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THE 'GENDER EDUCATION TRANSITION': WHAT IT MIGHT MEAN FOR THE LABOUR MARKET

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Abstract

While overall tertiary education participation has been rising, some groups are lagging. Men, and particularly Māori and Pacific men, are increasingly under represented in many education institutions, especially at higher levels of education. For example, in 1994 in the under 30 age group and when foreign students are excluded there were 13% more women than men enrolled in degree courses. By 2004 this had risen to 36%. For Māori undertaking degrees, the difference had risen from 21% to 79% in 2004, while for Pacific students the figures have gone from 27% to 52%. The cohorts that are part of this tertiary 'education transition' are now a key part of the population that are forming couples or deciding to live on their own, establishing their careers and deciding whether to have children. Some of the possible implications of this 'education transition' for the labour market are explored.

Introduction

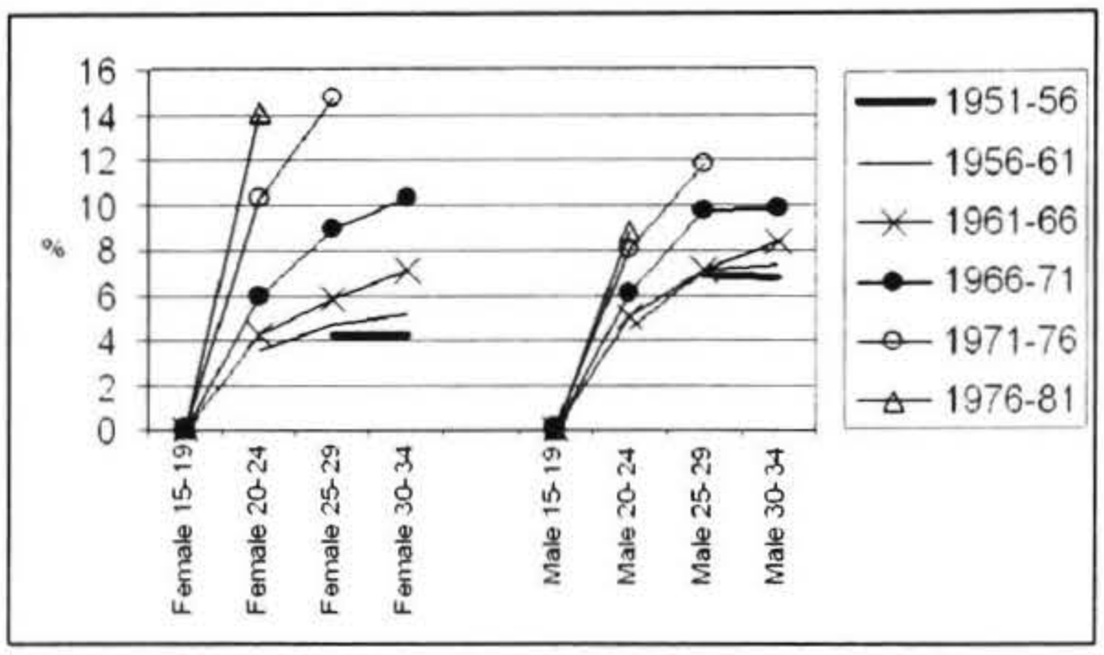
In the 1990s, New Zealand experienced a transition in tertiary educational enrolment within New Zealand. For the first time in our history women began participating in tertiary education at a significantly higher rate than men (Callister *et al.* 2006, Newell and Perry 2006). However, this transition is not unique to New Zealand with similar trends occurring, at differing rates, in most industrialised countries (Buchmann and DiPrete 2006).

This paper begins by setting out the magnitude of the changes in tertiary education for women and men within New Zealand. First, there is brief outline of overall long-term trends in participation. The paper then focuses on changes in both enrolments and completions since the mid 1990s, but with the main period studied 1999 through to 2004. The initial data used in this paper are drawn from a new Ministry of Education dataset based on student numbers. In an earlier paper on this issue, as well as in the second part of this paper, a different source of enrolment data is used (Callister *et al.* 2006). These are enrolment data that can result in some double counting where people are enrolled at more than one institution.

The paper then considers how these changes might have an impact, either directly or indirectly, on the labour market. We do so by focussing primarily on two professional qualifications: school teaching and the broad area of health related qualifications, but especially doctors.

