

SENIOR-SECONDARY CURRICULUM CHOICE AND ENTRY INTO POST-SECONDARY VOCATIONAL EDUCATION AND TRAINING

Katrina Ball

National Centre for Vocational Education Research

Stephen Lamb

Australian Council for Educational Research

ABSTRACT

The paper analyses the education outcomes of students surveyed in the Australian Youth Survey who undertook year 12 between 1990 and 1994. The paper focuses on the senior secondary curriculum choices that were likely to lead to an apprenticeship, a traineeship or to entry into other TAFE courses during the period 1991 to 1997.

The curriculum was mapped nationally to 20 mutually-exclusive subject groupings, as part of a broader study examining the education, training and employment pathways associated with year 12 curriculum choices. The subject groupings are presented under the broad curriculum groups of 'arts and humanities', 'business studies', 'business studies and humanities', 'business studies and sciences', 'sciences and maths' and 'sciences and humanities'. The methodology used to achieve the mapping is discussed in the paper.

The results of this analysis provide information on the important role played by curriculum choice in senior secondary school for entry to a vocational education and training pathway.

Background

Students currently undertaking vocational education courses have completed more years of schooling than was the case at the start of the decade (Ball and Robinson, 1998). Two-thirds of those aged 20-24 years enrolled in a VET course in 1997 had completed year 12. The increase in the numbers of students in VET who have completed year 12 is a reflection of the increase in apparent school retention rates since the early 1980s. The school retention rate to year 12 rose from 35 per cent in 1981 to 49 per cent in 1986, and then reached a high of 77 per cent in 1992 (Ainley, 1998).

Commensurate with the increase in school retention rates to year 12 has been an expansion in the subject choices available and the curriculum offered in senior secondary school. Given the large proportion of students in the VET system who have completed year 12 it is useful to monitor the areas of the curriculum that are being studied as a precursor to VET studies. It is important to understand the parts of the curriculum that are preparing students for entry to VET and to identify if different patterns of curriculum participation lead to differences in the likelihood of a student entering VET. It is also of interest to ascertain if VET subjects studied in senior secondary school are providing a pathway to an apprenticeship, a traineeship or other VET course.

Data and Methodology

The analysis uses longitudinal data from the Australian Youth Survey (AYS). Respondents to the AYS provide detailed information about their gender, family socio-economic and demographic background, education and training and labour market experiences. For this study, the sixteen year-olds who joined the survey in 1990, 1991, 1992, 1993 and 1994 are tracked annually to 1997 to explore the links between subjects taken in Year 12 and later entry to VET.

Longitudinal surveys provide detailed information on the post-school experiences of respondents. However, the nature of the data means that only historic insights into the effectiveness of the senior school curriculum can be obtained because school curriculums and organisational structures are constantly evolving. This study reports on the outcomes of the curriculum that applied over the period 1990 to 1994. The cumulative post-school educational experiences of students, one year after the

completion of year 12, three years after completing year 12, and at age 21¹ are presented. By these ages some students will have had both higher education and VET experiences so some students will be represented in more than one post-secondary education or training category.

MAPPING THE CURRICULUM

As the AYS is a national survey the year 12 subjects recorded in client records relate to the particular system pertaining in the State or Territory where the respondent was a resident during year 12. Details about the nature and level of year 12 subjects over the period 1990 to 1994 were obtained from each state's senior secondary board of studies. Based on this information, a national mapping of the curriculum between 1990 and 1994 was developed.

DETERMINING SUBJECT COMBINATIONS

In the past, research on subject choice and course enrolments has tended to report on individual subjects or course types based on key learning or subject areas. Post-school education and labour market outcomes, however, are likely to reflect the effects of a combination of a diversity of subjects rather than individual subjects.

Statistical clustering techniques were used to derive the Year 12 subject combinations. Preliminary analyses were undertaken using both 'principal components' analysis and 'tree' based statistical modelling of 70 identified subjects. Twenty different mutually exclusive groupings of subjects were distinguished as representing the most commonly selected groups of subjects. Students were then allocated to the group in which they had the highest number of subjects — providing at least three subjects were taken from that group. As English is a compulsory subject in most states it was not included as a subject in the analysis.

