



THE PERFORMANCE OF A DIVERSE COHORT OF CIVIL ENGINEERING STUDENTS AT UNITEC INSTITUTE OF TECHNOLOGY (2015-2019)

Dr Wei Yuen Loo

Dr Lusa Tuleasca

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INTRODUCTION

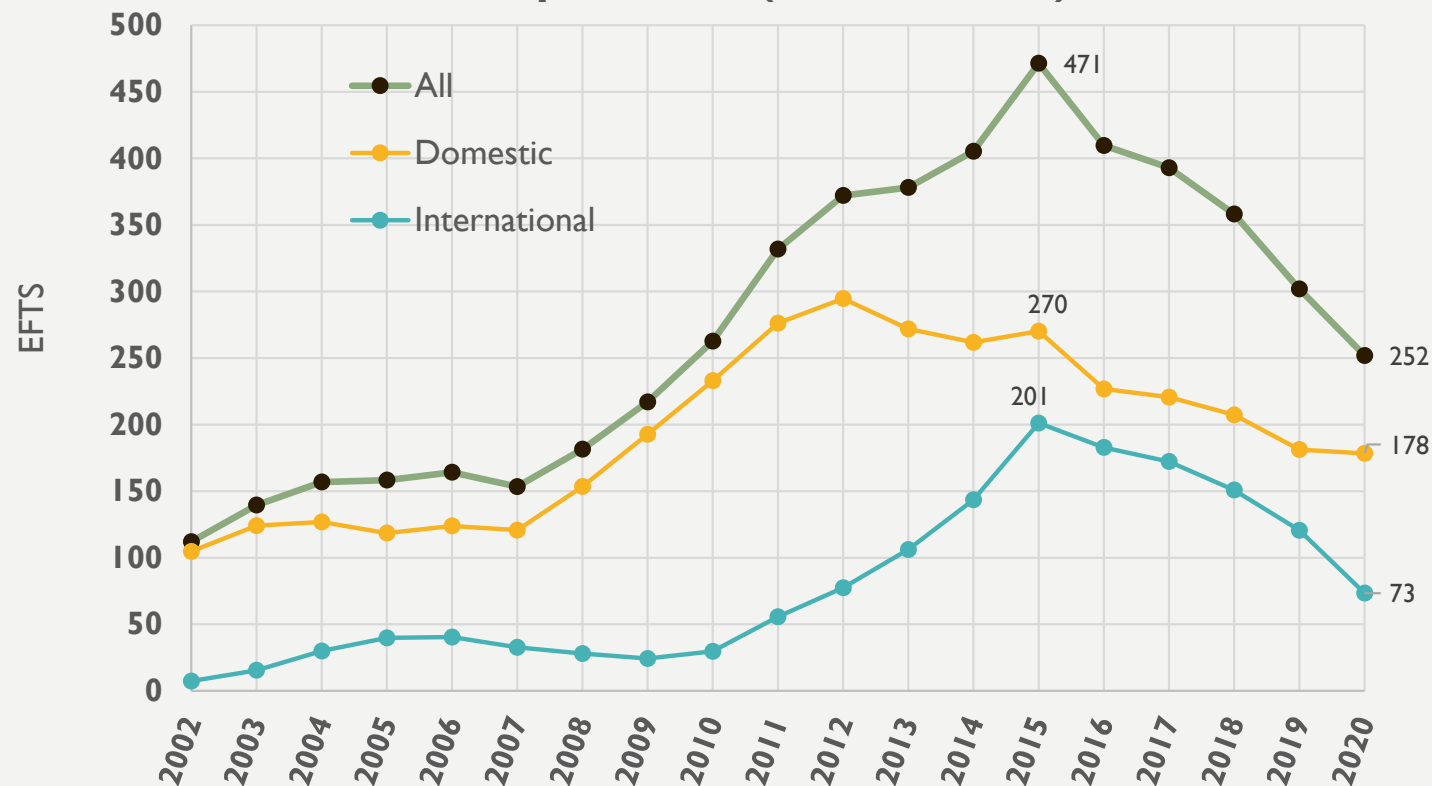
- Provide a background to Civil Engineering at Unitec
- Demonstrate the diversity in our civil engineering cohort of students
- Look specifically at the BEngTech civil, in terms of success and retention, over the period 2015 to 2019

BACKGROUND

- Civil Engineering: “*the profession of designing and executing structural works that serve the general public*” (Encyclopaedia Britannica)
- Civil Engineering has a long history at Unitec (formerly Carrington Polytechnic), with the department being established in the 1970s to deliver the NZCE (New Zealand Certificate in Engineering)
- Internationally, particularly in the English speaking world, there are typically three levels of qualification, governed by the following accords:
 - Four year (full time) Bachelor’s degrees (Washington Accord)
 - **Three year L7 Bachelor’s degrees (Sydney Accord)**
 - **Two year L6 Diplomas (Dublin Accord)**
- At Unitec we deliver the latter two only, the qualifications are respectively the *Bachelor of Engineering Technology* (BEngTech), and the *New Zealand Diploma in Engineering* (NZDE)
- At Unitec the BEngTech and NZDE are offered in the civil and electrical disciplines
- This presentation will focus on students in the civil discipline

BROAD ENROLMENT TRENDS

Civil engineering enrollments, BEngTech and NZDE, or equivalents (2002 to 2020)



- Huge growth from 100 EFTS in 2002 to 471 EFTS in 2015
- International growths from around 25 EFTS in 2010 to a peak of 201 EFTS in 2015
- Since 2015 steep decline in both domestic and international students
- Steep drop in internationals over past 12 months 120 to 73 EFTS
- Early indications are significant uptick in domestic students for 2021

