



QUALIFY FOR THE FUTURE WORLD KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

The impact on first-year university performance of changes to the UE standard in response to Covid-19

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Research team

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Acronyms

- EFTS Equivalent Full-Time Student
- GPA Grade point average
- NCEA National Certificate of Educational Achievement
- NSN National Student Number
- NZSCED New Zealand Standard Classification of Education
- NZQA New Zealand Qualifications Authority
- UE University Entrance
- UNZ Universities New Zealand

Executive summary

In a normal year, students need 14 credits in three National Certificate of Educational Achievement (NCEA) subjects to gain University Entrance (UE) (NZQA, 2022). In 2020, Covid-19-related lockdowns and disruptions to secondary school teaching saw a one-off change allowing students to gain UE with just 12 credits in three NCEA subjects (NZQA, 2020).

In April 2021, the New Zealand Qualifications Authority (NZQA) board requested that NZQA collaborate with Universities New Zealand – Te Pōkai Tara (UNZ) to better understand the impact of the 2020 Covid experience on students' learning and pathways, and NZQA proposed a joint research project to analyse the impact on outcomes for 2021 first-year university students.

Five out of eight Aotearoa New Zealand universities agreed to take part in the project: AUT, Te Herenga Waka – Victoria University of Wellington, the University of Canterbury, Lincoln University and the University of Otago. Normally, these universities each year admit into Bachelor's degree studies around 9,200 students who have gained UE qualifications the year before. In 2021, 10,323 started towards Bachelor's degree studies and 1,743 of them had 'modified UE' (gained UE with at least 12 but fewer than 14 credits in three subjects).

The purpose of this research project was to gain insights into how these students performed at university (i.e., did they cope well and had it been the correct decision to allow them entry?). The findings of the project show that the changes to UE in 2020 did not result in appreciably different university outcomes, with 80% of the modified UE students passing at least half their papers compared with 92% for unmodified UE students. The grade point average (GPA) of modified UE students at the end of their first year of university studies was on average below those of unmodified UE students – 3.4 for modified UE (equivalent to a GPA of about a C+) versus 4.9 for unmodified UE (equivalent to a B). However, it should be noted that modified UE students were distributed unevenly across NCEA Grade Score quintiles, the top predictor of first-year university academic performance.

The changes to NCEA and UE in 2020 did not result in a widespread failure in the population of university entrants. Having modified UE was not in itself a statistically significant factor explaining the differences in first-year GPA.

Both NZQA and UNZ emphasise the need for careful consideration when drawing conclusions about whether this study might inform future changes to UE. UE was modified so already capable NCEA students were not unfairly penalised by Covid-related impacts on their secondary schooling. Universities also provided additional support to the modified UE students in these exceptional circumstances.

Background

NZQA has developed the UE standard to meet its requirements under the Education and Training Act 2020 to establish "a common educational standard as a prerequisite for entrance to a university". UE is intended to provide evidence a student has a reasonable chance of success at degree-level study at New Zealand universities. NZQA undertakes periodic reviews of the UE requirements.

The 2010 review established the following requirements:

- 1. 60 Credits at Level 3 or above and 20 credits from Level 2 or above.
- 2. 14 Level 3 credits in each of three approved subjects.
- 3. Literacy requirements met by having 10 credits at Level 2 or above, made up of 5 credits in reading and 5 credits in writing.
- Numeracy requirements met by having 10 credits at Level 1 or above, made up of: (i) achievement standards, with specified standards available through a range of subjects; or (ii) unit standards, requiring all three of the numeracy standards 26623, 26626 and 26627).

In 2020, Covid-related lockdowns and disruptions to teaching saw a one-off change allowing students to gain UE with just 12 credits in each of three NCEA subjects and some learning recognition credits to be used to meet requirement 1 above. Table 1 below summarises the modifications.

Table 1. UE standard requirements and 2020 modification

UE standard			2020 modified UE standard								
UE subject 1 14 credits	UE subject 2	UE subject 3	UE subject 1	UE subject 2 12 credits	UE subject 3						
NCEA Level 3	60 credits at Le and 20 credits or above	evel 3 or above from Level 2	NCEA Level 3	60 credits at Level 3 or above and 20 credits from Level 2 or above	Learning Recognition Credits can be included						

Data sources, study population and methods

Data sources and linkage

UNZ approached universities inviting them to take part in this research project. Although all were interested in supporting it, only five had the capacity and datasets that allowed them to participate. The five universities provided NZQA with course-level achievement data for several cohorts of first-year students. Using the National Student Number (NSN), a unique identifier for a learner (Ministry of Education, 2022), NZQA linked the data provided by universities to secondary school attainment and personal demographic characteristics already held. NZQA also identified those students who gained modified UE qualifications.