PROBIT REGRESSIONS

Statistical analysis was conducted using probit regressions to determine if the curriculum undertaken in senior secondary school makes a significant difference in terms of entry to an apprenticeship, a traineeship or to other TAFE courses. The data was 'stacked' across the five years of data to create a cross-sectional time-series database. Each subject combination was represented by a dummy variable, namely,

$$S_j = \begin{cases} 1 & \text{if subject combination (j)} \\ 0 & \text{otherwise.} \end{cases}$$

Similarly, dummy variables were constructed for each year represented in the sample, namely,

$$Y_j = \begin{cases} 1 & \text{if Year 12 undertaken in year (j)} \\ 0 & \text{otherwise.} \end{cases}$$

As the subject combination dummy variables and time dummy variables each form a linearly dependent set it is necessary to drop one subject combination dummy variable and one time period dummy variable in estimation.

A number of regressions were run with the following subject combinations used sequentially as a 'control' group:

- 'maths, advanced maths, physics and chemistry'
- 'maths, biology, history, geography, art, LOTE',
- 'art, art other, graphics, music, media studies'.

Regression results are discussed in relation to these subject groupings.

The 'year' dummy variables (with 1990 as the 'control' time period) were significant throughout the regressions. This suggests that the year in which a student applied for entry to VET affected the chance of a student gaining entry. This effect can be explained by the demographic changes that

¹ The results reported 'at age 21' represent a considerably reduced sample size because two years of data on students who had not yet reached 21 years of age in 1997 have been excluded.

occurred over the five years of the sample period. There was a 9 per cent decline in the number of people aged 15 to 19 years between 1990 and 1994. It would be more difficult for a student aged 15 to 19 years in 1990 to gain entry to VET compared with the situation facing the equivalent age cohort five years later, other things being equal.

CURRICULUM CHOICE AND POST-SCHOOL EDUCATION AND TRAINING

The post-school education and training outcomes of students at age 19 according to their senior secondary subject choices are presented in table 1. The table provides details on the percentage of students in each subject grouping who have entered higher education, vocational education and training (apprenticeship, traineeship or other TAFE course), other education or have pursued no further education. By age 19 some students will have participated in both VET and higher education.

There are clear differences in post-secondary education and training outcomes depending upon curriculum subject choices in senior secondary school. Over two-thirds of the sample undertaking 'physical education' and 'technical drawing, technology, general maths and computing' subject groupings did not undertake further education in the year after they completed year 12.

By age 19, over half of the young people who had undertaken these subject groupings still had no further education experiences, although the percentage in the 'physical education' subject group with no further education had reduced to 46 per cent by age 21. These results are gender related because males are strongly over-represented in the 'technical drawing, technology, general maths and computing' subject grouping.

CURRICULUM CHOICE AND VOCATIONAL PATHWAYS

A high proportion of students who have taken subject combinations in senior secondary school from the 'vocational education and technology' and 'health sciences and physical education' curriculum groupings, with the exception of 'physical education' subject combinations, enter vocational education and training courses in the year after completing year 12. Other subject combinations where more than a quarter of students have entered vocational education and training in the year after completing year 12 are 'art, art other, graphics, music and media studies', 'history, geography, general maths, humanities other and art', and 'general maths, biology, history, geography, health and art'.

By age 19, over a quarter of students have entered post-secondary vocational education and training courses from all curriculum groups with the exception of 'business studies', 'business studies and sciences', 'sciences and maths and 'sciences and humanities', that include maths taken at a higher level than general maths.

There are clear differences, across the senior secondary curriculum groupings, in the percentage of students who have taken up an apprenticeship, a traineeship or have entered another TAFE course.

Apprenticeship

With the exception of subject combinations that include typing and secretarial studies, between 13 and 16 per cent of students who studied a 'vocational education and technology' curriculum in senior secondary school entered an apprenticeship the year after completing year 12.

By age 19, about a quarter of those who studied the subject combination 'technical drawing, technology, general maths and computing' had entered an apprenticeship. and one in five students who took the subject combination 'agriculture, craft, technology, general maths, health and general science' were in an apprenticeship.