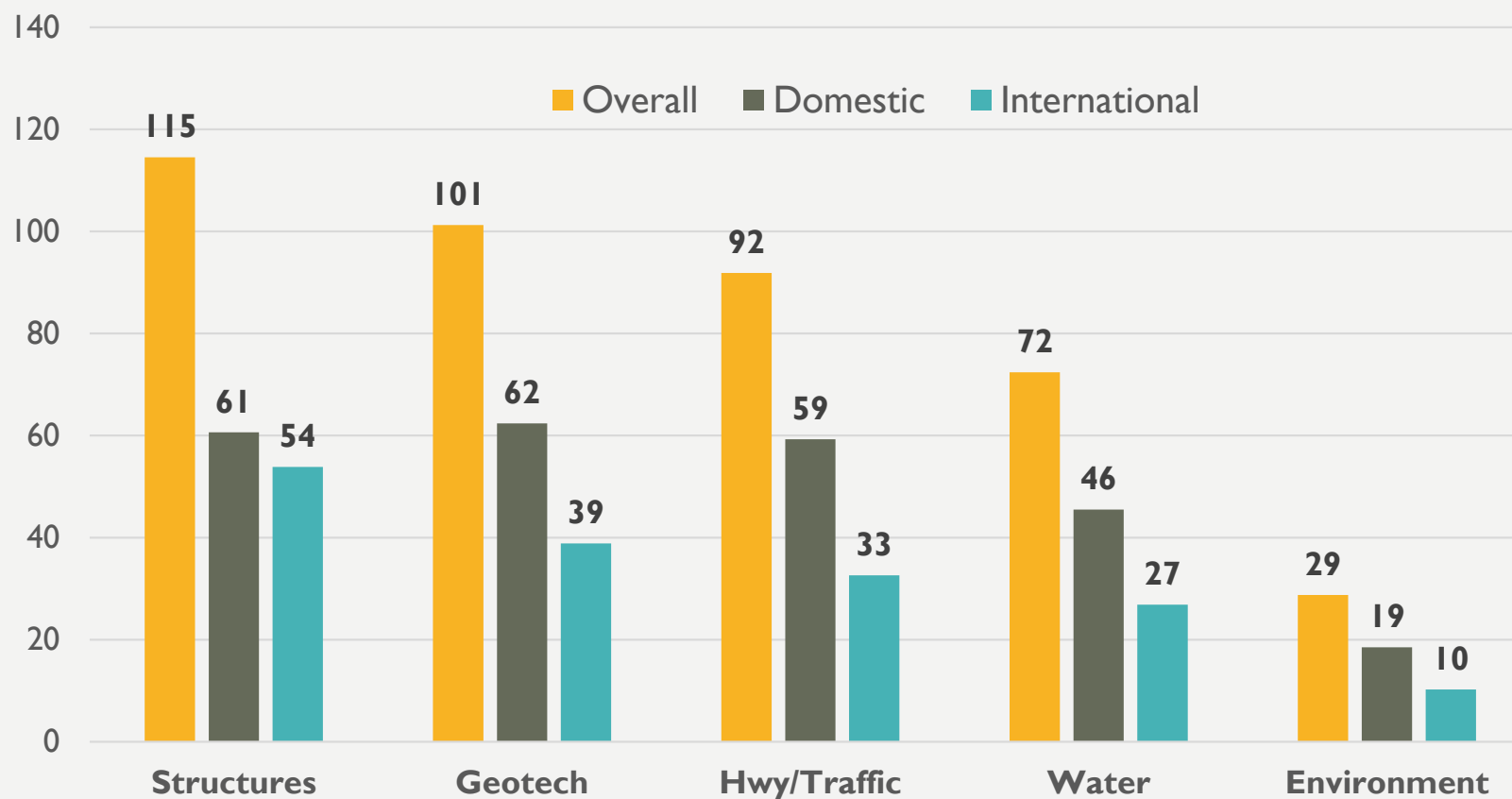
CIVIL ENGINEERING – SPECIALISATIONS

Civil Engineering specialist streams at Unitec:

- Geotechnical Engineering
- Water Engineering (hydraulics)
- Highway/Traffic Engineering
- Environmental Engineering
- Structural Engineering

CIVIL ENGINEERING – SPECIALISATIONS AND ENROLMENTS

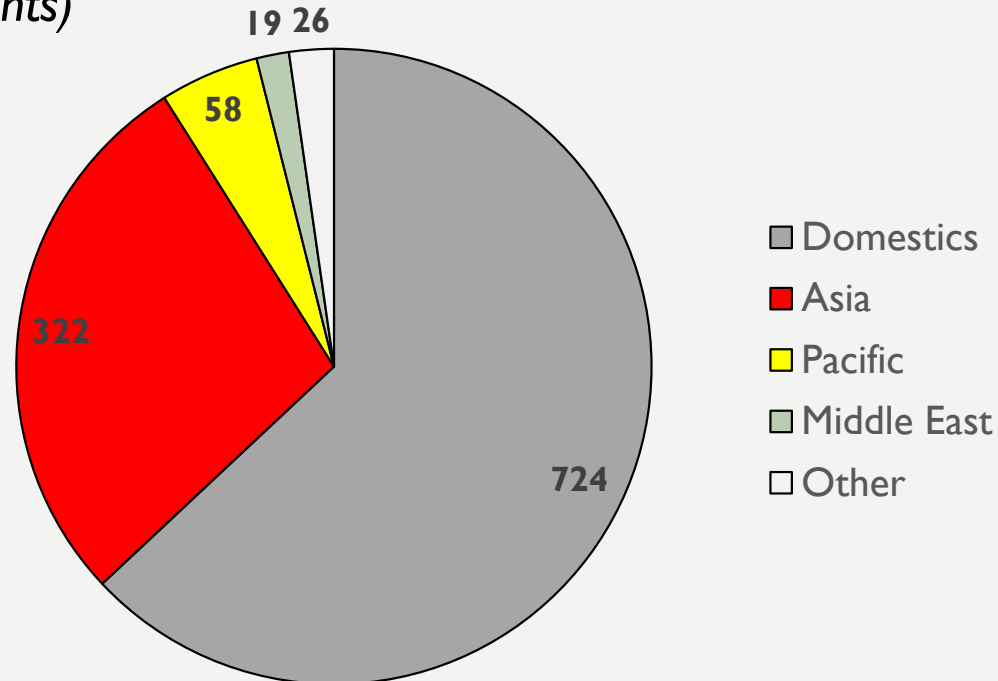
Bachelor of Engineering Technology: Civil specialisation enrollments
EFTS (2015 to 2019)



DOMESTIC AND INTERNATIONAL (2015 TO 2019)

For the purpose of this research:

- **Domestics** include New Zealand Citizens and Permanent Residents, and Australians (*total of 724 students*)
- **Internationals** (*425 students*) are grouped as follows:
 - [Asia](#) (*322 students*)
 - [Pacific](#) (*58 students*)
 - [Middle East](#) (*19 students*)
 - **Other** (*26 students*)

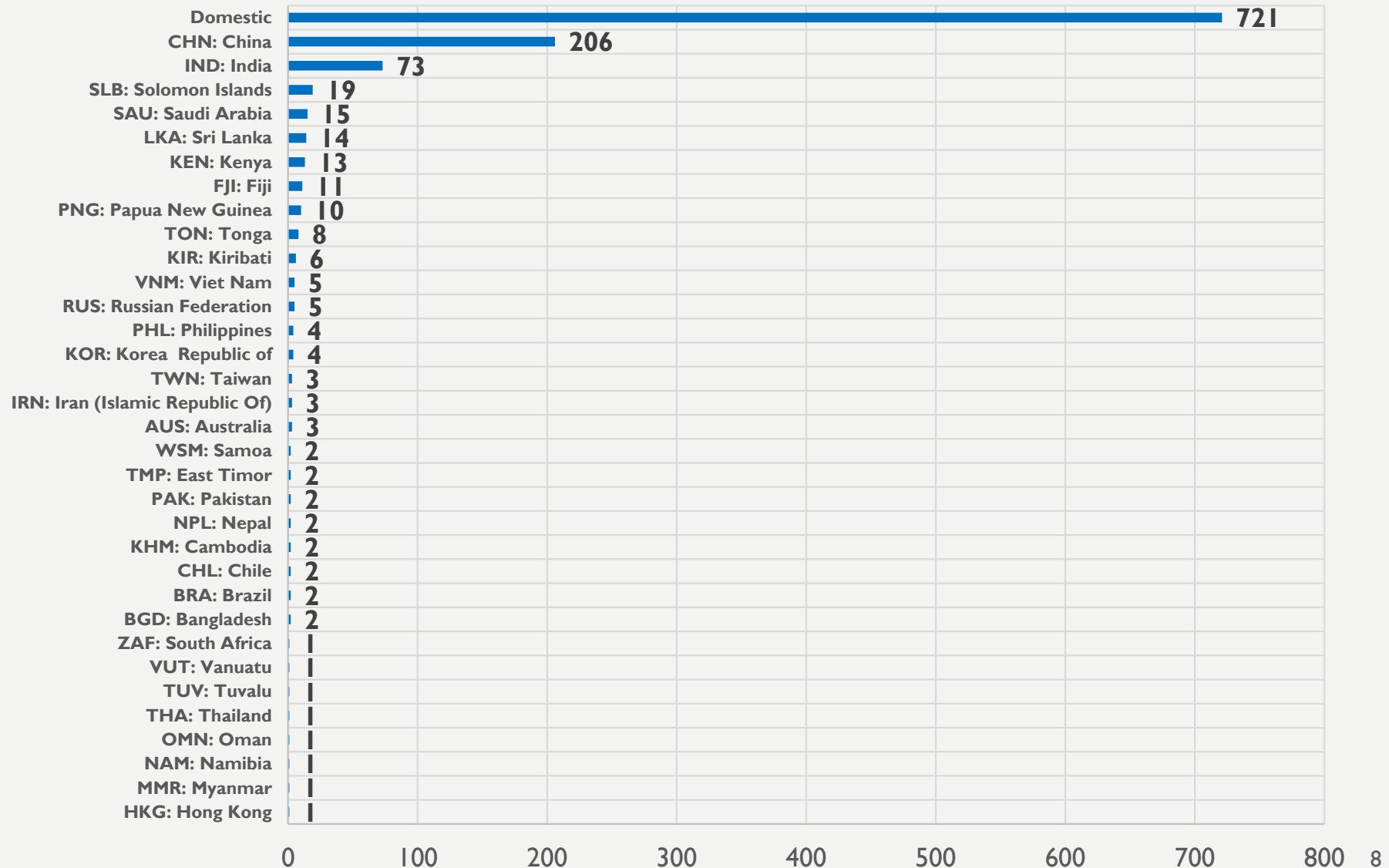


RESIDENCY OF STUDENTS (2015 TO 2019)