The tertiary course-level data contained the following fields: the NSN of the learner, the course enrolled (course code), the start and end dates of the course, course Equivalent Full-Time Students (EFTS), course credits and the grade awarded. The school leaver's demographics and school characteristics included the following fields: the gender of the learner, reported ethnicities, characteristics of the last secondary school attended (school decile, school gender type, school authority type) and the type of UE qualification attained. The standard-level attainment data was provided by NZQA as a separate file.

The linkage between tertiary and secondary school data was through the NSN, the most reliable and straightforward linkage between the two data sources. For some tertiary students, NZQA did not have any records of their NSN. This could happen for students who did not sit NCEA and gained non-NCEA secondary school qualifications, as well as for mature students and students who gained secondary school qualifications from overseas.

Study population

The final study population included 47,355 students for whom participating universities provided data. Five consecutive school leaver cohorts were included in the study population.

- (N=9,161) school leaver cohort 2016 as 2017 first-year Bachelor's cohort.
- (N=9,215) school leaver cohort 2017 as 2018 first-year Bachelor's cohort.
- (N=9,275) school leaver cohort 2018 as 2019 first-year Bachelor's cohort.
- (N=9,381) school leaver cohort 2019 as 2020 first-year Bachelor's cohort.
- (N=10,323) school leaver cohort 2020 as 2021 first-year Bachelor's cohort.

The final cohort, school leavers in 2020 as first-year Bachelor's students in 2021, were affected by the Covid pandemic at both school and university. Around 1,740 out of 10,323 (17% of the cohort) were admitted to university under the modified UE qualification. The fourth cohort was affected by the pandemic at university but not at secondary school, and the earlier cohorts were not affected at all.

The population was restricted to school leavers who gained UE qualifications though the NCEA pathway only, and who were enrolled in Bachelor's-level qualifications at participating universities in the first semester/trimester – i.e., without a gap year or partial year. This excluded from the study students who chose International Baccalaureate and Cambridge qualification pathways and those accepted to university through Discretionary Entrance or who had otherwise gained entry without NCEA. It also excluded those who started in the second semester/trimester from the study population to maintain the linkage between NCEA and university outcomes.

Methods

Derived variables

The NCEA Grade Score and first-year tertiary grade point average (GPA) were derived using standard and course-level data for each student. The NCEA Grade Score was calculated using the individual's grades on the Level 3 achievement (both internally and externally assessed) standards. The NCEA Grade Score is a measure on a scale from 0 to 4 and is calculated by dividing the total number of grade points earned (0 points for "Not Achieved", 2 points for "Achieved", 3 points for "Merit" and 4 points for "Excellence") by the total number of credits attempted. The first-year tertiary GPA is calculated using the same method, where a "failed" course receives 0 points; 1, 2 and 3 points are received for C-, C and C+ respectively; 4, 5 and 6 points for B-, B and B+ respectively; and 7, 8 and 9 for A-, A and A+ respectively.

For the final cohort, we established five quintiles based on the derived NCEA Grade Score – i.e., five equal-sized groups determined by performance in NCEA. Quintile 1 includes the 20% of students with the lowest NCEA Grade Scores and Quintile 5 includes the 20% of students with the highest. Similarly, we established quintiles based on the first-year tertiary GPA data, enabling us to identify any significant movement of students relative to their peers.

We also created a variable of proximity to home, to account for differences between students who are close to home and away from home. This was done by comparing the location of the last secondary school with the university location and is an approximation only (e.g., it does not account for boarding schools, remote-learning opportunities provided by universities, family relocations, etc). Appendix 1 lists all variables created and used in this study.

Analysis method

In this report, we employ both descriptive analysis (where we summarise the characteristics of the study population) and inferential analysis (where we test hypotheses to assess whether the study population is generalisable to the broader population). Most of the analysis focuses on the 2020 school leaver cohort and their first year at university in 2021. For comparative purposes, earlier school leaver cohorts are included in the descriptive analysis.

We ran a series of linear regression models in which the learner's demographic characteristics, secondary school attainment, characteristics of secondary school attended, and tertiary study characteristics are used to predict first-year tertiary GPA (see Appendix 1 for variables included in the models). We controlled for the effects of modified UE in the model for the total study population as well as for four major ethnic groups. This allowed us to assess the impact of modified UE and also to identify the predictors of first-year GPA. Standard regression diagnostics were run to ensure the validity of the results¹.

Regardless, care needs to be taken interpreting the results from these models, because we are not controlling for all other factors that might explain variance in first-year GPA. The 2020 school leaver cohort is unique and the factors explaining their GPA might be different to the factors explaining GPA for a 'regular' cohort of school leavers not affected by pandemic-related disruptions.