Census data helps set the scene. Summarising census trends from 1981 to 2001, Newell and Perry (2006) show that the proportion of women over 15 with a tertiary degree qualification increased from 2.5% in 1981 to 12.4% compared with an increase from 5.1% to 12.4% for men. Within this overall picture they show a major shift between 1991 and 1996 from male to female led educational attainment amongst younger age groups in the transition from school to work. Between 1981 and 1986 6.2% of males aged 20 to 24 and 5.4% of male residents had gained a degree. Between 1991 and 1996 9.9% of males aged 20 to 24 and 12.4% of females gained a degree qualification. By the 1996 to 2001 period the margins between male and female attainment levels diverged further with 11% of males and 16.6% of females gaining a degree qualification. The divergence shows up clearly when a cohort approach is taken (see Figure 1). The census data are consistent with Ministry of Education administrative data for the 1996 to 2001 which that show that 25,700 degree completions by females and 16,000 by males aged 20 to 24 years of age. The margin between male and female non-degree post-secondary qualification attainment is smaller with 15.8% of females versus 15.1% of males aged 20 to 24 gaining a non-degree post-secondary qualifications between 1996 and 2001 compared with 29.5% of men and 24.4% of women between 1986 and 2001. Newell and Perry show that the margins between male and female educational attainment are larger for Māori and Pacific people than others.

Figure 1: Percent of New Zealand born males and female residents with a degree aged 15-34, based on 1981 to 2001 census data.



While this paper focuses on trends in educational enrolment and completions in New Zealand, overall levels of educational qualifications, and the numbers of qualified men versus women, in each country is also strongly influenced by both inward and outward migration. New Zealand stands out internationally in terms of the proportion of the population that were born overseas as well as the proportion of New Zealanders living overseas (Dumont and Lemaître 2004). Newell and Perry (2006) make preliminary estimates for New Zealand resident net outflow rates between 1996 and 2001 of 10-20% over a wide range of New Zealand non-degree post-secondary qualification and a net loss of those with a degree qualification of the order of 15-20% concentrated amongst those aged 20 to 29 years.

Given that the most skilled and educated tend to be the most mobile internationally, ideally the balance of well-educated New Zealanders leaving, well-educated migrants arriving in New Zealand (the so-called 'brain drain'), and foreign students remaining in New Zealand after they have completed their studies, should be considered when determining what New Zealand's future labour force might look like. While this is an ideal, the complexities of determining overall educational trends, particularly when gender is also considered, are beyond the scope of this paper. Instead, only trends within New Zealand tertiary education institutions are considered.

While an important dimension to the gender changes, ethnicity is not directly considered in this paper. Finally, apart from briefly considering how the gender of teachers might affect the outcomes for students, the paper does not attempt to analyse why the gender-based changes in educational participation have taken place. Both these areas await research in a New Zealand context.