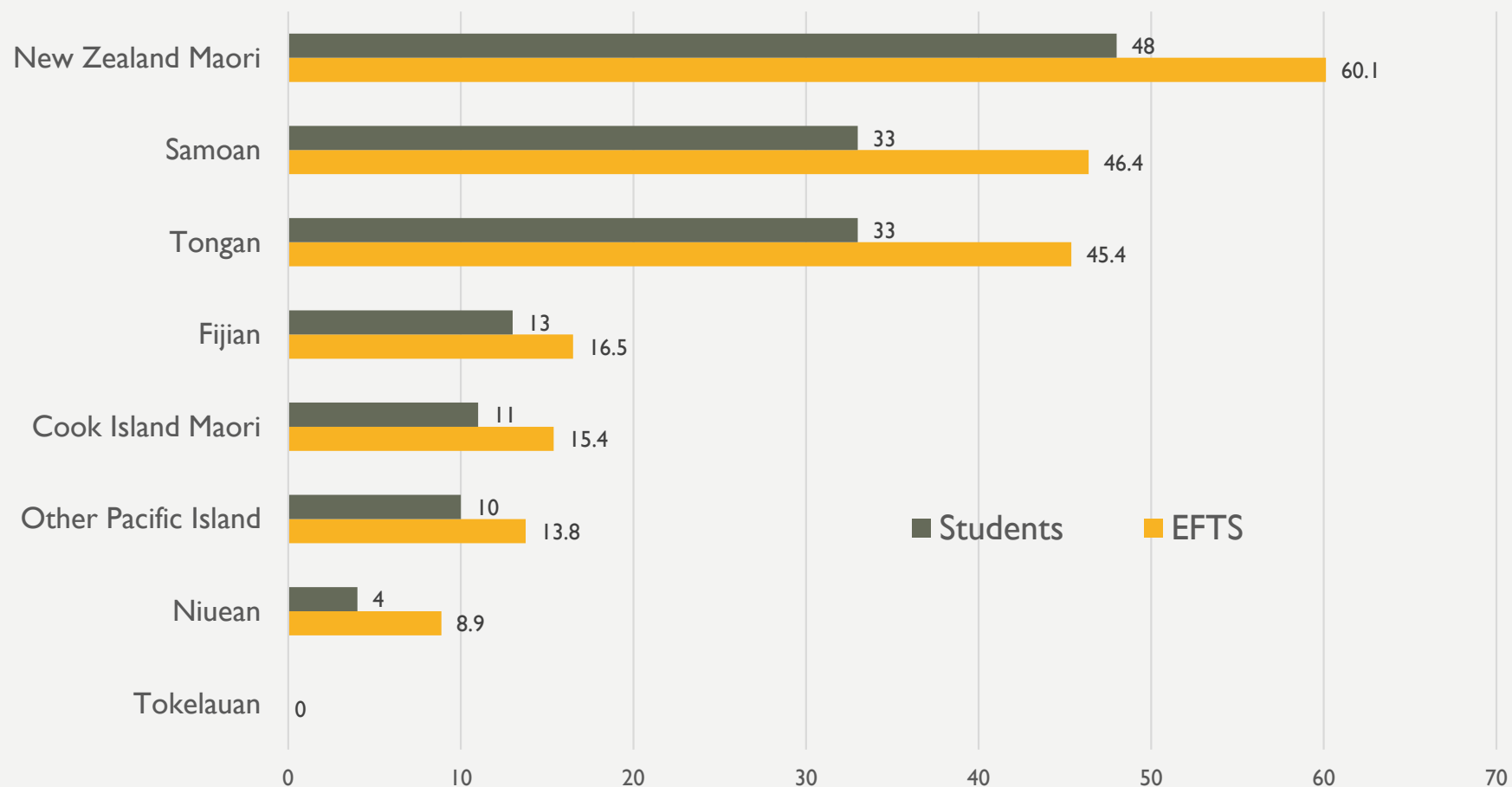
- 1137 students by headcount (representing 1463 EFTS) from 34 different places around the world

Students (headcount) and residency (2015 to 2019)



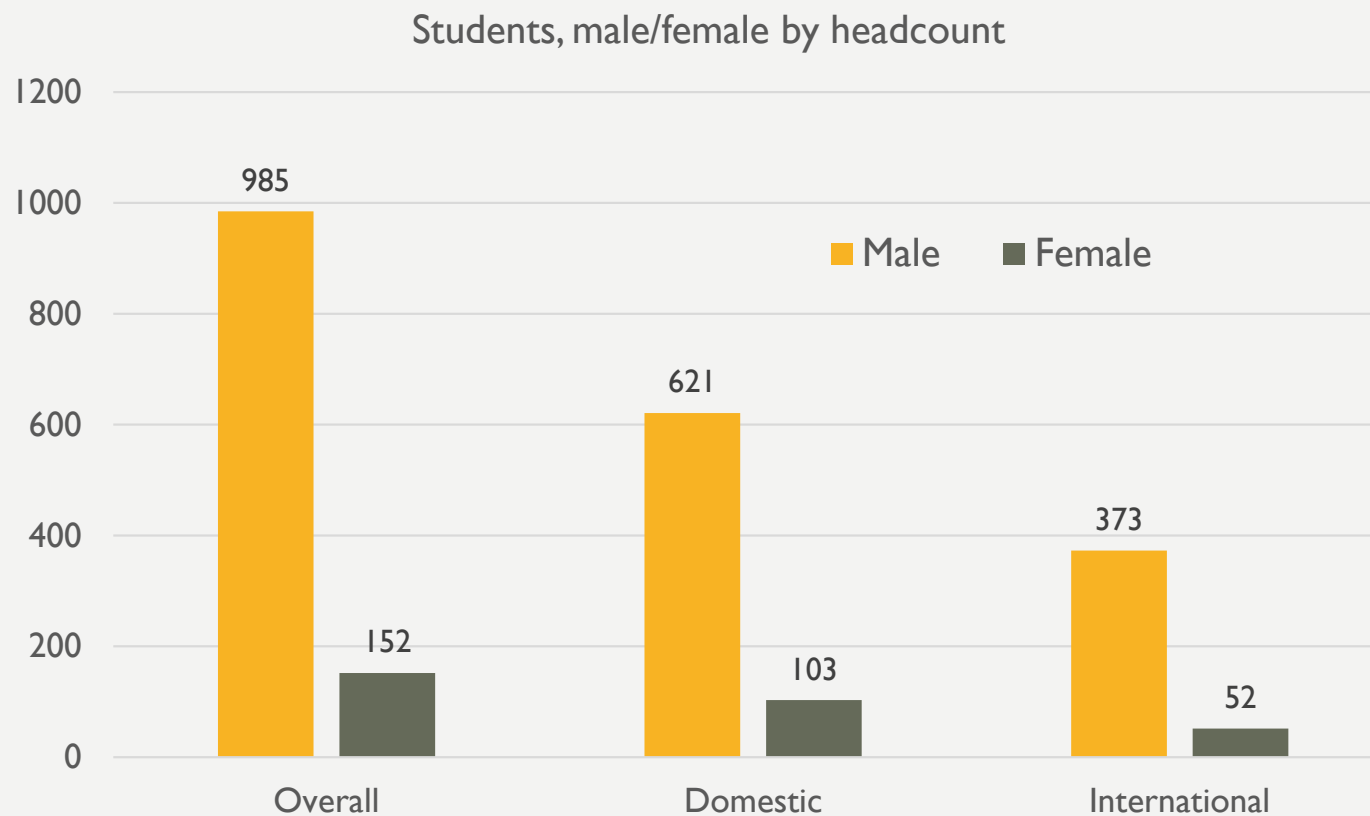
MĀORI AND PASIFIKA (2015 TO 2019)

