



“Ghost student” failure among equity cohorts: Towards understanding Non-Participating Enrolments

Bret Stephenson, Beni Cakitaki and Michael Luckman

2021

"Ghost student" failure among equity cohorts: Towards understanding Non-Participating Enrolments (NPE)

March 2021

Dr Bret Stephenson, La Trobe University

Mr Beni Cakitaki, La Trobe University

Mr Michael Luckman, La Trobe University

National Centre for Student Equity in Higher Education
Tel: +61 8 9266 1573
Email: ncsehe@curtin.edu.au ncsehe.edu.au
Building 602: 146 (Technology Park)
Curtin University
Kent St, Bentley WA 6102
GPO Box U1987, Perth WA 6845

DISCLAIMER

Information in this publication is correct at the time of release but may be subject to change. This material does not purport to constitute legal or professional advice.

Curtin accepts no responsibility for and makes no representations, whether express or implied, as to the accuracy or reliability in any respect of any material in this publication. Except to the extent mandated otherwise by legislation, Curtin University does not accept responsibility for the consequences of any reliance which may be placed on this material by any person. Curtin will not be liable to you or to any other person for any loss or damage (including direct, consequential or economic loss or damage) however caused and whether by negligence or otherwise which may result directly or indirectly from the use of this publication.

COPYRIGHT

© Curtin University 2021

Except as permitted by the Copyright Act 1968, and unless otherwise stated, this material may not be reproduced, stored or transmitted without the permission of the copyright owner. All enquiries must be directed to Curtin University.

CRICOS Provider Code 00301J

Acknowledgements

The authors acknowledge the funding of the National Centre for Student Equity in Higher Education (NCSEHE) that made this research possible.

We would also like to acknowledge the support and assistance provided by:

- Sam Ridsdale, Data Analyst, Centre for Higher Education Equity and Diversity Research, La Trobe University
- Hannah Beattie, HEPPP Coordinator, Centre for Higher Education Equity and Diversity Research, La Trobe University
- Yujie Wang, Senior Research Officer, Centre for Higher Education Equity and Diversity Research, La Trobe University
- Andrew Harvey, Director of the Centre for Higher Education Equity and Diversity Research and Executive Director of Student Equity, La Trobe University.

Table of contents

| | |
|---|----|
| Acknowledgements | ii |
| List of figures | iv |
| List of tables..... | iv |
| Abbreviations | v |
| Executive summary..... | 1 |
| The “ghost student” phenomenon..... | 1 |
| Non-participating enrolments (NPEs) | 1 |
| Research aims | 1 |
| Key findings..... | 2 |
| NPE as a leading indicator of retention and completion | 2 |
| Equity and NPE..... | 2 |
| Recommendations | 3 |
| Introduction | 4 |
| Part One: Background to the "ghost student" phenomenon in Australian higher education ... | 5 |
| Student failure in Australian universities: A policy view | 5 |
| The neglect of unit-level failure in the "success" literature | 7 |
| Unit-level failure among equity cohorts | 9 |
| The "ghost student" phenomenon..... | 10 |
| From “ghost students” to non-participating enrolments (NPEs)..... | 12 |
| Part Two: Quantitative study of NPE results..... | 14 |
| Research aims | 14 |
| Definitions | 14 |
| Definitions of NPE, Retention and Completion | 14 |
| Defining equity groups | 15 |
| Description of the data..... | 15 |
| High-level findings of fail and NPE outcomes | 17 |
| Student-level..... | 17 |
| Unit-level..... | 17 |
| Aggregating unit-level results to the student/course-level..... | 17 |
| "Total" and "partial" NPEs | 19 |
| Regression analysis | 20 |
| Regression methodology | 20 |
| NPE and institutional retention | 21 |
| NPE and six-year completion | 22 |
| Likelihood of receiving a fail or NPE result | 23 |
| Likelihood of NPE | 23 |
| Likelihood of failure | 24 |
| Equity students and course-related risk factors | 25 |

| | |
|---|----|
| Part Three: Discussion of findings and addressing the NPE challenge | 26 |
| Discussion of quantitative findings..... | 26 |
| The scope and scale of NPE results | 26 |
| The significance of NPE results | 27 |
| NPE and equity cohorts | 27 |
| The mystery of NPE behaviours | 28 |
| University grading scales and HEIMS reporting..... | 29 |
| Capturing NPE outcomes at the university level..... | 29 |
| Capturing NPE outcomes at the national level | 30 |
| NPEs and academic progression policies..... | 31 |
| Conclusion | 32 |
| References | 34 |
| Appendix..... | 38 |

List of figures

| | |
|--|----|
| Figure 1: Unit fail rates comparing equity groups against the national average, 2009 to 2018. | 9 |
| Figure 2: Distribution of fail marks for units completed by commencing domestic bachelor students between 2012 and 2017..... | 17 |
| Figure 3: Lowest marks plotted against average marks for commencing domestic bachelor students between 2012 and 2017..... | 18 |
| Figure 4: Student who achieved at least one NPE fail or non-zero fail by their average academic achievement in their commencing year | 19 |
| Figure 5: Average marginal effects for retention model | 22 |
| Figure 6: Average marginal effects for six-year completion model..... | 23 |
| Figure 7: Average marginal effects for NPE model..... | 24 |
| Figure 8: Equity groups by the share of students in part-time study and admitted with an ATAR below 60 | 25 |

