the VE sector. In contrast, offshore full-fee paying students are only in the higher education sector and particularly in full-time degree courses.

Figure 21: International Students, Within Segment Percentage of Course Level, 2007



Not reported here, data on father's birthplace suggests that 74% of international students studying in Australia are of Asian ancestry. Figure 22 also reveals that 'offshore TAFE' students are in Chinese-speaking countries.

Finally, Figure 23 clearly divides the three segments according to the source of funding as reported by the VUSIS database.

Figure 22: International Students, Within Segment Percentage of Language, 2007

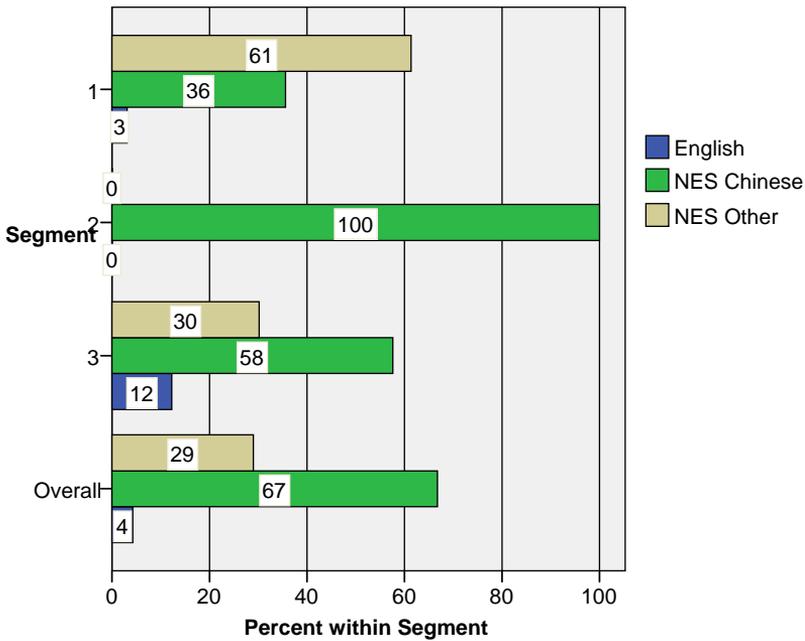
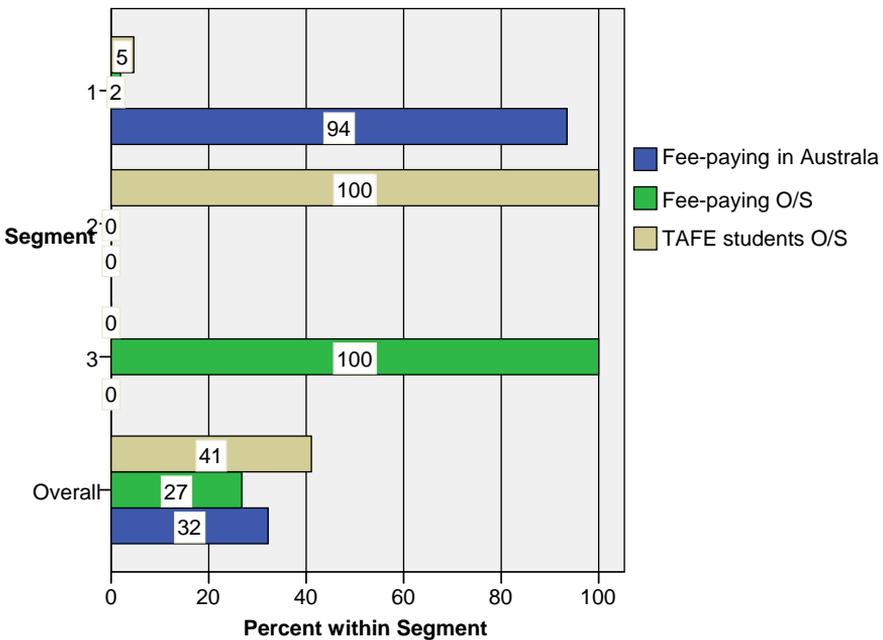


Figure 23: International Students, Within Segment Percentage of Course Location, 2007



## CONCLUSION

This report examines and maps the diversity of the student body at Victoria University for the period 2003-07. Both descriptive and statistical analysis are undertaken to identify significant segments of Victoria University's student population within that population in 2007.