Within the domestic cohort of 724 students, 48 (6.6%) were Māori and 104 (14.4%) were Pasifika:



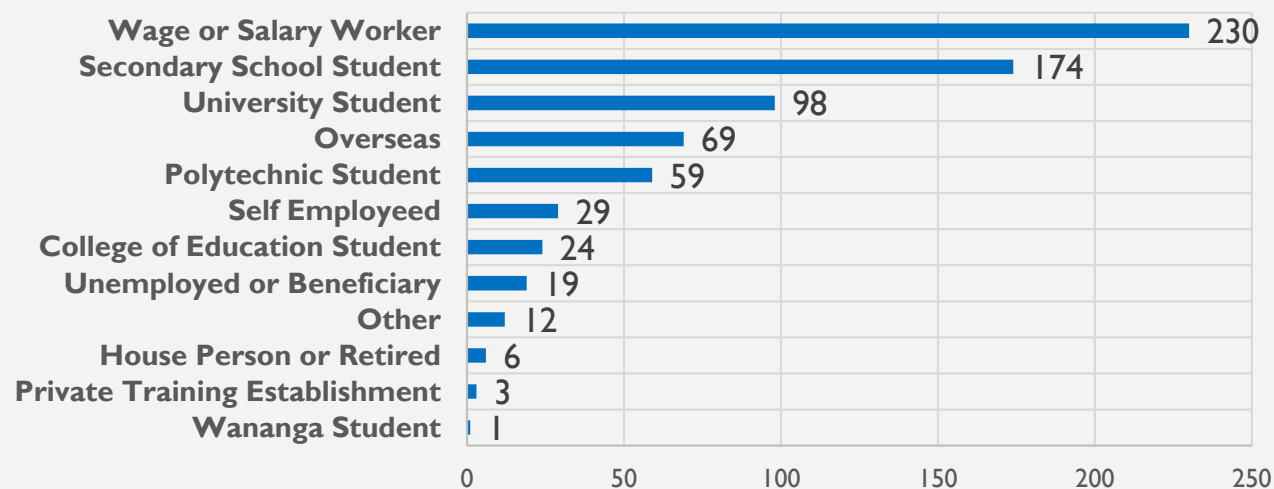
GENDER (2015 TO 2019)

- Overall: 13.4% female (152 of 1137 students)
- Domestic: 14.2% female (103 of 724 students)
- International: 12.2% female (52 of 425 students)

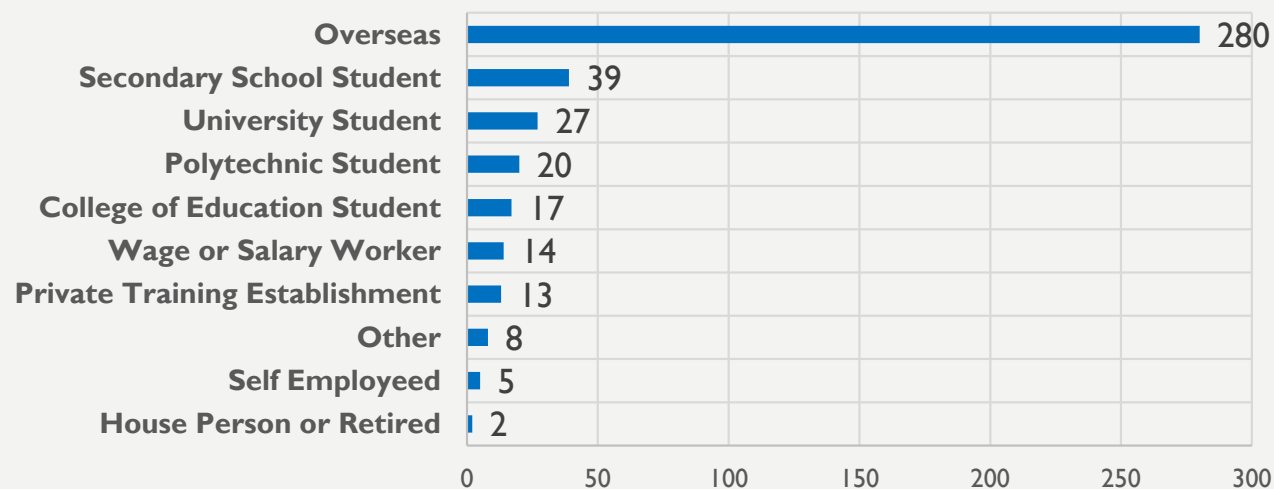


PRIOR ACTIVITY OF STUDENTS

Prior activity of *Domestic* students (total 724 students)



Prior activity of *International* students (total 425 students)



- 259 of the 724 (35.8%) of domestic students from the workforce
- 19 of the 425 (4.4%) of international students from the workforce

AGE OF STUDENTS AT TIME OF FIRST ENROLLMENT



Domestic students:

	EFTS weighted	By Headcount
<i>n</i>	143.31	316
<i>Average age</i>	23.61	23.9
<i>Median age</i>	21.10	21.6
<i>Oldest</i>	52.2	
<i>Youngest</i>	17.2	
<i>Standard Deviation</i>	6.34	6.4

International students:

	EFTS weighted	By Headcount
<i>n</i>	110.88	221
<i>Average age</i>	21.98	22.0
<i>Median age</i>	20.52	20.5
<i>Oldest</i>	43.8	
<i>Youngest</i>	17.0	
<i>Standard Deviation</i>	4.45	4.5