List of tables

| | |
|---|----|
| Table 1: Student-level summary statistics for the sample..... | 16 |
| Table A1: Summary statistics for the unit level of observation for the sample | 38 |
| Table A2: Summary retention and six-year completion rates for the sample | 39 |
| Table A3: Results from retention and six-year completion logit models..... | 40 |
| Table A4: Results from NPE and Fail logit models | 42 |

Abbreviations

| | |
|--------|--|
| ABS | Australian Bureau of Statistics |
| AME | Average Marginal Effects |
| APM | Academic Progression and Monitoring |
| ASGS | Australian Statistical Geography Standard |
| ATAR | Australian Tertiary Admission Rank |
| AWOL | Away Without Leave |
| CHEEDR | Centre for Higher Education Equity and Diversity Research at La Trobe University |
| CSP | Commonwealth Supported Place |
| DESE | Australian Government Department of Education, Skills and Employment |
| EFTSL | Equivalent Full Time Study Load |
| FNS | Failure - No Submission |
| HEIMS | Higher Education Information Management System |
| NESB | Non-English Speaking Background |
| NPE | Non-Participating Enrolment |
| PBF | Performance Based Funding |
| QILT | Quality Indicators for Teaching and Learning |
| SEIFA | Socio-Economic Indexes for Areas |
| SES | Socioeconomic Status |
| TEQSA | Tertiary Education Quality and Standards Agency |
| UAC | Universities Admissions Centre |
| VET | Vocational Education and Training |
| WAM | Weighted Average Mark |
| WINTA | Women in Non-Traditional Areas |

Executive summary

The “ghost student” phenomenon

Unit-level failure is a common experience among Australian university students, but it has not received adequate attention in the higher education research literature nor, until very recently, within government policy discussions. This oversight has many causes, but one result has been to leave unexamined important subtypes of student failure, such as those that are often described by academic staff as “ghost” or “zombie” failures at the unit level.

Every year, a significant percentage of students remain enrolled in one or more of their units yet exhibit no evidence of having engaged in learning or assessment activities. This most severe form of student disengagement and failure frequently goes unnoticed at institutional and national levels, as it is obscured by high-level metrics such as the all too binary “success rate”. The “ghosting” phenomenon does not, however, go unnoticed by academic teaching staff in Australia’s universities. What they frequently witness are students who are formally enrolled in their units, but who do not attempt any assessment tasks, and neglect to formally withdraw from the unit.

Ghosting behaviours have ramifications for students, institutions and the Australian government. The student receives a record of academic failure and an increased financial burden, institutions see a reduction in their published “success rate” and governments see little return for the allocation of Commonwealth Supported Place (CSP) funding. A report of this kind is also timely given the forthcoming government changes to CSP eligibility and the introduction of a “50 per cent pass rule” in 2022. As this report shows, ghosting behaviours are likely to make a significant contribution to student ineligibility under the new rules.

Non-participating enrolments (NPEs)

This report provides an in-depth examination of “ghost student” failure among commencing domestic bachelor students generally but focuses particularly on four student equity cohorts: regional and remote, low socioeconomic status (SES), Indigenous, and non-English speaking background (NESB) students. We term this type of unit failure a *non-participating enrolment* (NPE) and define it as a completed unit attempt that resulted in a failing grade and a numeric mark of zero on a 0-100 scale. NPE results can then be contrasted to what we term “non-zero failures”, or failures where a student has achieved any non-zero level of assessed credit for the unit.

This definition is intentionally tailored to the unit-level as an acknowledgement of the often selective nature of NPE behaviours which are frequently limited to individual unit enrolments. A student can also be considered an NPE over their total enrolment, or across their entire course, by exhibiting NPE behaviours in all attempted units — we have termed these “total NPE” results. Alternatively, a student may only have “partial NPE” results, characterised by receiving an NPE in one or some of their units, but otherwise showing evidence of participation in other units.

Research aims

Utilising a large multi-year dataset of commencing domestic bachelor students sourced from a large public (Table A) Australian university, we seek to:

- quantify patterns of NPE results and contrast these with conventional unit failures
- examine the extent to which student equity categories are linked to a higher risk of NPE behaviour
- describe the relationship between NPE results and rates of student retention and completion, particularly for students from equity groups

- analyse, via multivariate regression, the extent to which potential mediating factors—particularly studying part-time, ATAR, age and field of study— influence the NPE rates of equity cohorts.