Traineeship

Notably, 11 per cent of the subject combination 'health, general maths, general science, biology and home economics' had entered a traineeship in the year after completing year 12. The percentage entering a traineeship in the year after finishing secondary school that completed other subject combinations was considerably lower. However, by age 19 the percentage of those who entered a traineeship and undertook the subject combinations 'business studies, legal studies, textiles, general maths and biology', 'agriculture, craft, technology, general maths, health and general science', and 'typing, secretarial studies, general maths, home economics and applied computing' had increased to more than 9 per cent.

Other TAFE courses

With the exception of the 'sciences and maths' curriculum group and 'physical education', 'technical drawing, technology, general maths and computing' and 'maths, biology history, geography, art and LOTE' subject combinations, at least 10 per cent of students from all areas of the curriculum had entered a TAFE course, other than as an apprentice or trainee the year after completing year 12.

By age 19 about one in five students from 'arts and humanities' and the subject combination 'general maths, biology, history, geography, health and art' had entered a TAFE course. The percentage of each subject grouping entering a TAFE course by age 21 had increased considerably over those undertaking a TAFE course to age 19.

ENTRY TO POST-SCHOOL VOCATIONAL EDUCATION AND TRAINING

The distribution of students who have entered post-secondary vocational education and training by age 19 according to senior secondary subject grouping is presented in table 2. There are clear differences across subject groupings in the percentage of students undertaking an apprenticeship, a traineeship or other TAFE course according to the group of subjects taken in year 12.

Statistical analysis indicates that the curriculum undertaken in senior secondary school does make a significant difference in terms of the likelihood of entering different areas of vocational education and training to age 19.

Compared with the subject combination 'maths, biology, history, geography, art and LOTE', the likelihood of entering vocational education and training is significantly greater for youth who have undertaken subject combinations from the curriculum groupings 'vocational education and technology', 'health sciences and physical education', with the exception of physical education, and 'arts and humanities' with the exception of 'French, German, music, literature, history and geography'. The likelihood of entering vocational education and training is also significantly greater with the subject combinations 'general maths, biology, history, geography, health and art' and 'business studies, legal studies, textiles, general maths and biology'.

Compared with the subject combination 'art, art other, graphics, music, and media studies' the likelihood of entering vocational education and training is significantly lower for youth who have undertaken subject combinations from the curriculum groupings 'sciences and maths' and 'business studies and sciences' and the subject combination 'maths, biology, history, geography, art and LOTE'. Students from these curriculum areas tend to enter higher education rather than VET. There is no significant difference in the likelihood of students from these subject groupings entering VET.

Apprenticeship

At age 19, 11 per cent of students who had undertaken an apprenticeship, and had completed year 12, were from the 'technical drawing, technology, general maths, computing' subject grouping. A further 9 per cent of students were from each of the 'maths and physical sciences', the 'agriculture craft, technology, general maths, health, general science' and the 'maths, industrial arts, industrial technology, technical drawing' subject groupings (see table 2). Notably, very few students who studied the 'French, German, music, literature, history, geography' group of subjects were in an apprenticeship.

Statistical analysis suggests those students taking courses in senior secondary school from the 'vocational education and technology' curriculum areas have a greater likelihood of entering an apprenticeship by age 19. The exception is a subject combination including typing and secretarial studies. Almost a third of students who had undertaken an apprenticeship were from the vocational education and technology curriculum grouping.

The likelihood of entering an apprenticeship with a 'business studies and sciences' and 'French, German, music, literature, history and geography' subject combination is significantly less than a combination of subjects with 'art, art other, graphics, music and media studies'.

Traineeship

By age 19, over 12 per cent of trainees who had completed year 12 had studied the 'general maths biology, history, geography, health, art' subject grouping in senior secondary school. A further 10 per cent had studied 'health, general maths, general science, biology, home economics' subjects (see table 2).

Statistical analysis indicates that there is a significantly greater likelihood of entering a traineeship by age 19 with the subject combinations of 'maths, industrial arts, industrial technology and technical drawing', 'health, general maths, general science, biology and home economics' and 'agriculture, craft, technology, general maths, general science, biology and home economics' than other subject combinations.

The subject combination of 'business studies, legal studies, textiles, general maths and biology' offers a greater likelihood of entry to a traineeship than 'maths and physical sciences' or 'maths, biology, history, geography, art and LOTE'.