¹ Absence of multicollinearity, meaning there exists no strong correspondence among two or more independent variables. This assumption holds if the generalised variance inflation factors are all less than 2.5. Normality in the residuals, evaluated by visual inspection of the normal Q-Q plots. This assumption holds if the dots follow a 45-degree reference line. Homoscedasticity, meaning the residuals are assumed to have a relatively consistent variance throughout the regression.

Results

Describing population of modified UE students

Compared with other students in their cohort, modified UE students are disproportionally Māori and Pacific students, more likely to be enrolled in home regions and attempted fewer externally assessed NCEA standards and fewer achievement standards. On average, they have lower NCEA Grade Scores than their peers. Appendix 2 of this report provides a descriptive summary for school leaver cohorts.

Figure 1 a and b below presents box plots of NCEA Grade Scores for the five cohorts, from which it is apparent the aggregate distributions are not qualitatively different – 2 i.e., the NCEA Grade Scores for the 2020 cohort look 'normal' even if the underlying number of credits (per the modified UE requirement) are not. The school leaver cohort of 2020 is also separated into two groups: (i) school leavers with modified UE (17% of the cohort) and (ii) students who met standard UE requirements. From those two right-most boxplots, and their relative vertical positions, it is clear the group with modified UE has lower NCEA Grade Scores than other students who proceeded to university that year. However, the considerable overlap shows some modified UE students have very high NCEA Grade Scores, despite the overall distribution being lower.





Figure 2 gives more insight into the overlap of NCEA Grade Scores between unmodified UE and modified UE students. For each of the five NCEA Grade Score quintiles, we give the size of the modified UE group. While 45.2% of the bottom quintile had only modified UE, modified UE students were also present in the other quintiles – indeed more than 20% of Quintile 2, 10% of Quintile 3, 5% of Quintile 4 and 1% of Quintile 5. So clearly the modified UE students: (i) high NCEA achievers (with mainly Excellence and Merit grades in NCEA Level 3 standards) who obtained minimum credit requirements for the modified UE standard and (ii) low NCEA achievers (with mainly Merit and Achieved grades in NCEA Level 3 standards) who met conditions of the modified UE standard.



Figure 2. The proportion of modified UE students in each quintile of NCEA Grade Score

The average first-year pass rate for students with modified UE was 74% (compared with 88% for other students) and about 80% of them passed half their first-year papers (compared with 92% for the others). However, in terms of quality of grades, the average grades of modified UE students at the end of their first year of studies was below those of unmodified UE students – 3.4 for modified UE (equivalent to an average of about a C+ grade) versus 4.9 for unmodified UE (equivalent to a B grade). Figure 3a and 3b presents the distribution of first-year GPA for cohorts. As we saw with the NCEA Grade Score distributions, the box plot for modified UE students suggests this group is academically diverse, and some have performed highly in their first year at university. Broadly speaking, the top quarter of modified UE students have a similar GPA range to the top half of unmodified UE students, while the bottom three-quarters with modified UE are comparable to the bottom half of unmodified UE students.





Measuring academic improvements/progressions

As part of our descriptive analysis, we now present the relative progress of students in terms of achievement from secondary to tertiary for the cohort of 2020 school leavers, using the two quintile measures (one based on NCEA GPA Score and the other on university GPA).

Figure 3 presents graphically the quintile progressions for the whole cohort. For each NCEA quintile, we see what proportion of students appear in the same university quintile and to what extent they slip (from, say, Quintile 4 to 3) or improve (from, say, Quintile 2 to 3). For example, if a student was at the bottom quintile in terms of NCEA Grade Score but in Quintile 2 of first-year GPA, this means they improved from secondary to tertiary. The thickness of the lines represents the size of the NCEA quintile that has followed that path. Notably, while it is rare for a student to move from Quintile 1 to 5 or vice versa, those lines (and the underlying students) do exist albeit with line thickness consistently decreasing as the size of the movement increases. Because the entire cohort is analysed, we see that the proportions in each quintile are almost exactly 20% for both NCEA and university.





Figure 3b and 3c decomposes the cohort into the UE and modified UE groups. The initial proportions change according to the distribution shown in Figure 2, as the representation of these two student groups in both the NCEA and university quintiles is not equal. As before, we see ample evidence of students changing their relative position from school to university. Indeed, improvement is more common among the modified UE students, with 45% moving up one or more quintiles, than UE students where only 29% move up. Notably, approximately half of the modified UE students in the lowest quintile moved up, including some to Quintiles 3, 4 and even 5. This effect was even more common for UE students, where it is also clear that almost half of the top students did not remain in Quintile 5.