Key findings

At the unit-level of analysis, we found that NPE results—or results of “0”—were far and away the most common numeric fail mark and accounted for more than a quarter of all fail grades. While 13.7 per cent of all units undertaken by the students in our sample resulted in a fail grade, 3.7 per cent resulted in an NPE result. At the student-level of analysis, we found that a third of students in our sample had failed at least one unit in their commencing year, and a tenth of students had at least one NPE result. Just 1.8 per cent of students had an NPE result in all of their enrolled units (*total NPEs*), while 8.9 per cent of students in our sample registered at least one NPE result while achieving higher marks in other units (*partial NPEs*). Crucially, only a tenth of students with an NPE result managed to achieve an overall average pass mark (≥ 50). Students with a non-zero fail result as their lowest mark had much better overall academic achievement than NPE students. Despite having failed a unit, more than two thirds of these students still achieved an average mark of 50 or higher.

NPE as a leading indicator of retention and completion

We found that NPE is a leading indicator of student attrition and non-completion. Even after controlling for overall academic achievement (average marks), receiving an NPE result is one of the strongest predictors of both attrition and non-completion among all the variables we modelled for. Once NPE and other fail marks are accounted for, equity group membership has no statistically significant adverse association with retention and completion outcomes. On the contrary, low SES and NESB status were associated with a higher probability of retention, and students from regional and remote areas were associated with a higher probability of completion. Consistent with much of the existing literature, studying part-time had a large and statistically significant impact on retention and completion outcomes.

Equity and NPE

From an equity perspective, Indigenous students were shown to be at a high risk of receiving an NPE result, even after controlling for ATAR and study attendance mode. The probability of a low SES student achieving at least one NPE result was not statistically different than for high SES students. Conversely, students from regional and remote areas, and NESB students were actually at a lower risk of registering an NPE result than metropolitan and English-speaking students respectively.

While equity group membership *was not* a predictor of receiving an NPE result for most equity groups, equity students were overrepresented among course characteristics that *were* strong predictors. Students admitted with an ATAR below 60 were at a significant risk of having an NPE result. Yet Indigenous students, low SES students, and students from regional and remote areas had higher rates of students with an ATAR below 60 in our sample. Similarly, students studying part-time were at an elevated risk of receiving an NPE result, and Indigenous students, as well as students from non-English speaking backgrounds, were much more likely to study part-time.

This report further provides several important recommendations for university policy and practice in response to the NPE challenge. We also find that there is a need for greater conformity of NPE data collection across institutions and by the Department of Education, Skills and Employment’s Higher Education Information Management System (HEIMS) data collection processes. The report further contains several suggestions for future research aimed at further illuminating the mystery of NPE behaviours.

Recommendations

1. Australian university planning and performance units should carefully track, report and utilise non-participating enrolment (NPE) statistics as an important measure of institutional quality and performance.
2. Australian universities should work to particularly understand and address NPE amongst Indigenous students, who appear to have a substantially higher risk of receiving NPE results compared to non-Indigenous students. Additional advising or support to help address Indigenous NPE behaviour could lead to significant improvements in Indigenous student retention and completion outcomes.
3. Australian universities should adopt grade scales that capture a full taxonomy of student failure types/grades and, at minimum, include a dedicated category for failure via NPE.
4. Australian universities should review their grade reporting practices and definitions to ensure that multiple failure grade categories are being consistently applied and reported across academic areas and according to a clear rubric.
5. Australian universities should create policies dedicated to NPE failures and make the tracking and remediation of NPE failures a central feature of their student success and retention, and student equity strategies.
6. Australian universities should adopt academic progression and monitoring (APM), or academic probation, policies and practices that recognise and respond to differences in the relative severity and impact of different types of student failure, but particularly NPE failures as compared to, for example, marginal or “non-zero failures”.
7. The Australian Department of Education, Skills and Employment should adopt an NPE definition and make the reporting of NPE results a regular feature of HEIMS data collection.
8. Researchers of higher education should account for and include NPE failures in relevant research studies, but particularly those relating to the evaluation of student success and retention intervention efforts. Failing to account for the type of student disengagement that NPE results represent can, in some instances, dramatically skew research results.
9. Researchers of higher education should seek to further extend the findings of this report by conducting qualitative research studies aimed at better understanding student motivations for, and responses to, NPE behaviours. We recommend that qualitative research be focused particularly on Indigenous student cohorts where better understanding of the behaviour is particularly needed.

Introduction

This report investigates the phenomenon of non-participating enrolments (NPEs) at an Australian public university, and further examines the implications of NPE for selected equity cohorts. Also referred to as “ghost students”, these students enrol in university units, remain enrolled post the census date but show no meaningful interaction with the unit’s coursework. NPE represents significant waste: for students, it represents failure on academic transcripts and foregone student fees; for institutions it represents higher failure and attrition rates; and for governments, wasted commonwealth support funding. There is a clear imperative for the sector to pay greater heed to the NPE phenomenon. Our research is aimed at further illuminating the issue of NPE, and for the first time, examine the potential relationship between NPE and longer-term student outcomes, as well as the possible relationship between the risk of NPE and equity group membership.