Other TAFE courses

By age 19, over 15 per cent of all students undertaking other TAFE courses (not apprenticeships or traineeships), and who had completed year 12, had studied the 'general maths biology, history, geography, health, art' subject grouping in senior secondary school.

In terms of entry to a TAFE course by age 19 other than as an apprentice or a trainee, there is a significantly greater likelihood of entry with the combination of subjects 'art, art other, graphics, music and media studies', 'general maths, biology, history, geography, health, art' and 'health, general maths, general science, biology and home economics'. There is a significantly reduced chance of entry from the 'sciences and maths' curriculum group and with the 'maths, biology, history, geography, art and LOTE' combination of subjects. These subject groupings however, lead onto higher education. There is also a significantly reduced likelihood of entering TAFE with the 'physical education' subject combination.

Conclusions

The results of this study suggest that there are important differences in post-secondary education outcomes depending upon the group of subjects taken in senior secondary school.

- Some parts of the senior secondary curriculum do not provide the opportunity for further education that is provided by other areas of the curriculum.
- These results are of concern as there are gender patterns associated with those areas of the curriculum that offer limited opportunities for further education.
- Some subject combinations clearly offer poor outcomes for participants in terms of opportunities for undertaking post secondary education.
- Some parts of the curriculum provide a greater likelihood of entry to an apprenticeship, a traineeship or other TAFE course.
- Not all students who study vocational subjects in senior secondary school undertake an apprenticeship after completing school. By age 19, two-thirds of students who undertook vocational subject groupings had not been in an apprenticeship.
- Many young people who undertake an apprenticeship have not studied vocational subjects in senior secondary school.
- Young people entering traineeships or pursuing other TAFE courses have studied a wide range of subject groupings in senior secondary school, although a high proportion of students have a sciences and humanities background.

REFERENCES

- Ainley, J 1998, School participation, retention and outcomes, *Australia's Youth: Reality and Risk*, Dusseldorp Skills Forum, Sydney
- Ball, K and Robinson, C 1998, Young peoples' participation in and outcomes from vocational education and training, *Australia's Youth: Reality and Risk*, Dusseldorp Skills Forum, Sydney

TABLE 1: CURRICULUM GROUP, BY POST-SECONDARY EDUCATION, TO AGE 19 (PER CENT)

Curriculum group	Higher education	Vocational education			Other education	No further education
		Apprentice	Trainee	Other TAFE		
ARTS AND HUMANITIES						
French, German, Music, Literature, History, Geography	38.71	1.08	6.45	19.35	5.38	34.41
Art, Art Other, Graphics, Music, Media Studies	17.14	7.14	3.57	20.71	13.57	41.43
History, Geography, General Maths, Humanities Other, Art	23.85	3.67	5.50	20.18	15.60	35.78
BUSINESS STUDIES						
Maths, Economics, Accounting, Computing	60.48	4.79	2.40	16.77	4.19	17.37
Economics, Accounting, Legal Studies, Textiles, General Maths, Biology, Computing	42.86	3.06	3.06	16.33	9.18	27.55
BUSINESS STUDIES AND HUMANITIES						
Maths, Economics, Geography, History, Art	43.75	2.08	7.29	16.67	12.50	25.00
Business Studies, Legal Studies, Textiles, General Maths, Biology	19.01	5.63	9.15	13.38	8.45	46.48
BUSINESS STUDIES AND SCIENCES						
Maths, Economics, Chemistry, Biology, Computing	59.57	2.13	5.67	12.77	4.96	17.02
SCIENCES AND MATHS						
Maths, Advanced maths, Physics and Chemistry	76.83	4.28	2.52	8.56	2.02	9.82
Maths, Chemistry, Biology, Other Science, Computing	63.19	5.49	3.85	10.99	4.40	15.93
SCIENCES AND HUMANITIES						
Maths, Chemistry, Literature, Music, French, History, Art.	50.47	3.74	5.61	14.95	2.80	24.30
General Maths, Biology, History, Geography, Health, Art	17.61	3.99	6.98	23.26	10.96	41.20
Maths, Biology, History, Geography, Art, LOTE	46.84	4.22	3.38	11.81	7.59	30.80
HEALTH SCIENCES AND PHYSICAL EDUCATION						
Physical Education	16.19	6.67	7.62	11.43	9.52	55.24
Maths, Biology, Physical Education, Health, Home Economics, Legal Studies	31.17	8.44	5.19	16.23	10.39	31.82
Health, General Maths, General Science, Biology, Home Economics	13.85	8.46	12.31	27.69	12.31	34.62
VOCATIONAL EDUCATION AND TECHNOLOGY						
Technical Drawing, Technology, General Maths, Computing	3.61	25.30	4.82	14.46	8.43	51.81
Agriculture, Craft, Technology, General Maths, Health, General Science	7.32	20.73	12.20	12.20	4.88	43.9
Typing, Secretarial Studies, General Maths, Home Economics, Applied Computing	7.84	8.82	10.78	17.65	12.75	46.08
Maths, Industrial Arts, Industrial Technology, Technical Drawing	17.58	17.58	8.79	17.58	7.69	37.36