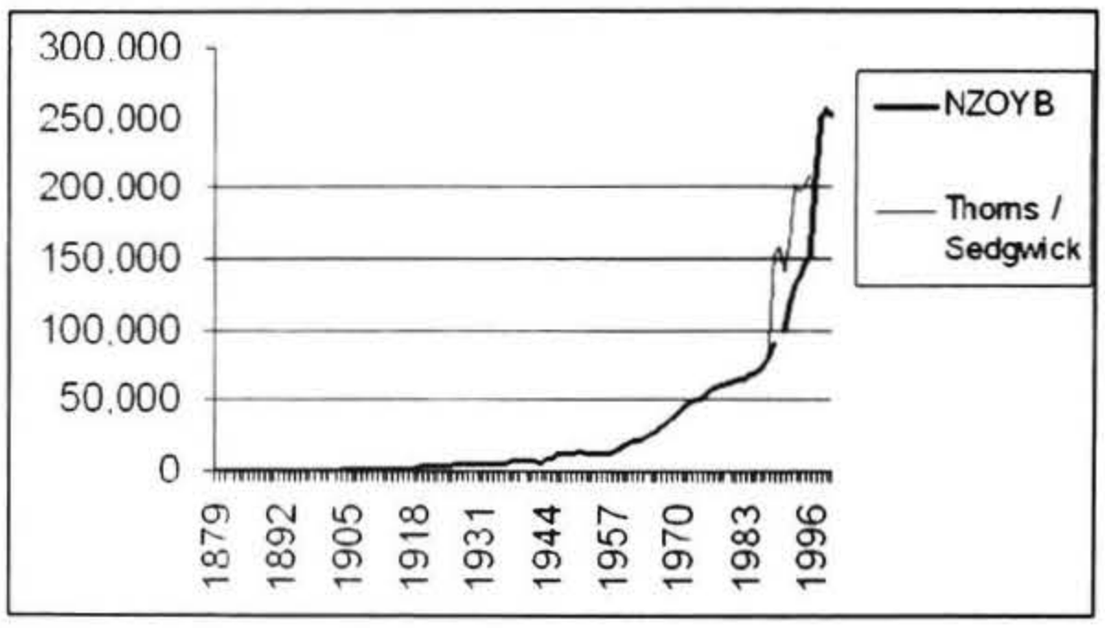
Historic Education Trends

Figure 2 shows the number of women and men taking part in tertiary education in each year from 1879 through to 1999. It indicates a dramatic increase in enrolments post World War II, with particularly strong growth since the 1980s.

Ministry of Education data indicate that the growth continued since 1999. If foreign students are included then the number of students enrolled increased from 308,139 in 1999 to reach 505,408 in 2004.

US research shows that in the late 1890s through to the turn of that century there were times where there were slightly more women than men enrolled in tertiary education (Goldin *et al.* 2006). The authors note that the peak of male dominance in tertiary educational enrolments in the US was post WW2 in the 1960s and 1970s. While similar data have not been produced in New Zealand, case studies indicate a comparable pattern in New Zealand. For example, in terms of enrolments at Victoria University, Barrowman (1999) shows that in 1920 women made up 42% of enrolments but this had declined to around 25% in the 1950s and 1960s.

Figure 2: Long term trends in tertiary enrolment using two measures, 1879 to 1999.



Source: http://www.stats.govt.nz/tables/ltds/ltds-social-indicators.htm.

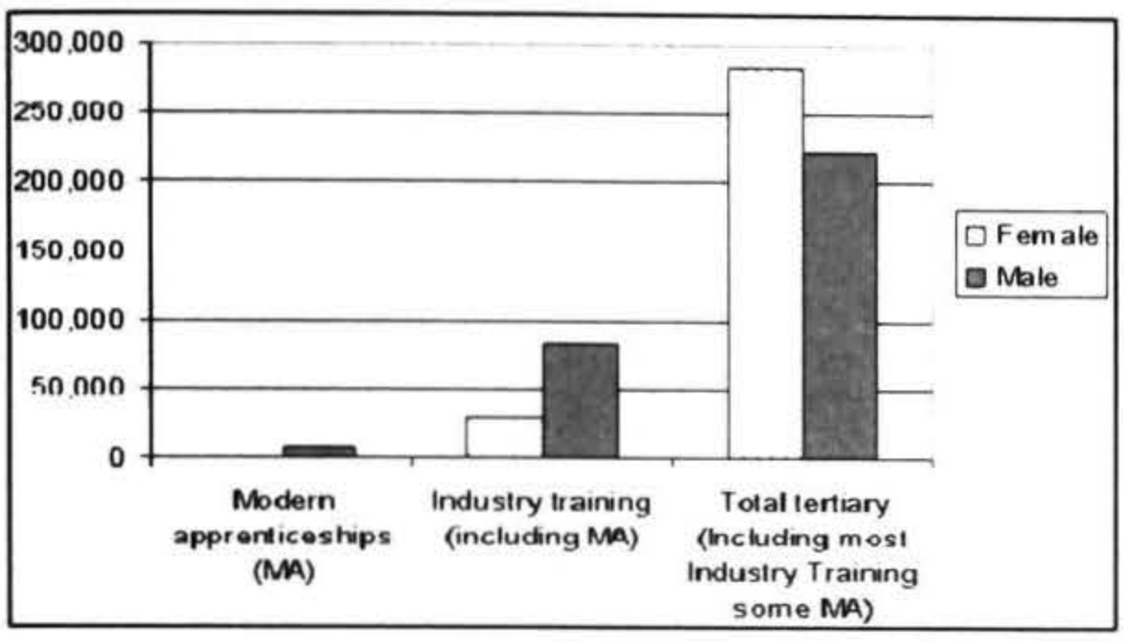
Focussing on a much shorter time period, using Census data Newell and Perry (2006) demonstrate that from 1981 to 2001 the proportion of New Zealand residents aged 15 years or older with no educational qualification halved from 55% to 28%. While part of this decrease in the number of New Zealanders without educational qualifications is due to increases in the number of people with school qualifications, reflecting the pattern shown in Figure 2, much of the growth in qualifications has been through an increasing number of New Zealanders gaining tertiary qualifications.