The research report is divided into three parts. Part One examines NPEs within the broader context of research on student failure in Australian higher education and the limited existing literature on NPEs. We argue that with some minor exceptions, the phenomenon of NPEs has been obfuscated by a focus within the literature and higher education statistics on binary pass/failure outcomes. Further, we located the phenomenon of non-participating enrolments within recent changes to government legislation and guidelines as part of the broader “Job Ready Graduate” reforms. Amongst other things, the changes are likely to shift a greater share of the financial risk of NPEs from students and the government to institutions. Beginning in 2022, universities face the prospect of refunding students who showed no meaningful engagement in a subject and managing students who persistently fail more than 50 per cent of their course load. It is clear that institutions will have to pay greater attention to issues relating to disengagement, persistent failure and “non-genuine students” in the future. The framework of non-participating enrolments may be one of the ways institutions can better conceptualise and monitor these behaviours.

Part Two covers a quantitative study of NPE at an Australian public university. We provide an overall examination of NPE trends at the university and then, using multiple regression methods, specify three separate models to further explore the phenomenon. Firstly, we explore the relationship between NPE behaviours and subsequent retention and completion outcomes, while controlling for a range of equity indicators and a selection of covariates identified in the literature as being associated with attrition and non-completion, such as ATAR and study load. Secondly, we specify a model of NPE outcomes themselves and explore the factors that are linked to a greater likelihood of being NPE, specifically exploring the relationship between key equity cohorts and the likelihood of being NPE. Finally, we examine the relationship between failure generally and a range of covariates. Our analysis suggests that while NPE consists of a relatively small fraction of student enrolment, aggregated across the sector it represents a substantial issue.

Part Three draws on our literature review and quantitative findings to discuss the implications of NPE for institutions and the sector generally. We argue that there is an imperative for universities to pay closer attention to the issue of NPE and we make a number of recommendations for how universities and government could respond to the issue. Yet, as we highlight, our research is just a beginning and there is much that researchers still do not understand about the NPE phenomenon. As such, we also outline several avenues of inquiry for further research.

Part One: Background to the "ghost student" phenomenon in Australian higher education

Student failure in Australian universities: A policy view

The experience of academic failure for students in Australia's universities is not uncommon. In 2019, for example, the overall *success rate* for domestic commencing bachelor students was 84.86 per cent among Table A providers (DESE, 2020c). Taken as a *failure rate*, a much less commonly reported metric, this indicates that 15.14 per cent of unit attempts resulted in a record of student failure. Moreover, this is a metric that has been relatively static since 2005 when the rate of failure was slightly lower at 14.28 per cent. Despite the relatively commonplace nature of academic failure in Australian universities, interest in unit-level failure has been lower than more widely studied success indicators such as rates of course completion and the many varieties of student retention. However, due to recent government policy changes, as described below, unit-level failures are now rapidly gaining attention in Australian higher education.

Today there are numerous regulatory, reputational and economic pressures exerted upon Australian universities that require the creation of institutional policies and interventions aimed at reducing the incidence of student academic underperformance. On the regulatory side, the *Higher Education Standards Framework (Threshold Standards) 2015*, which is overseen and enforced by the Tertiary Education Quality and Standards Agency (TEQSA), requires that universities develop and maintain a system, for example, where: "Processes that identify students at risk of unsatisfactory progress and provide specific support are implemented across all courses of study" (1.3.4). To meet these requirements, Australian universities expend significant resources in their efforts to identify and support students who have demonstrated academic unit failure. The most substantial of these institutional efforts typically takes shape as academic progression and monitoring (APM) policies and procedures, yet countless other curricular and co-curricular programs and interventions can be found throughout the sector.

Beyond strict legislative and accreditation pressures, Australian universities are also attentive to the reputational costs associated with poor rates of student success. Harvey, Cakitaki, and Brett (2018), citing the earlier work of Bowen (1980), argued that higher education institutions are motivated to maximise prestige, not just profit, and the accountability can be reinforced by collection and publication of performance data (Harvey et al., 2018, p. 14). In the Australian context, there have been multiple incarnations of comparison websites, such as QILT and ComparEd, that have been designed to make university comparison data more readily available. The Australian Department of Education, Skills and Employment (DESE) also publicly releases yearly statistics of institutional and cohort-level *success rates*—measured as the proportion of units passed divided by units attempted—as part of its Higher Education Statistics Collection. While these statistics are not meant to be read as "league tables", the trends and rankings that they naturally capture and communicate do not go unnoticed within the sector, by governments, or by prospective students.

The economic pressure which unit-level failures may exert on Australian universities has been indirect and largely mediated through unit-level failure's correlation with attrition. It has been established that there is frequently a strong correlation between student failure and attrition (Harvey & Luckman, 2014; Norton, Cherastidham, & Mackey, 2018; Walker-Gibbs et al., 2019)—with attrition having a clear and often significant impact on an institution's financial position—yet individual unit failures currently present no financial cost to universities themselves. While universities may have a pressing financial interest in

minimising student attrition, student failure at the unit-level may instead present something of a moral hazard for institutions. Where individual unit failures still result in a university collecting the full student unit fee, as is the current situation, the potential for perverse incentive is clear and there remains little financial inducement for universities to unenrol students with high rates of unit failure (Stephenson, 2019, July 30). A similar moral hazard may be exerted upon individual academic teaching staff who may not be aware of the “ghost students” in their units or may otherwise welcome the reduction in marking load.