Figure 3b and 3c. Quintile improvements/progressions for students with unmodified UE and modified UE

These patterns are similar for Māori students. Around 37% of Māori students with modified UE moved up quintiles, compared with 26% of Māori students with unmodified UE, and one in two Māori students with modified UE in the bottom quintile moved up (see Figure 4).





For Pacific students, around 37% with modified UE moved up quintiles, compared with 25% of Pacific students with unmodified UE, and 43% of Pacific students with modified UE in the bottom quintile moved up (see Figure 5).



Figure 5. Quintile improvements/progressions for Pacific students

A higher proportion of Māori and Pacific students with modified UE improved at university compared with their peers without modified UE, and one in two Māori and Pacific students from the bottom quintiles of secondary school attainment improved at university.

Findings from regression modelling

As demonstrated above, modified UE students are a diverse group, about one in five of whom would mainly get Excellence and Merit grades in NCEA Level 3 achievement standards. The analytical challenge is how to choose a fair comparative group so we compare similar students. Through regression modelling, we can control for basic demographic and schooling factors, prior attainment, and tertiary study characteristics (including university, subject and workload). By doing this, we can assess whether having modified UE explains the differences in first-year university GPA once those other factors have been accounted for.

In this section of the report, we present findings of linear regression models. First are the findings on the impact of modified UE on first-year university GPA for the entire cohort, as well as for ethnic subgroups. Second, we present findings on other factors affecting first-year GPA. While the control variables are not the focus of this study, some of our findings are nonetheless interesting.

Impact of modified UE

When similar students are compared, we find that having modified UE was not a significant determinant of first-year university GPA. Controlling for demographic background, NCEA Grade Score, university and programmes at university, those who entered university with modified UE have similar first-year GPA as those with unmodified UE – i.e., the estimated regression coefficient for the modified UE variable is not statistically significantly different from zero. This could mean one of two things: (i) If support was provided to students with modified UE, it succeeded in mitigating differences; or (ii) if universities did not intervene, having modified UE made no significant difference.

When we run separate regressions for each of four main ethnic groups (Māori students, Pacific students, Asian students and New Zealand European students), in each case we again find that modified UE was not a statistically significant factor in first-year university GPA.

Predictors of first-year university performance.

The regression models also show some factors do strongly predict first-year university GPA and these are different for each ethnic group. In this section, we present estimates from the regression models (See Appendix 1 for variables included in the models). It is critical to note we do this only for the 2020 cohort. These students were unique in terms of admission to university (i.e., allowing the focus on modified UE described above), but they also experienced a disruption to both their 2020 secondary schooling and their 2021 university studies. We cannot be at all confident that the relationships observed for this cohort will endure beyond 2021, especially if the findings are unusual. Consequently, forming policy based on these results is not recommended.

Secondary school attainment is well known to be the most significant and strongest predictor of university attainment in the education literature (Mwandigha, 2018; Paterson, 2022; Ruegg, 2021) and this was also the case in all our models. Note, though, that the diagrams showing progression between NCEA and university quintiles show that while secondary school attainment may well be the strongest predictor of university success it is far from a perfect one, otherwise there would be much less movement between quintiles. We do not focus further on the estimated effects of NCEA Grade Score.

The broad field of study and university variables are also not presented. Some universities specialise in certain programmes and therefore the broad field of study and university variables were excluded mainly for confidentiality reasons, so no single university can be identified from the results.

Top 5 factors that affect first-year GPA at university

The top 5 predictors of first-year GPA from the overall and ethnic models are summarised in table 2 below. NCEA Grade Score, study load and field of study are consistently the top 3 predictors in all models. Differences across universities appear as a 4th or 5th predictor in all models except for Pacific students. Having modified UE is not a significant factor in any model.

Top five factors	Overall model	Model for Māori students	Model for Pacific students	Model for Asian students	Model for European students
1.	NCEA Grade Score	NCEA Grade Score	NCEA Grade Score	NCEA Grade Score	NCEA Grade Score
2.	Study load	Study load	Study load	Study load	Study load
3.	Field of study	Field of study	Field of study	Field of study	Field of study
4.	Pacific	University	School authority	University	Gender
5.	University	Decile group	Decile group	School authority	University

Table 2. Top 5 statistically significant factors

Interpretation of study load variable

Study load appears as the second most significant factor in all models. As per Appendix 1, it consists of three categories: full-time full-year, full-time part-year and part-time (which includes part-time full-year and part-time part-year). The majority of first-year Bachelor's students are full-time full-year. This is the baseline group to which all other groups are compared.

Full-time part-year students are students who drop out after semester/trimester one. The findings suggest full-time part-year students have a GPA at least 2 grade points lower than those who study full-time full-year – e.g., dropping from a B GPA to a C+ GPA. While study load is included as an explanatory variable of GPA, implying it determines GPA, we note that for some students the causal link may well be in another direction, namely that a low GPA in the first semester/trimester of study causes them to withdraw from further study, triggering their observed full-time part-year status. From the data available, we cannot determine students in this category who began the year as full-time full-year and changed status after experiencing a low GPA after the first study period.