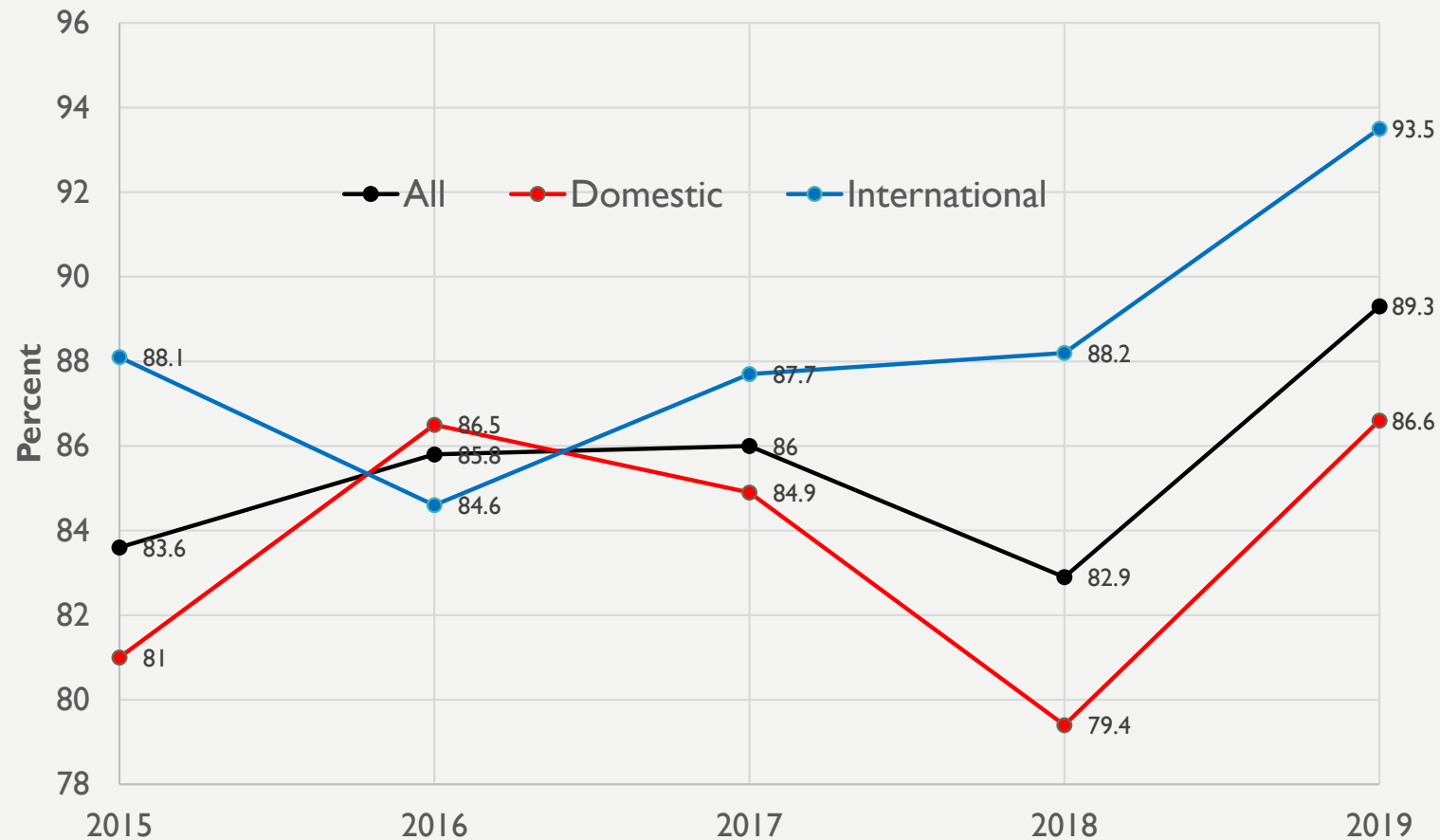
BACHELOR OF ENGINEERING TECHNOLOGY CIVIL



- Over the period 2015 to 2019, 659 students equating to 1050 EFTS studied on this qualification
- Of these 659 students, 459 were domestic (654 EFTS), and 201 were internationals (395 EFTS)
- Of these 659 students, 91 were female (13.8%)
- The youngest student was 17, the oldest 57. The average age was 25.5 years
- We will now look at success and retention for this group of students.

COURSE SUCCESS - DOMESTICS AND INTERNATIONALS

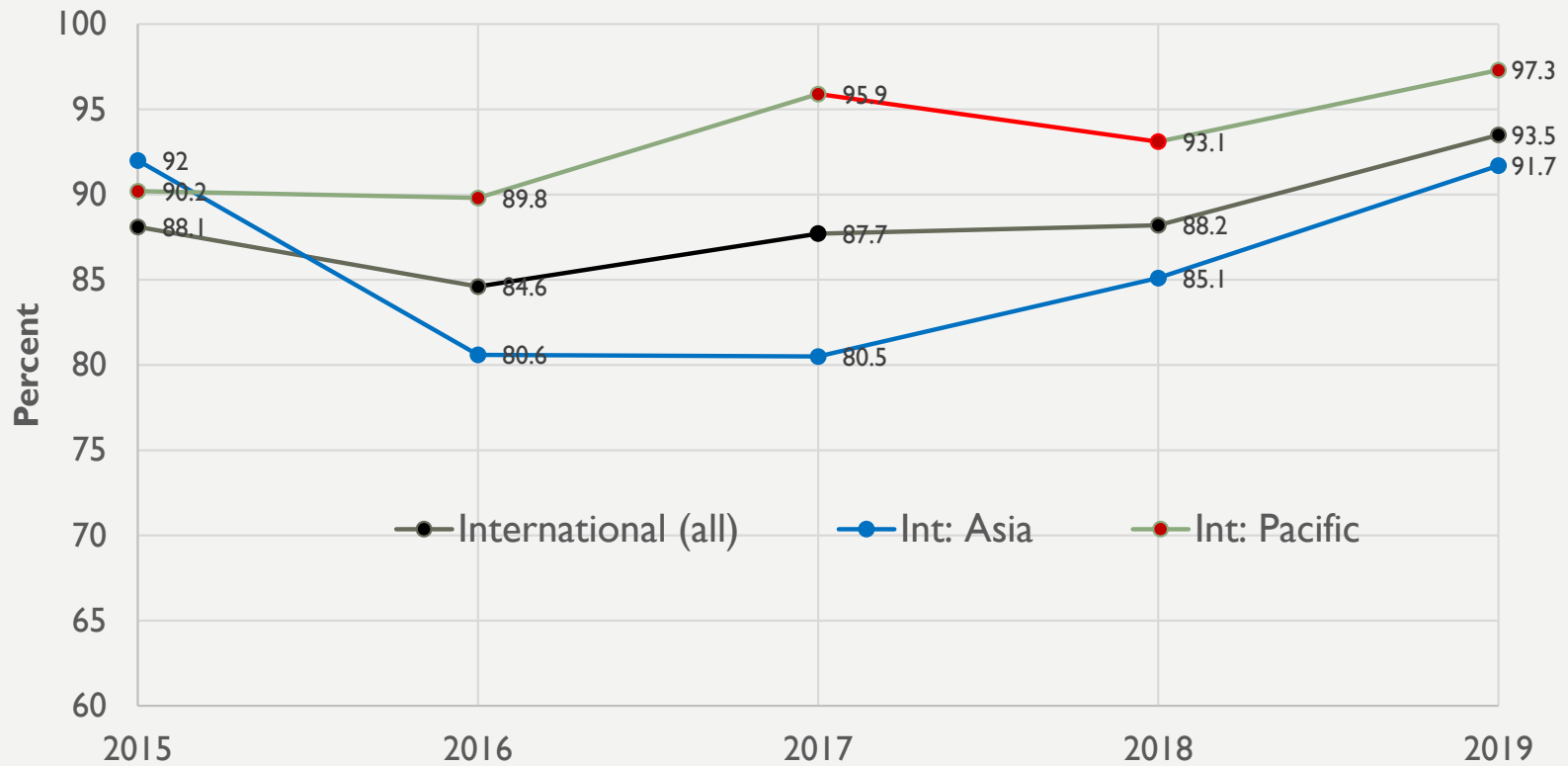
BEngTech (Civil): Course success rate (2015 to 2019)