What Types of Education are we Considering?

All formal educational courses offered within polytechnics, wānanga, universities, colleges of education, universities and private providers are captured in the Ministry of Education tertiary data. There has been much public policy focus on the gender imbalance in Modern Apprenticeships, which is strongly in favour of men. Some people undertaking apprenticeships may not undertake any formal study within a tertiary education provider. But most people undertaking some form of industry-based training will undertake a formal course and therefore will be counted in the official data. To give some idea of the relative size of Modern Apprenticeships,

overall industry based training and the total education sector, Figure 3 shows the gender balance in industry training and in wider education in 2004. It indicates that Modern Apprenticeships, while important, are a very small part of the education sector.

Figure 3: Enrolment by sex in tertiary education, 2004 and 2005 data.



Recent Educational Trends

Not all enrolments end as qualifications, and in fact Ministry of Education data indicate that women are more likely than men to complete their tertiary studies. For instance of those enrolled in 2000, women had a qualification completion rate after five years of 43% against men at 35%. There are also some ethnic differences in completion rates with lower rates for Māori and Pacific students. Nevertheless, enrolment data provide an initial guide to how educational trends are emerging.

Table 1 shows end of year data for enrolments from 1999 to 2004 and exclude foreign students. The gender transition had already taken place in the mid 1990s and women as a percentage of all students' in this time period moves in a narrow band between a low of 56% and a high of 58%.

The differences between women and men also show up when age standardised participation rates are calculated. For example in 2004 the participation rate for women was 16.2% while for men it was 12.4%.

In recent years, one of the growth areas in tertiary education has been amongst older students. Part of this represents a 'catch-up' by those who had no formal tertiary qualifications, a component represents people re-training within a similar level of qualifications, while another group are those who already had a tertiary qualification gaining further advanced qualifications, perhaps an honours degree or some other postgraduate study. In recent years in the older age groups, while male enrolments have increased strongly, female enrolments have greatly outnumbered males. To some degree this is not surprising given that in the past women were less likely to participate in tertiary education when they were young. In addition, many women have taken time out of paid work while raising children and upgrade skills before returning to the workforce. This is indicated by data that shows in 2004 that 74% of those who were enrolled in tertiary education, and had not been in the workforce prior to this enrolment, were women.

Table 2 show enrolments by sex and age in the period 1999 to 2004. Only in the under 18 age group were there more men than women in each year but total student numbers under 18 are relatively low compared with other age groups.

Table 3 shows female students as a percentage of total enrolments in each broad age group. As already noted, only in the under 18 age groups were there more men than women enrolled. In the 18-24 and 25-39 age groups there was a small rise in the proportion of women students, but amongst those aged 40 or older a slight decline between 1999 and 2004.

Table 1: Students enrolled in tertiary education from 1999 to 2004, all age groups but excluding foreign students.

	1999	2000	2001	2002	2003	2004
Female	165,305	177,321	196,286	223,869	243,247	258,587
Male	130,899	138,041	149,446	162,401	184,384	196,366
Total	296,204	315,362	345,732	386,270	427,631	454,953
Women as %	56	56	57	58	57	57

Table 2: Male and female tertiary student enrolments by age, 1999-2004.

		1999	2000	2001	2002	2003	2004
under 18	Female	6,621	8,318	8,734	7,993	8,100	9,067
	Male	7,676	8,270	9,283	8,077	9,305	10,436
18-24	Female	65,163	66,181	70,677	74,472	77,286	80,162
	Male	59,830	60,224	62,764	63,980	66,679	68,938
25-39	Female	58,321	62,775	70,324	81,126	85,283	91,364
	Male	43,058	45,806	49,852	55,401	59,580	63,638
40+	Female	35,149	40,004	46,544	60,276	68,499	77,994
	Male	20,313	23,198	27,544	34,942	44,682	53,354

Table 3: Female tertiary student enrolments as a percentage of total enrolments, by age 1999-2004.