Part-time students are students who study part-time part-year or part-time full-year. We don't know why they study less intensively than the majority of first-year students, but the implication is study is not their sole focus. Estimates from the model suggest they did poorly academically in 2021. This is another case of correlation not being able to imply causality. Here, it could be that inherent academic weakness caused them to enrol part-time and then even at that reduced load they performed poorly. Or it could be that the same external pressure caused both the choice to enrol part-time and the poor performance (e.g., the student was in full-time paid employment, knew to reduce study load, but overestimated their ability to succeed).

Full-cohort model

In the full-cohort model for 2020 school leavers at university in 2021, the top 5 predictors of firstyear GPA were: (i) NCEA Grade Score, (ii) study load, (iii) broad field of study, (iv) Pacific student and (v) a university variable. Figure 6 presents the estimated effect on first-year GPA of these variables (and others), as well as 95% confidence intervals, which show the likely range of the true parameter. Notes alongside the graph highlight particular findings.



Figure 6. Overall model: Estimates from the regression model (all ethnic groups and five universities)

Some effects not presented for confidentiality reasons.

Model for Māori students

In the model for Māori students, the top 5 predictors of first-year GPA were: (i) NCEA Grade Score, (ii) study load, (iii) broad field of study, (iv) a university variable and (v) secondary school decile group. Figure 7 presents parameter estimates from the Māori students' model. Gender, away from home, secondary school gender type, secondary school authority type and having modified UE were not significant factors for Māori students' first-year GPA. The fact a university variable comes as one of the top factors suggests differences across universities in terms of performance of Māori students, which suggests some support models may have been better than others in 2021.



Figure 7. The model for Māori students: Estimates from the regression model (five universities)

Model for Pacific students

In the model for Pacific students, the top 5 predictors of first-year GPA were: (i) NCEA Grade Score, (ii) study load, (iii) broad field of study, (iv) secondary school authority type and (v) secondary school decile group. The characteristics of secondary school attended appear to be more important for Pacific students' performance at university than for Māori students. Figure 8 presents parameter estimates from the Pacific students' model and notes significant associations found. Gender, secondary school gender type and having modified UE were not significant factors for Pacific students' first-year GPA. Being away from home was a positive factor associated with higher GPA for Pacific students and such effects were only present for Pacific students.

Category	Level							Population
School authority	State (baseline)	0.00						Pacific students.
	State - Integrated	-0.88			_			(N=502, five universities.)
	Private - Fully registered	-0.95		-	_	_		Increase (+) in the first
School decile	Medium (4~7) (baseline)	0.00						Away from home.
	High (8~10)	0.29				-	- 11	Democra () in the first
	Low (1~3)	-0.78				-		with:
Proximity to	Close to home (baseline)	0.00						Studying full-time part
home	Away from home	0.58				-	-	 Studying part-time not Low-decile school.
Study load	Full-time, full-year (baseline)	0.00						State-integrated or priv
	Full-time, part-year	-2.46	_	-				Campridge etc students
	Part-time	-1.30		_	-			Not significant factors
			-3	-2	-1	0	1	 Gender. School gender.
				Change	in first year G	PA		 Modified UE.
								Some effects not presente

Figure 8. The model for Pacific students: Estimates from the regression model (five universities)

rease (+) in the first-year GPA is associated h: Away from home. crease (-) in the first-year GPA is associated h: Studying full-time part-year not full-time full-year. Studying part-time not full-time full-year.

- Low-decile school.
- State-integrated or private school (note: IB and Cambridge etc students excluded).

significant factors

- Gender. School gender.
- Modified UE.

ome effects not presented for confidentiality reasons.

Model for Asian students

In the model for Asian students, the top 5 predictors of first-year GPA were: (i) NCEA Grade Score, (ii) study load, (iii) broad field of study, (iv) a university variable and (v) secondary school authority type. Figure 9 presents parameter estimates from Asian students' model. Gender, secondary school gender type, away from home and having modified UE were not significant factors for Asian students' first-year GPA.



Figure 9. The model for Asian students: Estimates from the regression model (five universities)

Some effects not presented for confidentiality reasons.

Model for New Zealand European students

In the model for New Zealand European students, the largest ethnic group of university first-years, the top 5 predictors of first-year GPA were: (i) NCEA Grade Score, (ii) study load, (iii) broad field of study, (iv) gender and (v) a university variable. Figure 10 presents parameter estimates from the New Zealand European students' model. Away from home and having modified UE were not significant factors for New Zealand European students' first-year GPA.