The Australian Government’s recent introduction of a performance-based funding (PBF) model (DESE, 2020g) held out some promise that student success rates—again, understood as the inverse of failure rates—would factor into government funding levels for individual institutions. However, once the new PBF model was released, it was clear that individual unit-level failures would not factor into the new policy’s stated “student success” metric, which is one of four “core measures”. The policy would instead measure “student success” via the “adjusted attrition” metric which measures a student’s retention within the higher education sector overall (DESE, 2020g, p. 1). While the adjusted attrition measure may have merits of its own within a PBF scheme, the new model failed to introduce a clear financial incentive aimed at encouraging universities to minimise unit-level failure, but particularly in relation to “ghost student” failures.

More recently, the Australian Government has introduced a set of wide-ranging changes for universities through its *Higher Education Support Amendment (Job-Ready Graduates and Supporting Regional and Remote Students) Bill 2020*. From a regulatory perspective, the bill introduces a broad set of rules designed to protect students that previously only applied to students receiving FEE-HELP. The new regulations will extend these protections to apply equally to students with a Commonwealth Supported Place (CSP) (s. 36–13). Importantly, these changes broaden the government’s regulatory focus to now include unit-level oversight. Directly relevant to the present report, the new rules introduce radical changes to the consequences of unit-level failure for Australian students who benefit from CSP and for the universities they attend.

The new regulations, which take effect with the 2022 commencing cohort, link a student’s unit-level failure record to their eligibility for CSP status. The rules prescribe that once a student has undertaken eight or more units in a CSP course, at the bachelor level or higher, they must have successfully completed at least 50 per cent of their units in order to retain their CSP status. For students studying CSP courses below the bachelor level, the rules prescribe that a student need only have completed four or more units for their unit failure record to potentially impact their CSP status. While special conditions are presently embedded within the Higher Education Support Act (2003) that provide exceptions in cases where a student experienced unexpected hardship or distress (s. 36–13(5)), it is anticipated that under the new rules a significant minority of students will lose their entitlement to a government subsidised higher education.

The legislation also makes universities accountable for assessing the academic suitability of students for a given unit, whereas previously the rule was only applied to the course level. It also gives DESE the authority to remove CSP status from a student in relation to a unit where the DESE has determined the person was not a “genuine student” within that unit (*Higher Education Support Act 2003*, s. 36-5). The latest version of the *Higher Education Provider Guidelines 2012*, introduced as part of the “Job-Ready Graduates” reforms, includes a new chapter that outlines the “genuine student” test, at the unit-level, for all higher education providers. The guidelines indicate that the following points may be considered when determining whether a student is genuine within a particular unit:

- (a) *whether the student is reasonably engaged in the course;*
- (b) *whether the student has been provided with information about the requirements for the course, and the cost and duration of the course;*

- (c) *whether the student has satisfied course requirements for the course or participated in assessment activities for the course;*
- (d) *if the course is an online course—the number of occasions on which the student has logged in to the course is not insignificant;*
- (e) *whether the student has provided up-to-date contact details that enable the Department to contact the student to verify the student's enrolment in the course;*
- (f) *if the student is enrolled in another course—the number of the enrolments and associated course loads would not make successful completion of a course by the student impossible or highly improbable.* (Higher Education Provider Guidelines 2012, s. 9.2.1)

The conditions described in the guidelines read very much like consumer protections against unscrupulous providers and were directly modelled on earlier reforms to discourage predatory behaviours in the VET sector. The requirements that students demonstrate reasonable engagement, interaction with online learning content, and participate in assessment activities, are—as we will describe throughout this report—of particular relevance to student non-engagement and failure at the unit level. The new regulations indicate that it is now more important than ever for universities to increase their efforts to monitor the academic suitability and progress of their students at the unit-level.

The neglect of unit-level failure in the "success" literature

Given that the Australian higher education policy and funding environment has, until very recently, had a rather ambivalent orientation towards unit-level failures, it is of little surprise that it has attracted significantly less scholarly attention within the broad "student success" literature as compared to other concepts and metrics. Higher education researchers have instead focused primarily on exploring the related, although distinct, topics of student engagement (Kahu, 2013; Kahu & Nelson, 2018; Krause & Armitage, 2014), transition (Gale & Parker, 2012), retention and completion (Edwards & McMillan, 2015; Gale & Parker, 2017; Grebennikov & Shah, 2012) and the student experience (Baik, Naylor, & Arkoudis, 2015), often, although not exclusively, to the neglect of unit-level student failure.