	1999	2000	2001	2002	2003	2004
under 18	46	50	48	50	47	46
18-24	52	52	53	54	54	54
25-39	58	58	59	59	59	59
40+	63	63	63	63	61	59
Total	56	56	57	58	57	57

Table 4 shifts the focus to completions and, as already discussed, indicates female completions are higher than those for men. In recent years the women have formed between 59% and 62% of those completing tertiary qualifications.

Table 4: Male and female tertiary student qualification completions and female completions as a percentage of total completions, 2004

	1999	2000	2001	2002	2003	2004
Female	33,886	41,368	45,731	55,397	59,146	76,682
Male	22,406	27,414	31,269	34,904	36,997	51,451
Total	56,292	68,782	77,000	90,301	96,143	128,133
%	60	60	59	61	62	60

Table 5 shows that in 2004 there was only one area of study where there were more completions by males, that is at the doctorate level in the 25-39 age group. The highest difference was completions by women aged over 40 who had undertaken study at a bachelors level (75% of graduates in this age group in 2004 were women).

Earlier research indicates that when field of study is examined there remain areas that are still male dominated (such as engineering, computing and most Modern Apprenticeships), while there are other areas that have for a long time been female dominated (for example nursing or childcare) (Callister *et al.* 2006). In the remainder of this paper we primarily focus on two areas of study when considering possible labour market implications of the gender transition in tertiary education. These are teacher training for the compulsory education sector and the gender balance in enrolments in health training. These data are drawn from the Ministry of Education enrolment database rather than the student dataset as such data are not available at this level on the publicly available website for the latter database. Except where noted, they show enrolments for those under 30 years of age and exclude foreign students.

Table 6 shows enrolments in 2004 for those training to teach in the compulsory education sector. As is well known, almost all early childhood teachers are women (Farguhar *et al.* 2006). However, as children move through the education system they increase their chances of having a male teacher.

Table 6: Women as a percentage of enrolments in teacher training, 2004 (all ages and including foreign students).

	% of enrolments
Early childhood	99
Primary teaching	83
Secondary teaching	60
General	76
Bilingual primary	80
Immersion primary	75

Table 5: Female tertiary student qualification completions as a percentage of total completions, by age 2004 (areas where there were more men are in bold italics).*

	Level 1-3 Certificate	Level 4 Certificate	Level 5-6 Diploma	Level 7 Bachelors	Level 8 Honours/ Postgrad Cert/Dip	Level 9 Masters	Level 10 Doctorate	Total
18-24	57	67	55	61	61	55	-	59
25-39	61	65	62	63	63	53	***48***	61
40+	57	62	71	75	72	64	55	61
Total	58	64	62	64	65	57	51	60

* The under 18 age group is not shown as the completions in this age group are so low.

Turning to health, Tables 7-10 shows women as a percentage of enrolments health related training at four levels of qualification for those domestic students under the age of 30. For postgraduate students it needs to be noted that a significant number of students are not shown as many students studying at this level are older. The categories of education where men form more than half of enrolments are marked in italics.

Table 7: Women as a percentage of enrolments in certificate courses, domestic students under the age of 30, 2004.

	Female as % of enrolments
Dental Therapy/Assistant	100
Health Care Assistants	100
Natural Healing/Health	98
Pharmacy Assistant	95
Other Nursing Programmes	91
Occupational Therapy	89
Physiotherapy	82
Introductory Health	82
Public & Environmental	71
Medical Technology	67
Para-medical	54
General Health Programmes	*40*

Table 8: Women as a percentage of enrolments in diploma courses, domestic students under the age of 30, 2004.

	Female as % of enrolments
Midwifery	100
Pharmacy/ Pharmacology	99
Dental Therapy/Assistant	96
Physiotherapy	83
Natural Healing/Health	83
Nursing	80
Other Nursing Programmes	56
Para-medical	*39*

Table 9: Women as a percentage of enrolments in bachelor degree courses, domestic students under the age of 30, 2004.

	Female as % of enrolments
Midwifery	100
Nursing	94
Natural Healing/Health	93
Occupational Therapy	91
Other Nursing Programmes	90
Radiography	86
Medical Technology	75
General Health Programmes	71
Pharmacy/ Pharmacology	69
Physiotherapy	68
Optometry	63
Public & Environmental	62
Medicine & Surgery	57
Dentistry	50
Dental Therapy	*37*

Table 10: Women as a percentage of enrolments in postgraduate courses, domestic students under the age of 30, 2004.