Figure 10. The model for New Zealand European students: Estimates from the regression model (five universities)

Conclusions and policy implications

Not all students with modified UE are academically low-performing secondary school leavers. Students with modified UE are found to be a diverse group. One in five of students with modified UE is a high-performing secondary school leaver who nonetheless did the minimum of what is required to get modified UE.

Overall, modified UE students did about as well as unmodified UE students in their first year at university. About 80% passed half their enrolled papers, which means they are on track to retain access to student support schemes. This is compared with 92% for unmodified UE students. About 45% progressed to higher achievement quintiles, compared with 29% for unmodified UE students. About 53% in the bottom achievement quintile progressed to higher quintiles, compared with 56% for unmodified UE students in the bottom achievement quintile. However, noting that modified UE students are distributed unevenly across the NCEA Grade Score quintiles (the top predictor of first-year university achievement), in terms of overall quality of university grades the average GPA of modified UE students at the end of their first year of studies was below those of unmodified UE students – 3.4 for modified UE (equivalent to a GPA of about a C+) versus 4.9 for unmodified UE (equivalent to a B).

The changes to NCEA and UE in 2020 did not result in a widespread failure in the population of university entrants. Having modified UE was not in itself a statistically significant factor explaining the differences in first-year GPA. It is unknown how much (if any) additional support was provided to students with modified UE, but where it was this would have been a mitigating factor. We know universities routinely provide additional support to (a) students whose NCEA results and university assessment data suggest they are less academically prepared for university, and/or (b) students identified as belonging to various equity groups.

NCEA Grade Score, study load and field of study are consistently the top 3 predictors of university success. Differences across universities are evident overall and for ethnicity groups other than Pacific students. Ethnic differences and the effects of secondary schools attended on first-year university performance remain, even when we compare students with a similar level of school attainment. New Zealand European students had higher university GPAs on average than Māori or Pacific students. Being from a low decile school was consistently associated with lower university GPA.

In these models, we did not control for whether students received academic support or not, as this data was not sought from universities at the time original data requests were made. This should be included in any follow-up study.

NZQA and UNZ emphasise the need for careful consideration to be taken in drawing conclusions about whether this study might inform future changes to UE. UE was modified so already capable NCEA students were not unfairly penalised by Covid-related impacts on their secondary schooling.

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Variable name	Description and values	Role in the model
First-year university GPA	Derived using learner's grades on courses enrolled. Values range from 0 to 9	Outcome variable in all models
Student demographic variable	25	
Gender	Source: NZQA, as reported by schools. Values: male/ female or other	Explanatory variables in all models
Māori student	Source: NZQA, as reported by schools. Values: 1-Yes, 0-No	
Pacific student	Source: NZQA, as reported by schools. Values: 1-Yes, 0-No	Explanatory variables only in overall model. Excluded from all other ethnicity
Asian student	Source: NZQA, as reported by schools. Values: 1-Yes, 0-No	models
NZ European student	Source: NZQA, as reported by schools. Values: 1-Yes, 0-No	
Away from home	Source: NZQA, as reported by schools. Values: 1-Yes, 0-No	Explanatory variables in all models
Characteristics of last enrolled	d school and NCEA Grade Score	
NCEA Grade Score	Source: NZQA. Derived using Level 3 Achievement standards. Values range from 0 to 4	
School decile group	Source: Low decile (1–3), Medium (4–7) and High (8–10). Missing included in medium decile	
School authority type	Source: NZQA, as reported by schools. Values: State, State-integrated, Private fully registered	Explanatory variables in all models
School gender type	Source: NZQA, as reported by schools. Values: Co-Ed, Single sex girls only, Single sex boys only	
Characteristics of university s	tudy	
Broad field of study	Source: NZSCED based on programme enrolled. There are 12 broad fields of study*. For modelling purposes, we grouped some fields of study	
Study load	Source: Universities. Derived variable using StudyLink definitions of study load. Values: Full-time full-year, Full-time part-year and Part-time (includes Part-time full-year and part-time part-year)	Explanatory variables in all models
University	Source: Universities, just an identifier for each university	