The key important characteristics of the student body at Victoria University are as follows. Victoria University has a strong intake of international students. Students at Victoria University are heavily involved in the labour market, with over 80% either working or seeking work. Also, a substantial proportion of Australian students come from socio-economic backgrounds well below the Melbourne average. Victoria University is also characterised for its access to post-secondary education for culturally and linguistically diverse Australians.

Analysis has revealed evidence of four main segments within the Australian student body: 'young, full-time Australian degree' students who are focused on full-time study for an undergraduate degree, work part-time, tend to be much younger than others, and to come from families with relatively higher socio-economic status; 'disadvantaged' Australian students who tend to have lower labour force attachment and study part-time in non-degree courses; 'working, third-generation' Australian students who are involved in part-time study and full-time work; and international students.

## APPENDIX: ABS CENSUS 2006, SEIFA DEFINITIONS

### (1) INDEX OF RELATIVE SOCIO-ECONOMIC ADVANTAGE

Note: this is the inverse of the following ABS measure:

#### INDEX OF RELATIVE SOCIO-ECONOMIC DISADVANTAGE

##### Included variables

- % occupied private dwellings with no internet connection
- % employed people classified as Labourers
- % people aged 15 years and over with no post-school qualifications
- % people with stated annual household equivalised income between \$13,000 and \$20,799 (approx. 2nd and 3rd deciles)
- % households renting from Government or Community organisation
- % people (in the labour force) unemployed
- % one parent families with dependent offspring only
- % households paying rent less than \$120 per week (excluding \$0 per week)
- % people aged under 70 who have a long-term health condition or disability and need assistance with core activities
- % occupied private dwellings with no car
- % people who identified themselves as being of Aboriginal and/or Torres Strait Islander origin
- % occupied private dwellings requiring one or more extra bedrooms (based on Canadian National Occupancy Standard)
- % people aged 15 years and over who are separated or divorced
- % employed people classified as Machinery Operators and Drivers
- % people aged 15 years and over who did not go to school
- % employed people classified as Low Skill Community and Personal Service Workers
- % people who do not speak English well

## (2) INDEX OF ECONOMIC RESOURCES

### **Included Variables**

- % people with stated annual household equivalised income between \$13,000 and \$20,799 (approximately 2nd and 3rd deciles)
- % one parent families with dependent offspring only
- % occupied private dwellings with no car
- % households renting from Government or Community organisation
- % households paying rent less than \$120 per week (excluding \$0 per week)
- % people aged 15 years and over who are unemployed
- % households who are lone person households
- % occupied private dwellings requiring one or more extra bedrooms (based on Canadian National Occupancy Standard)
- % households owning dwelling they occupy (without a mortgage)
- % dwellings with at least one person who is an owner of an unincorporated enterprise
- % households paying mortgage greater than \$2,120 per month
- % households owning dwelling (with a mortgage)
- % households paying rent greater than \$290 per week
- % people with stated annual household equivalised income greater than \$52,000 (approximately 9th and 10th deciles)
- % occupied private dwellings with four or more bedrooms

## (3) INDEX OF EDUCATION AND OCCUPATION

### **Included variables**

- % people aged 15 years and over who left school at Year 11 or lower
- % people aged 15 years and over with no post-school qualifications
- % employed people who work in a Skill Level 5 occupation
- % employed people who work in a Skill Level 4 occupation
- % people (in the labour force) unemployed
- % people aged 15 years and over with a certificate qualification
- % people aged 15 years and over at university or other tertiary institution
- % people aged 15 years and over with an advanced diploma or diploma qualification
- % employed people who work in a Skill Level 1 occupation