COURSE SUCCESS – INTERNATIONAL BREAKDOWN

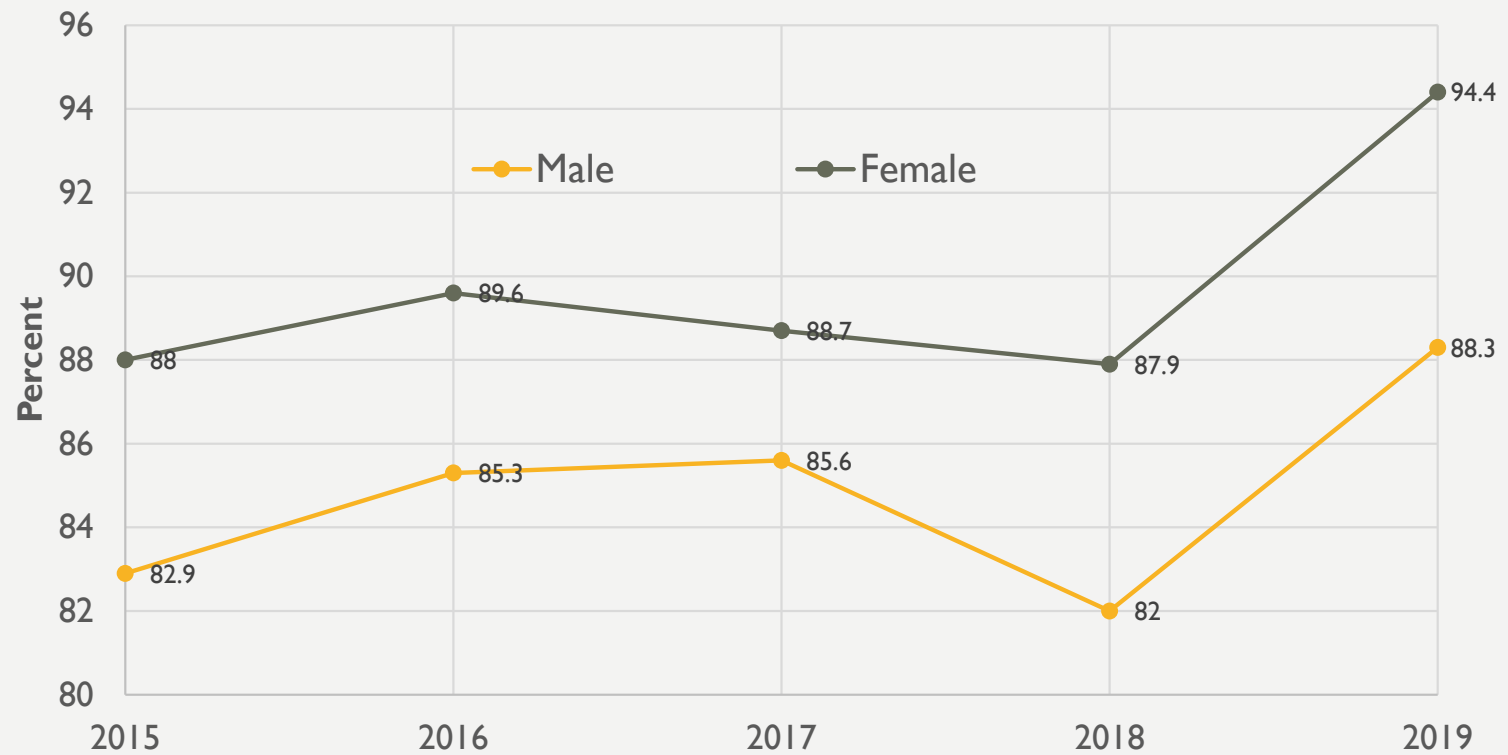


BEngTech (Civil): Course success rate (2015 to 2019)



COURSE SUCCESS - GENDER

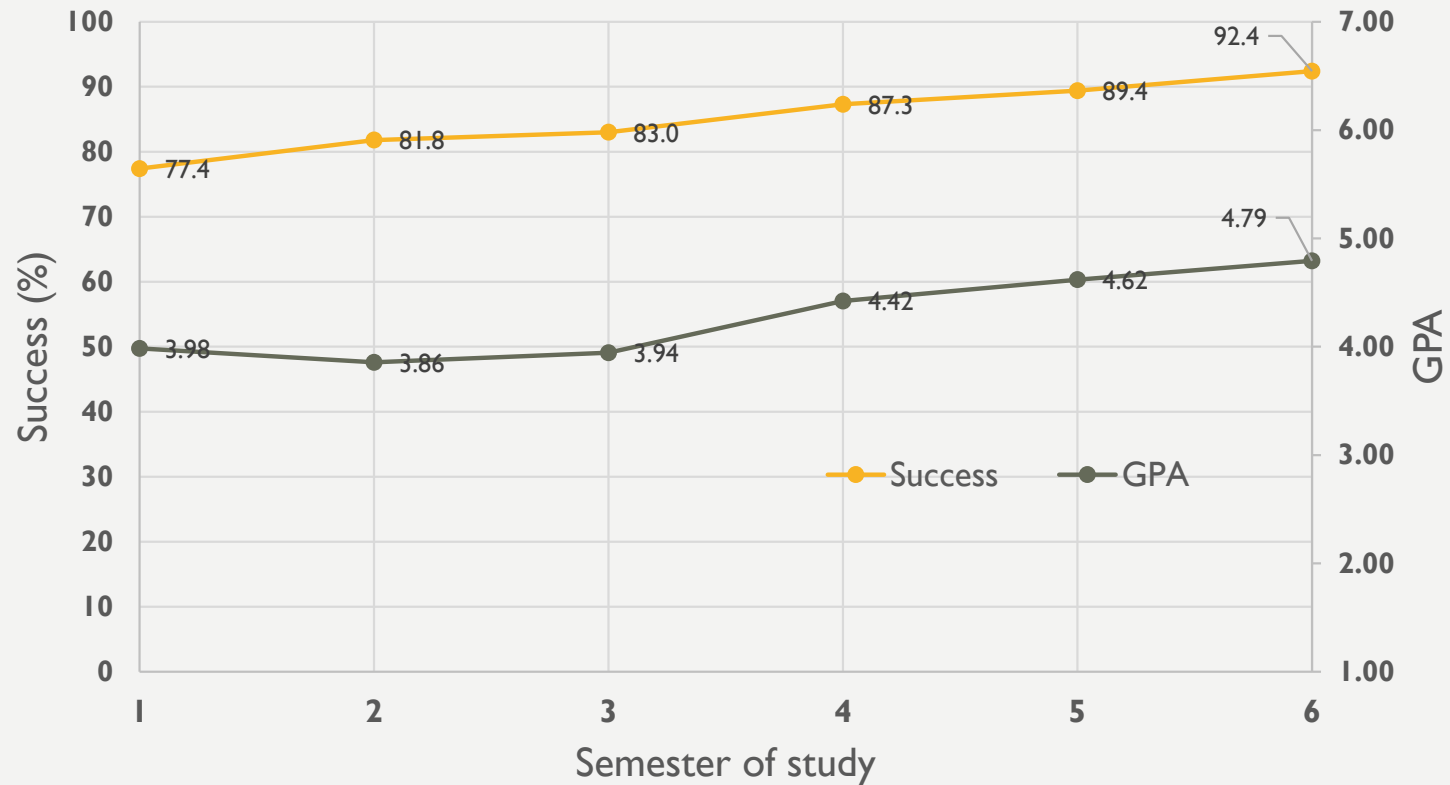
BEngTech (Civil): Course success rate (2015 to 2019)



COURSE SUCCESS – SEMESTER OF STUDY



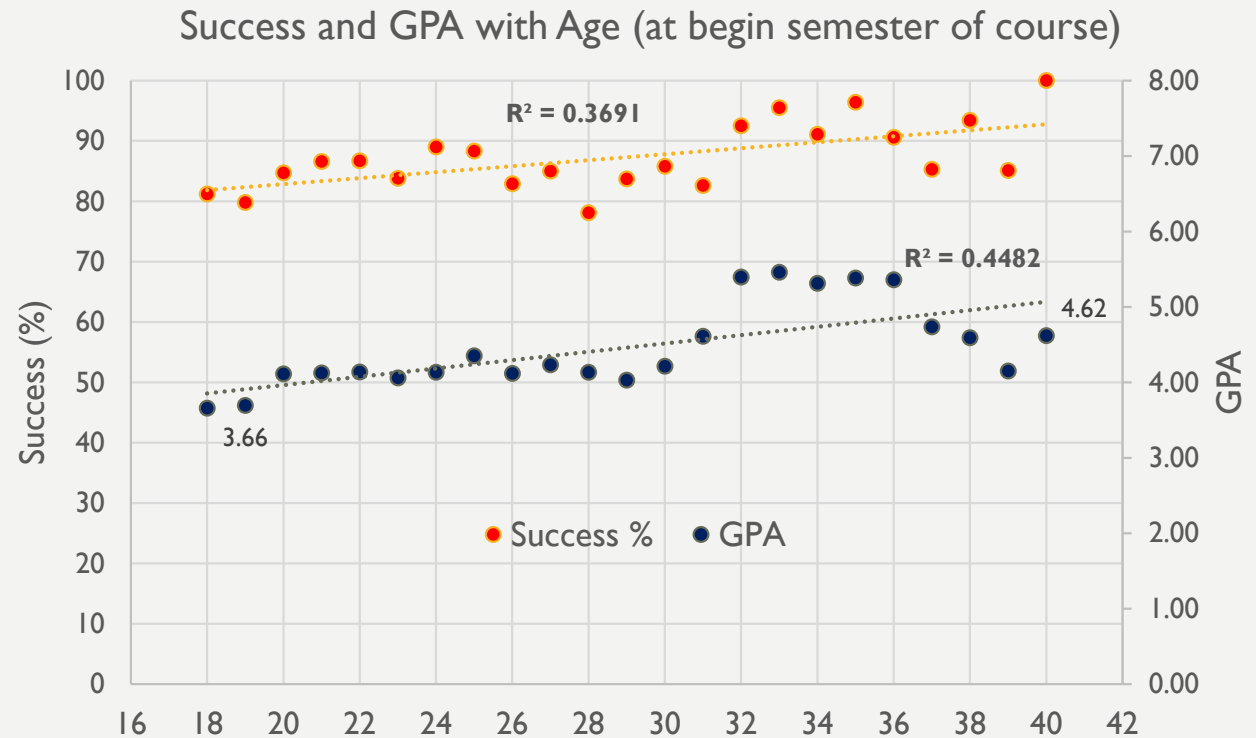
Success and GPA vs Semester of study (2015 to 2019)