Appendix 1: List of variables, definitions and sources

Appendix 2: Detailed table on Modified UE vs UE and cohorts

		School leaver	Of which:					
		2016/2017 at	2017/2018 at	2018/2019 at	2019/2020 at	2020/2021 at	Modified UE	Unmodified UE
		university	university	university	university	university	group	group
Total study population	N	9,161	9,215	9,275	9,381	10,323	8,580	1,743
Gender								
Female	N	5,241	5,329	5,220	5,442	5,981	4,993	988
Male	N	3,918	3,883	4,051	3,933	4,335	3,582	/53
Others	N	S	S	S	6	S	S	S
Ethnicity								
Maori	N	861	942	973	928	1,072	807	265
Pacific	N	469	469	480	525	570	413	157
European	N	6,935	6,931	7,032	7,094	7,907	6,674	1,233
Asian	N	1,413	1,466	1,541	1,557	1,745	1,463	282
Away from home								
Yes	N	5,046	4,936	5,139	5,186	5,728	4,898	830
No	N	4,115	4,279	4,136	4,195	4,595	3,682	913
NCEA Grade Score	Mean	2.6	2.6	2.6	2.6	2.6	2.7	2.1
	Median	2.6	2.6	2.6	2.7	2.6	2.8	2.0
NCEA Grade Score (externally assessed)	Mean	2.1	2.0	2.0	2.0	1.9	2.1	1.0
HELA Grade Score (externally assessed)	Median	2.1	2.0	2.0	2.0	2.0	2.1	0.9
NCEA Grado Scoro (internally accessed)	Mean	3.0	3.0	3.0	3.0	3.0	3.1	2.5
NCEA Grade Score (Internally assessed)	Median	3.0	3.1	3.0	3.0	3.1	3.2	2.4
School decile								
Decile1	N	115	96	89	102	118	80	38
Decile2	N	175	171	157	164	157	108	49
Decile3	N	362	260	311	305	346	259	87
Decile4	N	519	445	483	488	490	384	106
Decile5	N	432	511	451	466	523	425	98
Decile6	N	1,243	1,153	1,249	1,173	1,178	956	222
Decile7	N	1,193	1,173	1,165	1,156	1,294	1,095	199
Decile8	N	1,550	1,644	1,636	1,579	1,716	1,404	312
Decile9	N	1.684	1.680	1.655	1.677	2.028	1.752	276
Decile10	N	1.820	2.005	1.947	1.982	2,265	1,968	297
NA and missing	N	68	77	132	289	208	149	59
School Authority				102	200	200		
Partnershin school	N	ç	s	s	ç	s		s
Private: Fully Reg	N	768	890	805	837	881	799	82
State	N	6 570	6 4 2 2	6 672	6 725	7 224	5 006	1 2 2 9
State	N	1 915	1 991	1 792	1 912	7,324	1 777	221
Other	N	1,015	1,001	1,783	1,012	2,108	1,777	551
School Conder	IN	0	10	14	,	0	0	3
	N	E 240	E 249	E 226	E 42E	6 000	4 900	1 101
Co-Lu Single Cou Doug	IN N	1,245	1,540	1,330	1 710	1,017	4,633	1,101
Single Sex-BOys	IN N	1,720	1,002	1,/33	1,/10	1,017	1,550	201
Single Sex-Girls	IN N	2,170	2,255	2,172	2,251	2,490	2,137	559
	IN	0	10	14	/	10	0	5
	N	1.050	1 (0)	1 (0)	1 700	1.001	1 470	200
AUT	IN N	1,050	1,693	1,603	1,706	1,801	1,472	389
	IN N	1,913	1,940	2,039	2,104	2,421	2,063	358
Lincoln University	IN N	251	237	230	2/9	339	258	18
University of Utago	N	2,614	2,739	2,831	2,859	3,195	2,754	441
Te Herenga waka – victoria University of	N	2,727	2,606	2,566	2,433	2,507	2,033	474
Enrolled broad field of study								
Agriculture, Environmental and Related	N	74	85	92	77	124	104	20
Studies								
Architecture and Building	N	227	213	216	258	2/8	230	48
Creative Arts	N	625	716	651	693	725	620	105
Education	N	216	200	205	218	283	203	80
Engineering and Related Technologies	N	907	989	1,051	1,004	1,036	969	67
Food, Hospitality and Personal Services	N	28	22	31	24	16	13	S
Health	N	392	467	466	523	549	458	91
Information Technology	N	91	90	93	75	110	82	28
Management and Commerce	N	1,719	1,604	1,652	1,594	1,723	1,310	413
Mixed Field Programmes	Ν	368	494	489	495	751	599	152
Natural and Physical Sciences	Ν	2,412	2,375	2,584	2,574	2,651	2,374	277
Society and Culture	N	2,102	1,960	1,745	1,846	2,077	1,618	459
First-year nass rate	Mean	84%	84%	84%	87%	86%	88%	74%
	Median	100%	100%	100%	100%	100%	100%	88%
Passad E0% of first year name	N	8,187	7,951	8,030	8,326	9,042	7,894	1,400
rasseu 50% ut ittst-year papers	%	89%	86%	87%	89%	88%	92%	80%
Eirst voor GPA	Mean	4.3	4.4	4.4	4.9	4.7	4.9	3.4
	Median	4.4	4.5	4.5	5.1	4.9	5.1	3.4

Notes: counts fewer than 6 are supressed.