The relative lack of attention paid to unit-level failure has not been limited to the Australian context alone. As Peelo (2002) has observed from a UK perspective:

While 'failing' or 'failure' is a part of everyday experience in universities, it hardly seems to matter in the education literature. There have been few attempts to understand 'failing' as an ever-present phenomenon within higher education. However, there has been a long history of research into important aspects of 'wastage', particularly retention, drop-out or mapping students' progress, especially in the context of US universities. (p. 7)

There are likely to be several factors that have contributed to the relatively low levels of scholarly output on the problem of unit-level student failure. For instance, the absence of sufficiently refined unit-level outcomes data, particularly at the national level, can be a significant barrier to researchers. We return to this issue later in this report, but here we note that the DESE's HEIMS data collection processes record little more than binary pass/fail outcomes at the unit-level. This means that the HEIMS data collection is currently unable to capture a refined picture of unit failure, or one that would allow researchers to identify different, and educationally relevant, types of unit failure.

Even where refined data is available, it may be that there exists on the part of researchers and university leaders, a perceived risk of causing embarrassment to individual institutions, or to the higher education sector more broadly (Stephenson, 2019, July 30; Wimshurst & Allard, 2008). This is unfortunate given that the neglect of unit-level failures in the research could be obscuring, or even exacerbating, harms to students for whom institutions have a

duty of care. While students frequently find benefit from attempting, although not completing, a university degree (Norton et al., 2018), there are also clear financial and emotional (Ajjawi, Dracup, Zacharias, Bennett, & Boud, 2020; Fassett & Warren, 2004) risks and potential harms borne by students who experience unit-level failure.

Perhaps most critically, many education researchers have been conscious, and even anxious, to avoid research inquiries—like that of “student failure”—that appear to run the risk of contributing to the proliferation of “deficit discourses” or “deficit thinking” in universities (McKay & Devlin, 2016; Smit, 2012). Fundamentally, deficit models of success and failure posit that student underperformance is due to a deficit, or *lack*, that can be identified and located, most commonly in the student themselves, but increasingly also in the institutions they attend. These two related deficit discourses may be summarised under the broad twin headings of “students are the problem” and “institutions are the problem” (Devlin, 2013).

On the student side, Smit (2012) has described deficit discourse as “the dominant thinking in higher education”, and one that “attempts to understand student difficulty by framing students and their families of origin as *lacking* the academic, cultural and moral resources necessary to succeed...” (p. 370). Deficit discourses of this type, Smit (2012) argues, are particularly harmful when “students are referred to in terms of what they are not: *not* traditional, *not* prepared for higher education, *not* in a position of privilege or advantage” (p. 370). The view of institutional deficit, on the other hand, posits that it is higher education institutions themselves that lack flexibility and preparedness to accommodate a student body that is rapidly changing (Devlin, 2013; Smit, 2012).

We believe that the concerns regarding deficit discourses in higher education are well-founded and demand continued vigilance on the part of researchers, institutions and even students. Specifically, we are particularly motivated to resist discourses, like those described by Smit (2012), that threaten to erode widely embraced commitments to diversity and inclusivity within universities. What we wish to highlight, however, is that research concerned with student failure, particularly at the unit-level, has had to anxiously navigate this tension between institutional and personal factors that may, or may not, contribute to student failure. The impact on the research literature has been to especially limit the number of quality studies that closely investigate the “student” or “personal” side of the equation.

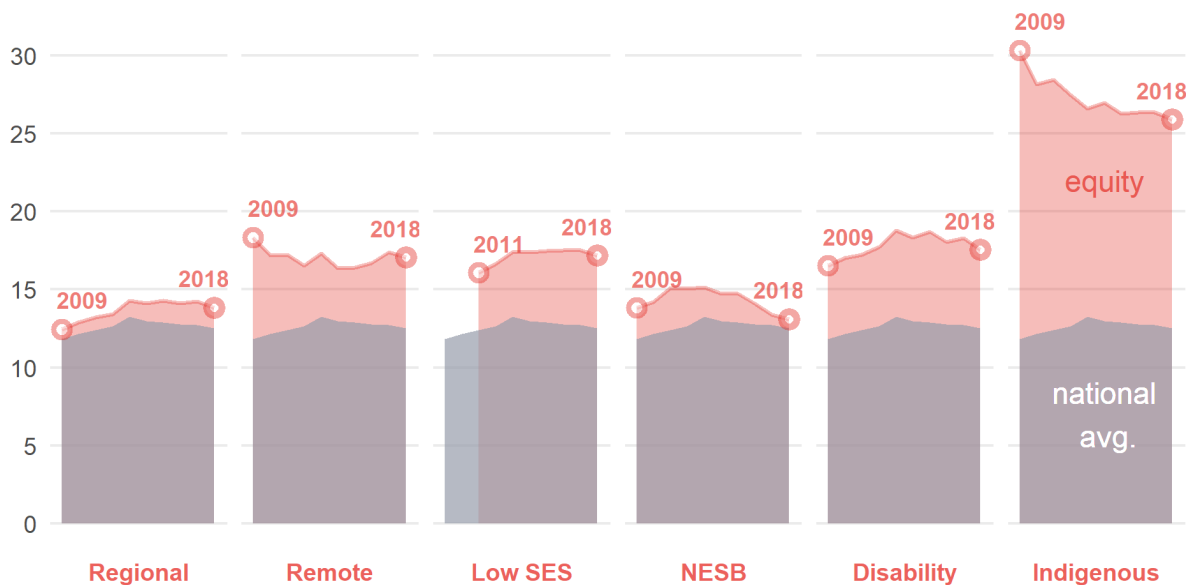
There are, however, encouraging signs that academic researchers are growing more willing to take on questions that relate more directly to unit-level student failure. Recent studies by Walker-Gibbs et al. (2019) and Ajjawi et al. (2020) have both taken up the challenge of better understanding the personal experience of student unit failure and subsequent academic recovery. Studies of this kind, but explicitly that of Walker-Gibbs et al. (2019, p. 3), have benefited from new conceptual models that envision the interactions between personal and institutional factors in much richer and far less dichotomised ways. Kahu and Nelson’s (2018) conceptual model of the “educational interface” has been particularly instructive in this regard. Drawing on the student engagement literature, the educational interface framework seeks to understand the student as actively engaging in a “micro-context” where “institutional and student factors align” (p. 63). The framework’s utility and insight is best expressed in its deployment of four “psychosocial constructs that strongly influence student outcomes and which result from the interaction between institutional and student characteristics” (Kahu & Nelson, 2018, p. 64). Described as “mediating mechanisms” between institutional and student characteristics, Kahu and Nelson (2018) describe the psychosocial constructs of “self-efficacy”, “emotions”, “belonging” and “wellbeing”. Moreover, in an effort to escape damaging deficit discourses, the educational interface framework seeks to “highlight how each of these mediating mechanisms offers explanations for differences in outcomes for non-traditional students” (Kahu & Nelson, 2018, p. 64).