COURSE SUCCESS – AGE

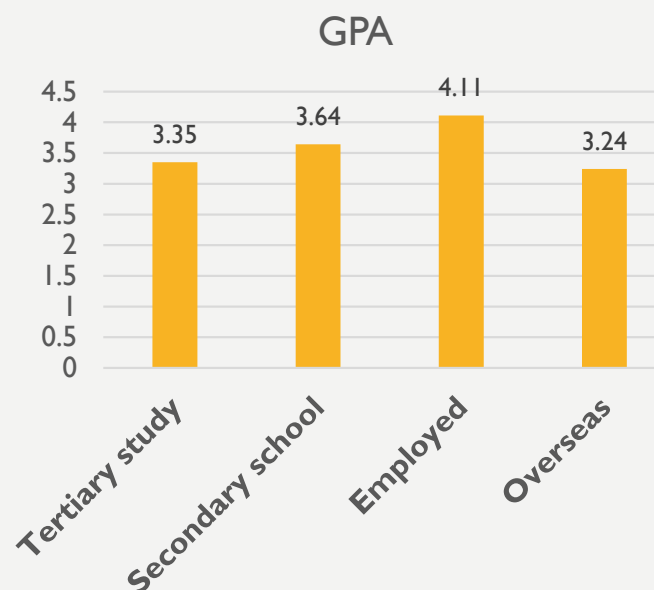
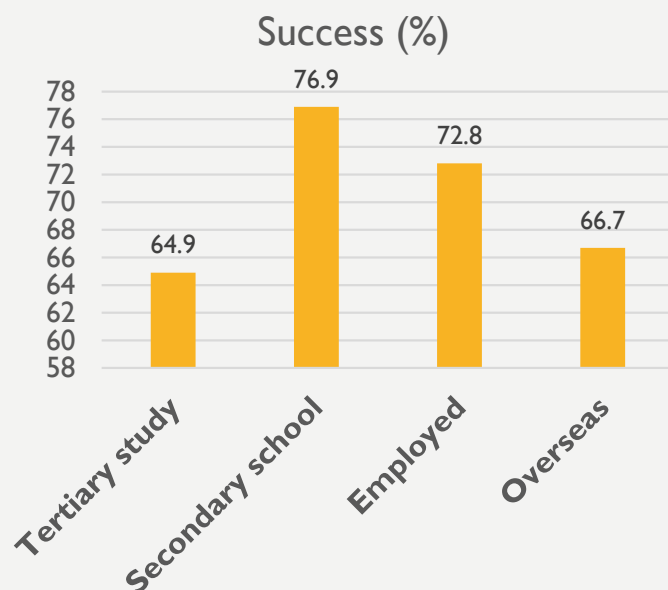
(2015 TO 2019)

Age	Course enrolls	Success %	GPA
18	278	81.2	3.66
19	672	79.8	3.69
20	961	84.7	4.11
21	1056	86.6	4.13
22	876	86.7	4.14
23	632	83.8	4.06
24	573	89	4.13
25	534	88.3	4.35
26	512	82.9	4.12
27	392	85	4.23
28	293	78.1	4.13
29	219	83.7	4.03
30	183	85.8	4.21
31	185	82.6	4.61
32	159	92.5	5.39
33	121	95.5	5.46
34	124	91.1	5.31
35	62	96.4	5.38
36	70	90.6	5.36
37	71	85.3	4.74
38	68	93.4	4.59
39	54	85.1	4.15
40	22	100	4.62



COURSE SUCCESS – PRIOR ACTIVITY

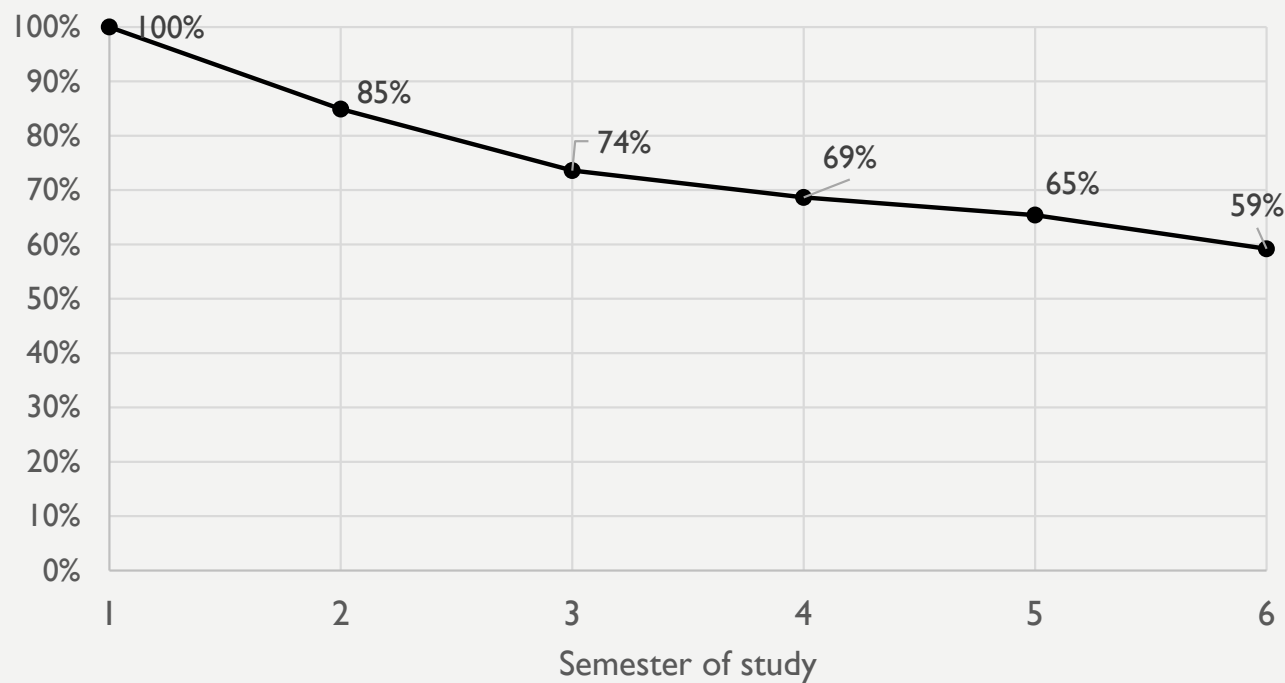
DOMESTIC STUDENTS, FIRST SEMESTER OF STUDY (2015 TO 2019)