	Female as % of enrolments
Occupational Therapy	100
Nursing	96
Other Nursing	94
Physiotherapy	91
Radiography	91
Audiology	83
Optometry	78
Public & Environmental	77
General Health	77
Medicine & Surgery (post service)	72
Sports Medicine	71
Introductory Health	70
Medicine & Surgery (pre service)	67
Pharmacy/ Pharmacology	67
Medical Technology	63
Dentistry	55

Some Implications of the Changes

Overall, the gains in education enrolment and attainment by both women and men are positive. If New Zealand is to be a high-income society competing on quality and innovation rather than quantity and price it is essential that we have a high level of the population completing some form of tertiary education early in their lives and perhaps undertaking further training or retraining as they move through their lifecycle. It is also positive to see women moving into many of the fields of study that have traditionally been dominated by men. This has many positive features. As an example, women who wish to consult with a female doctor now have more choice. But inevitably a change of the size of the gender transition that has taken place in tertiary education in New Zealand will have other impacts on society, including the labour market.

In commenting on a similar transition that has taken place in the US, Buchmann and DiPrete (2006) set out a number of areas where the changes could have an impact. These include:

- Wage gaps, labour force participation, and other labour market outcomes, and
- Trends in educational assortative mating, which then impact on labour market.

In terms of assortative mating, in the US Mare and Schwartz (2006) argue that who marries who has implications for the formation of families, the extent of labour market and income inequality among families and individuals and intergenerational inequality. Their research shows that over the past 40 years in the US, primarily due to the increase in educational attainment of women, the similarity of husbands' and wives' educational attainments has increased markedly. In turn, Costa and Kahn (2000) show that in the US college educated couples are increasingly located in large metropolitan areas. These areas were home to 32 percent of all college-educated couples in 1940, 39 percent in 1970, and 50 percent in 1990. They suggest a primary reason for this is the growth of dual career households and that these households face co-location problems. In a US context they note that smaller cities may therefore experience reduced inflows of human capital relative to the past and thus become poorer (most of New Zealand's cities, in a global context, are small). In addition such trends will tend to draw people away from living in rural areas. This includes the male GPs who in the past may have been married to a schoolteacher or nurse who could also work in rural areas or small towns. Now the potential male or female GP may have a partner who is a specialist doctor, lawyer or other professional who needs to work in a large urban area.

But even considering individuals outside a family context changes in education are forcing change in labour markets, especially in small towns and rural areas. Based on historical evidence, in New Zealand, as in other industrialised countries, well-educated women have, on average, patterns of attachment to the workplace that are different to men. This applies to participation rates and hours worked (Callister 2005, McPherson 2005), as well as willingness to work in more remote areas (Janes *et al.* 2004). Overall time use surveys show that women are also slightly less likely to be working in evenings, at night and or at the weekends (Callister and Dixon 2001). This has been due primarily to different roles assumed by men and women in childrearing but also factors such as concerns about safety when working in remote areas.

These patterns can be considered in relation to more women training to be doctors. First, if female doctors keep following the broad patterns of working hours described above, then this will result in New Zealand requiring more trained doctors to fill any given level of need. Due to possible changes in norms, it may also mean that overall doctors, including male colleagues, will be less willing to work long hours than in the past, perhaps one reason for the strikes in 2005 about working hours for trainee doctors. But also of significance to an economy that still depends strongly on rural production and the viability of small towns, it may be increasingly difficult to recruit doctors into small towns and rural areas. Both New Zealand and Australian research indicates, for a variety of reasons, female doctors are less willing to work in rural areas (Janes *et al.* 2004; Health Workforce Queensland & Australian Rural and Remote Workforce Agencies Group 2006; Tolhurst 2003). Overcoming this problem will be a challenge.

The changes in the gender mix of the health workforce will also mean that family friendly policies need to be increasingly considered in all areas of the health workforce, not just traditionally female areas such as nursing.

Turning to education, one question is whether the gender imbalance in the training of teachers flows through to an imbalance in employment and then ultimately has some affect on the education outcomes of the next generation? Table 11 shows that the majority of teachers are female (around 71%), as are more than half of senior managers in schools. While the majority of principals are male, the proportion of female principals has increased from 34% in 1999 to 41% in 2004.