Unit-level failure among equity cohorts

While unit-level failure has not been a central focus of Australian “student success” policy and research generally, there has been a comparatively greater focus within the student equity research literature. From this limited research, and from data published by the DESE, we can outline what is known of unit-level failure and its relation to student attrition/retention among equity cohorts in Australia. Utilising DESE (2020d) data on multi-year equity group “success rates”—again, measured as units passed divided by units attempted—we can create a “unit fail rate” by taking the inverse statistic ($100 - \text{success rate} = \text{unit fail rate}$). In the following analysis we present unit fail rates for domestic undergraduate students, including both commencing and continuing students.

Analysis of DESE data (2020d) shows that, since peaking in 2013, unit fail rates for all domestic undergraduate students have been trending slightly downwards. As Figure 1 indicates, in the years 2009 to 2018 all student equity cohorts recorded higher unit fail rates than the national average, but there were important differences in magnitude and multi-year trends across the time period. Students from regional areas, along with those from a non-English speaking background (NESB) had only marginally higher unit fail rates than the average. By contrast, students from remote areas, from low socioeconomic status (low SES) backgrounds, and students with disability had a unit fail rate that was nearly five percentage points higher than the average in 2018 (DESE, 2020d). Over a quarter of all units undertaken by Indigenous¹ students in 2018 resulted in a fail, although the fail rate for this cohort has continued to track downwards from a high of 30 per cent in 2009.

Per cent of units failed



Notes: Unit fail rates are calculated as the inverse of success rates.

Source: DESE (2020d).

Figure 1: Unit fail rates comparing equity groups against the national average, 2009 to 2018.

A number of studies have investigated the relationship between unit-level achievement and retention outcomes. Harvey and Luckman (2014) found that, for a sample of Bachelor of Arts students at a large Victorian university, weighted average mark (WAM) and unit-level success rate were the strongest predictors of attrition. Similarly, Walker-Gibbs et al. (2019, p. 22) found that students who had failed a unit were more than four times as likely not to be

¹ In this report ‘Indigenous’ is taken to be inclusive of both Aboriginal and Torres Strait Islanders.

retained compared to those who passed all of their units. These findings align with results from the national Student Experience Survey, which found that nearly half (48 per cent) of students in the sample with a self-reported average mark below 50 per cent had considered early departure from their course (Social Research Centre, 2020).

Compared to unit-level achievement, equity group membership tends to be a relatively weak predictor of retention and completion outcomes in multivariate analyses (Harvey & Luckman, 2014; Li & Carrol, 2017; Walker-Gibbs et al., 2019). For example, Li and Carrol (2017, p. 31) found that after controlling for WAM, students from equity groups were less likely to leave their course in the following year. Where academic achievement data are not available as model inputs, researchers find that institutional factors, admission factors, and course study load are much stronger predictors of attrition or course non-completion than is a student's equity status (Department of Education and Training, 2015; DESE, 2020e; HESP, 2018; Norton et al., 2018).