Prior activity	Total enrolls	Distinct students	Succeeded	Success %	GPA	Grouped result	
						Success %	GPA
Polytechnic Student	35	10	21	63.6	3.03		
University Student	142	39	91	65.5	3.38	64.9	3.35
Private Training Establishment	8	2	8	100	4.25		
College of Education Student	18	5	14	77.8	3.56	76.9	3.64
Secondary School Student	181	46	139	77.2	3.64		
Wage or Salary Worker	171	51	128	76.6	4.28	72.8	4.11
Self Employed	24	6	14	60.9	2.91		
Unemployed or Beneficiary	12	3	7	58.3	2.42		
Overseas	58	14	36	66.7	3.24		
Other	4	1	4	100	7.50		

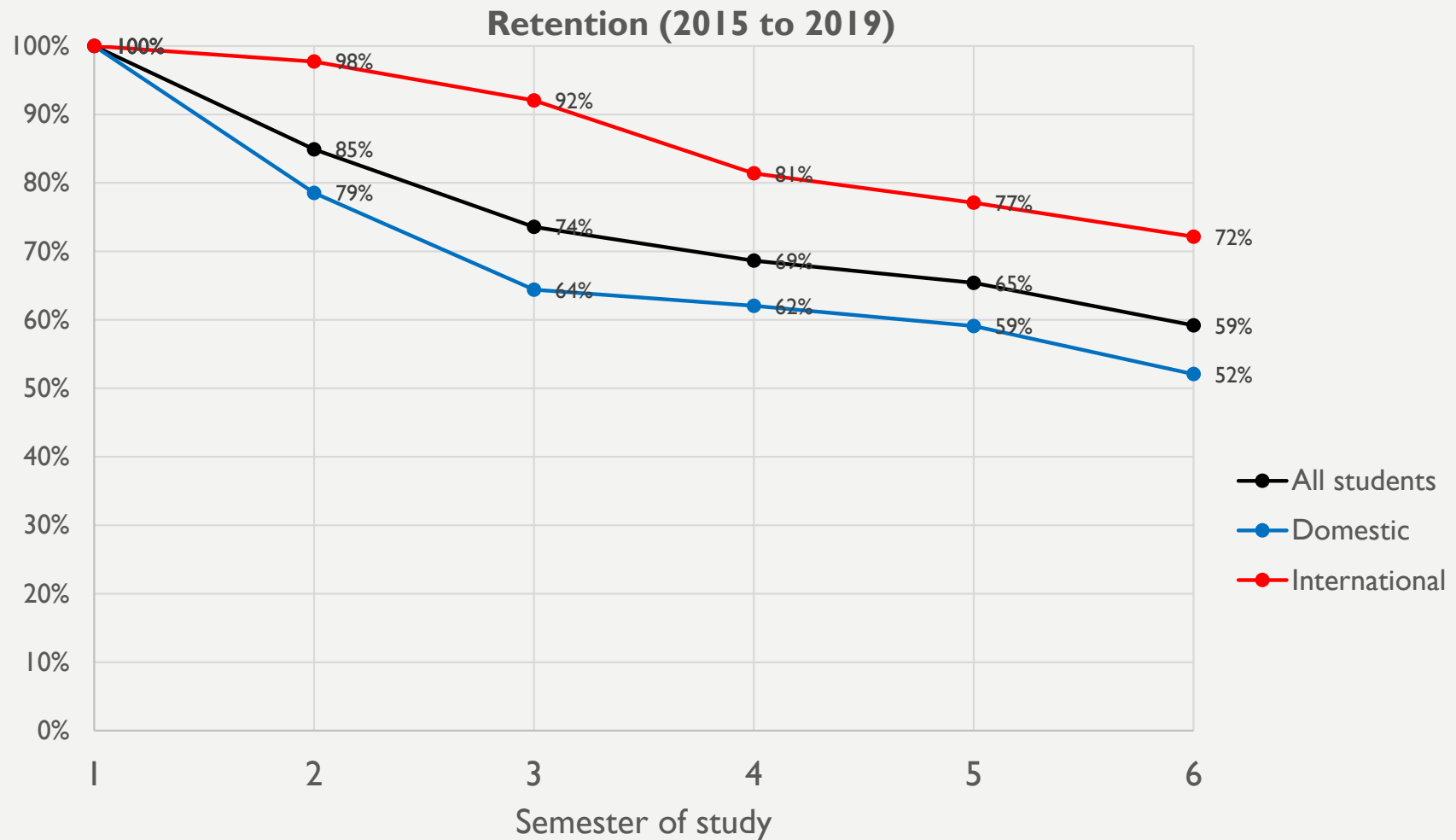
RETENTION: ALL STUDENTS

Retention (2015 to 2019)



Sem first enrolled	All students at n semester of study (head count)					
	One	Two	Three	Four	Five	Six
2015 - S1	59	51	46	45	44	40
2015 - S2	27	20	20	15	15	12
2016 - S1	30	23	21	20	17	15
2016 - S2	14	12	11	9	9	7
2017 - S1	38	36	31	30	27	24
2017 - S2	22	21	18	16	16	13
2018 - S1	33	31	22	25	23	21
2018 - S2	14	10	8	5	4	
2019 - S1	15	12	10	8		
2019 - S2	13	9	8			

RETENTION: INTERNATIONAL AND DOMESTIC



RETENTION: DOMESTICS FIRST SEMESTER

- Over the period 2015 to 2019, 177 domestic students newly enrolled for the BEngTech(Civil). These students had never before studied at Unitec.
- Of these 177 students, 142 have completed at least 2 semesters of study in the BEngTech(Civil)
- However 35 of the 177 (20%) completed just one semester of study
- We look at some of the characteristics of these students

RETENTION: DOMESTICS FIRST SEMESTER

- Chinese and NZ European/Pakehas appear to be overrepresented in first semester drop-out

Ethnicity	Distinct students	Overall percent	Dropped out	Drop out rate
African	3	2%	2	67%
Australian	1	1%	0	0%
British/Irish	1	1%	0	0%
Chinese	20	11%	6	30%
Fijian	2	1%	0	0%
Filipino	3	2%	1	33%
Indian	44	25%	6	14%
Japanese	1	1%	0	0%
Korean	3	2%	1	33%
Latin American	3	2%	1	33%
Middle Eastern	10	6%	0	0%
New Zealand Maori	12	7%	2	17%
No response	1	1%	0	0%
NZ European/Pakeha	29	16%	8	28%
Other	12	7%	1	8%
Other Asian	9	5%	3	33%
Other European	1	1%	0	0%
Other Pacific Island	2	1%	0	0%
Samoan	8	5%	1	13%
Sri Lankan	4	2%	1	25%
Tongan	8	5%	2	25%
	177		35	
		Overall drop out rate	20%	

- We are currently looking at other factors that lead to students dropping out after one semester of study. This will be the focus of our paper

CONCLUSIONS AND FUTURE RESEARCH



- International students overall perform at least as well as domestic students
- The largest groups within the international cohort are come from [Asia and the Pacific](#)
- Pacific students are the highest performing group of international students
- While female students are a minority (13.4%), they consistently outperform their male peers
- As would be expected success and GPA improve with numbers of semesters of study elapsed.
- Success and GPA both strongly and positively correlate with the age of the student.
- Domestic students drop out of their studies at a far higher rate than international students
- After one semester of study, 21% of domestic students drop out, compared to only 2% of internationals
- Finding the reason that one in five domestic students drop out after one semester of study will contribute significantly to improving overall outcomes.
- Future research will also look into the domestic cohort, with particular focus on Māori and Pasifika success.



THANK YOU

For details on methodology, sources of data, or any other questions relating to this presentation, please feel free to contact the authors

Wei Yuen Loo: wloo@unitec.ac.nz

Lusa Tuleasca: ltuleasc@unitec.ac.nz