Appendix 3: The model estimates

	Overall model		The model for Māori students			The model for Pacific students			The model for Asian students			The model for NZ European students				
	Estimate	SE	p-value and sign (*)	Estimate	SE	p-value and sign (*)	Estimate	SE	p-value and sign (*)	Estimate	SE	p-value and sign (*)	Estimate	SE	p-valu and sig (*)	e 3n
(Intercept)	-0.79	0.12	0.00 *	-0.20	0.33	0.55	-0.25	0.48	0.59	-0.73	0.23	0.00 *	-0.57	0.12	0.00	*
Male vs Female	0.15	0.05	0.00 *										0.17	0.05	0.00	*
Māori vs non-Māori	-0.22	0.06	0.00 *													
Pacific vs non-Pacific	-0.57	0.08	0.00 *													
Asian vs non-Asian	0.13	0.07	0.04 *		lld			na			nd			lld		
NZ European vs non-NZ European	0.35	0.06	0.00 *													
NCEA Grade score	2.20	0.03	- *	2.09	0.09	0.00 *	1.74	0.15	0.00 *	2.30	0.07	0.00 *	2.23	0.03	-	*
Low decile vs Medium decile	-0.64	0.08	0.00 *	-0.72	0.18	0.00 *	-0.78	0.21	0.00 *	-0.76	0.16	0.00 *	-0.49	0.11	0.00	*
High decile vs Medium decile	0.10	0.04	0.01 *	-0.02	0.12	0.86	0.29	0.20	0.15	0.27	0.10	0.01 *	0.08	0.04	0.07	
Single Sex-Boys school vs Co-Ed school	0.04	0.05	0.41										0.04	0.06	0.55	
Single Sex-Girls school vs Co-Ed school	0.19	0.05	0.00 *										0.24	0.05	0.00	*
State-Integrated school vs State school	-0.33	0.05	0.00 *				-0.88	0.17	0.00 *	-0.15	0.11	0.17	-0.34	0.05	0.00	*
Private school vs State school	-0.43	0.06	0.00 *				-0.95	0.41	0.02 *	-0.61	0.23	0.01 *	-0.42	0.07	0.00	*
Agriculture, Environmental and Related Studies**	0.24	0.18	0.17	-0.46	0.58	0.42	1.53	1.23	0.21	0.39	1.04	0.71	0.22	0.18	0.22	
Architecture and Building**	0.63	0.11	0.00 *	1.43	0.41	0.00 *	0.36	0.50	0.47	0.38	0.25	0.12	0.73	0.13	0.00	*
Creative Arts**	-0.01	0.08	0.87	-0.12	0.27	0.65	0.77	0.38	0.04 *	-0.23	0.19	0.24	-0.03	0.09	0.70	
Education**	0.85	0.11	0.00 *	0.80	0.32	0.01 *	1.42	0.48	0.00 *	0.57	0.36	0.12	0.88	0.12	0.00	*
Engineering and Related Technologies**	0.03	0.07	0.69	-0.52	0.29	0.07	0.19	0.49	0.69	0.35	0.17	0.05 *	-0.08	0.08	0.36	
Health**	0.79	0.09	0.00 *	0.42	0.31	0.18	1.39	0.39	0.00 *	0.91	0.22	0.00 *	0.75	0.11	0.00	*
Information Technology**	0.78	0.18	0.00 *	1.16	0.72	0.11	1.20	0.69	0.08	0.66	0.27	0.02 *	0.98	0.27	0.00	*
Management and Commerce**	0.14	0.06	0.01 *	-0.27	0.19	0.16	0.83	0.33	0.01 *	0.24	0.16	0.13	0.10	0.06	0.12	
Mixed Field Programmes**	0.11	0.07	0.14	-0.14	0.24	0.56	-0.03	0.37	0.93	0.07	0.22	0.74	0.17	0.08	0.05	*
Society and Culture**	0.10	0.05	0.06	0.19	0.17	0.28	0.17	0.27	0.54	-0.16	0.17	0.37	0.10	0.06	0.09	
Away from home							0.58	0.21	0.01 *							
Full-time part-year vs Full-time full-year	-2.05	0.10	0.00 *	-2.06	0.31	0.00 *	-2.46	0.41	0.00 *	-2.26	0.26	0.00 *	-2.03	0.12	0.00	*
Part-time vs Full-time full-year	-1.66	0.13	0.00 *	-1.88	0.40	0.00 *	-1.30	0.37	0.00 *	-2.21	0.34	0.00 *	-1.62	0.15	0.00	*

Notes: SE-standard error, *-p-value is less than 0.05, **- all field of studies compared against Society and Culture