SOURCE: Tabulations from *Australian Youth Survey* based on the 1990-1994 16 year-old samples and follow-up surveys (unweighted N=6,052; weighted N=1,189,846).

TABLE 2: POST-SECONDARY EDUCATION, BY CURRICULUM GROUPING, AT AGE 19 (PER CENT)

Curriculum group	Higher Education	Vocational education			Other education	No further education
		Apprentice	Trainee	Other TAFE		
ARTS AND HUMANITIES						
French, German, Music, Literature, History, Geography	3.17	0.54	3.55	3.89	2.16	3.55
Art, Art Other, Graphics, Music, Media Studies	2.11	5.38	2.96	6.26	8.23	6.43
History, Geography, General Maths, Humanities Other, Art	2.29	2.15	3.55	4.75	7.36	4.32
BUSINESS STUDIES						
Maths, Economics, Accounting, Computing	8.89	4.30	2.37	6.05	3.03	3.22
Economics, Accounting, Legal Studies, Textiles, General Maths, Biology, Computing	3.70	1.61	1.78	3.46	3.90	2.99
BUSINESS STUDIES AND HUMANITIES						
Maths, Economics, Geography, History, Art	3.70	1.08	4.14	3.46	5.19	2.66
Business Studies, Legal Studies, Textiles, General Maths, Biology	2.38	4.30	7.69	4.10	5.19	7.32
BUSINESS STUDIES AND SCIENCES						
Maths, Economics, Chemistry, Biology, Computing	7.39	1.61	4.73	3.89	3.03	2.66
SCIENCES AND MATHS						
Maths and Physical Sciences	26.85	9.14	5.92	7.34	3.46	4.32
Maths, Chemistry, Biology, Other Science, Computing	10.12	5.38	4.14	4.32	3.46	3.22
SCIENCES AND HUMANITIES						
Maths, Chemistry, Literature, Music, French, History, Art.	4.75	2.15	3.55	3.46	1.30	2.88
General Maths, Biology, History, Geography, Health, Art	4.67	6.45	12.43	15.12	14.29	13.75
Maths, Biology, History, Geography, Art, LOTE	9.77	5.38	4.73	6.05	7.79	8.09
HEALTH SCIENCES AND PHYSICAL EDUCATION						
Physical Education	1.50	3.76	4.73	2.59	4.33	6.43
Maths, Biology, Physical Education, Health, Home Economics, Legal Studies	4.23	6.99	4.73	5.40	6.93	5.43
Health, General Maths, General Science, Biology, Home Economics	1.58	5.91	9.47	7.78	6.93	4.99
VOCATIONAL EDUCATION AND TECHNOLOGY						
Technical Drawing, Technology, General Maths, Computing	0.26	11.29	2.37	2.59	3.03	4.77
Agriculture, Craft, Technology, General Maths, Health, General Science	0.53	9.14	5.92	2.16	1.73	3.99
Typing, Secretarial Studies, General Maths, Home Economics, Applied Computing	0.70	4.84	6.51	3.89	5.63	5.21
Maths, Industrial Arts, Industrial Technology, Technical Drawing	1.41	8.60	4.73	3.46	3.03	3.77