Does it matter if the majority of teachers are female? In New Zealand, when this question has been discussed one response is that it is the quality of teaching that matters not the gender of the teacher. Determining whether gender matters in teaching outcomes is a very difficult research question. But recent research by Dee (2006a; 2006b) in the US suggests that outcomes for boys could be improved if there were more male teachers. Using longitudinal data Dee found that assignment to a same-gender teacher significantly improves the achievement of both girls and boys, the teacher perceptions of student performance and student engagement with the teacher's subject. As an example, Dee's data suggests that having a female science teacher increases the likelihood that a girl views science as useful for her future. He notes that because most US middle-school teachers in the majority academic subjects are female, his results suggest that the gender dynamics between teachers and students

Table 11: Trends in gender composition of teaching workforce.

	1999	2000	2001	2002	2003	2004
Male Principal	1,663	1,650	1,632	1,561	1,518	1,465
Female Principal	859	899	952	967	1,008	1,028
Male Management	4,103	4,054	4,099	3,911	3,975	3,953
Female Management	5,749	5,603	6,139	6,053	6,291	6,399
Male Teachers	7,276	7,427	7,508	7,713	8,040	8,464
Female Teachers	24,654	25,457	25,586	26,003	26,835	27,245
Total Male	13,042	13,131	13,239	13,185	13,533	13,882
Total Female	31,262	31,959	32,677	33,023	34,134	34,672
% of principals	34	35	37	38	40	41
% of managers	58	58	60	61	61	62
% of total teachers	71	71	71	71	72	71

Source: http://educationcounts.edcentre.govt.nz/statistics/downloads/teaching-staff-march04.xls

strengthen boys' large underperformance in reading while helping overcome the more modest underperformance of girls in maths and science.

As shown, in New Zealand the majority of teachers in primary school are female. In addition of particular relevance to those Maori children attending immersion or bilingual units, the majority of teachers training to teach in these areas are also female. While other research suggests a wide range of factors will be influencing outcomes for boys and girls, if Dee is correct, then the gender composition of the teaching labour market could be having some long-term impact on the overall workings of the labour market.

Conclusion

Like most other industrialised countries, in recent decades New Zealand experienced a gender transition in tertiary educational enrolment. With many researchers and policy makers still focusing on those areas that are male dominated, such as Modern Apprenticeships, there has been a lack of recognition of the dramatic changes that have taken place in most other areas of study. Two main areas are considered in this paper, teaching and health workers. We argue while there are many positive implications in the rise of human capital of women, there are also some potential outcomes that will provide new challenges within the labour market. In particular, we suggest that the health sector, already facing difficulties in attaching and retaining staff, will also have to make some adjustments, especially in rural areas, if it is to retract and retain the women who are increasingly form the majority of new entrants in many skilled occupational groups.

Further Research

There are a number of areas where further research would be useful. The first, and perhaps one of the most difficult, is determining why this gender transition has taken place. As part of this research, there is a need to consider why particular areas of tertiary education remain so strongly male dominated and why some remain strongly female dominated. Currently research tends to focus on barriers to women in those areas that remain male dominated. Already, a number of hypotheses are being put forward as to why the transition has taken place including: that the schooling system has become feminised, both in terms of curriculum and teaching staff, which assists a greater proportion of girls to move onto tertiary education; that more boys are being raised by mothers without good male role models present in the family; that male behavioural, psychological or developmental characteristics are slowing increases in male educational attainment; that new courses being developed by tertiary education providers tend to be in 'female dominated' subjects; that women have seen better gains than men in earnings and other material benefits from their participation in higher education; through to the idea that women are genetically 'brighter' than men but have historically been held back by discrimination within the family, within schools and in the wider society (Buchmann and DiPrete 2006; DiPrete and Buchmann 2006).

Second, while not focussed on in this paper, ethnic dimensions of this gender transition are especially important. If Maori and Pacific people are to dramatically increase their participation in education and bring them up to the same rates as Europeans, then lifting male participation rates is particularly important. Understanding why men from these communities are, on average, under performing relative to women in educational settings, is important.

Finally, more research is needed on the long-term implications of these changes in areas such as the closing of pay gaps, couple formation, fertility decisions, decisions about paid and unpaid work within couples, and both

internal and external migration decisions. In particular, more research is needed as to family friendly policies that may be needed if the investment in women's education, by both the women themselves and by the taxpayer, is to be optimally utilised while at same time allowing women, and men, to have both careers and be parents.

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