While equity group membership alone is generally not a risk factor for attrition or non-completion, members of equity groups are often more likely to be at risk. In other words, risk factors such as unit failure and low academic achievement, low ATAR, and part-time study mediate the relationship between equity group membership and attrition and non-completion. Li and Carrol (2017, p. 33) use multivariate regression to show that Indigenous students, NESB students, low SES students, and students with disability were more likely to have WAMs lower than average. Another recent study of unit-level failure among equity groups at a single Australian university found that Indigenous, NESB and low SES cohorts had larger shares of students who had failed at least one unit compared to the average (Walker-Gibbs et al., 2019). Similarly, even though low ATAR is a better predictor of non-completion than socioeconomic status (DESE, 2020e; Edwards & McMillan, 2015, p. 16), low SES students are much more likely to be admitted with a low ATAR than their more advantaged peers (Manny, 2020, p. 3). Indeed, Edwards and McMillan (2015, p. 24) have shown that low SES, regional, and Indigenous students are more likely than average to be admitted with a low ATAR and study part-time.

The "ghost student" phenomenon

One of the more critical consequences of the relative neglect of unit-level failure in the literature has been the surprising lack of sector-wide acknowledgement, and research into, the "ghost student" phenomenon (Stephenson, 2019, July 30). This oversight is even more surprising given that academic staff teaching in Australian universities are frequently familiar with the phenomenon. Reflecting something of the peculiar nature of the behaviour, academic staff have adopted several colloquialisms that give name to the problem, such as "ghost students", "zombie enrolments" or "no-shows". Fundamentally, these academics observe students who enrol in their units, sometimes in significant numbers, yet who fail to attempt any of the assigned assessment tasks, and further fail to withdraw before the "financial" or "academic penalty" census dates. In many cases, these students will also neglect to attend any of their scheduled learning sessions or fail to access online learning materials and activities. In all cases, however, the result is the same: the student receives a failing grade of "0" while also incurring a student debt liability.

This frequently overlooked, yet highly consequential, type of unit-level failure has seldom been reported in the higher education research literature, nor has it been recognised within government reports and statistics. We are aware of just one published Australian research study that has explored the "ghost student" failure phenomenon at the unit-level. Wimshurst and Allard (2008), analysed "FNS" (Failure – No Submission) results within a large Australian university's Faculty of Arts during the years 1998–2000. The research took advantage of the institution's grading schema which allowed for an FNS result to be recorded in cases where a unit fail was due to the student's failure to submit any of the unit's assessments (p. 688).

While the Wimshurst and Allard (2008) study did not explicitly report rates of FNS among their study population—their focus was instead to investigate institutional and personal factors related to FNS via regression—they did report overall counts that allow for the calculation of a summative FNS rate. From their total data set consisting of 37,960 unit grades drawn from 221 Arts Faculty courses, they report a count of 1,639 FNS results, which indicates an FNS rate of 4.31 per cent. They further report an overall fail count for all types of failure of 5,053, which indicates that FNS results accounted for 32.43 per cent of all failures (Wimshurst & Allard, 2008, p. 690). Again, this indicates that of all unit attempts, 4.31 per cent resulted in both a unit failure and no credit awarded to the student. If we were to extrapolate this rate to the whole of Australian higher education, even as a thought experiment, we can see that the likely scale of the “ghost student” phenomenon potentially extends to many tens of thousands of students each year.

The “ghost student” phenomenon has also been strongly noted at the program or course-level within Australian university enabling programs. As Andrewartha and Harvey (2014) have described, enabling programs in Australia are of two types:

...programs that provide a distinct pathway to higher education; and remedial enabling programs which are undertaken concurrently with university education study and cater to students who have qualified for entry but are academically underprepared. (p. 54)

In their study of enabling program outcomes, Clarke et al. (2000) found that a significant number of students could be classed as “non-participatory” within the program as a whole. While the students may have enrolled for the program, they simply showed no signs of genuinely participating in the program and thus failed the program requirements. Clarke et al. (2000) further concluded that if “non-participatory” or “inactive” students were removed from the analysis of program outcomes, success rates for enabling programs would be similar to those found in undergraduate award courses (p. xvii). In a more recent study of enabling programs, Hodges et al. (2013) found that “phantom” students again represented a “significant proportion of enrolling students (and) never appear in any effective way...” within the program (p. 53). Adopting the language of Clarke et al (2000), Hodges et al. (2013, p. 124) also describe the “phantom” cohort as “non-participating students” and further find that enabling programs attain similar retention outcomes, as compared to undergraduate courses, when non-participating students are excluded from analysis. Importantly for our purposes, the description of “non-participating” students that is presented in these two studies of enabling programs is limited to the program-level of analysis. In this way, the studies by Clarke et al. (2000) and Hodges et al. (2013) do not consider the “ghost student” phenomenon at the unit-level or among undergraduate award students more generally.

At an even higher level of analysis, Norton et al. (2018) have recently highlighted the challenged posed by “very disengaged students” who enter university, show little evidence of engagement, and then exit their course, perhaps with no academic credit earned and sizeable student debt (p. 49). The phenomenon they describe may be more clearly thought of as a form of “ghosting behaviour” observed at the course-level rather than the unit-level. Moreover, what they describe seems to be a form of disengagement that is limited to commencing, but specifically first-year, students alone. The “very disengaged student” described by Norton et al. (2018) appears to refer to students who come to university with little motivation or preparedness, fail to engage, and then further fail to purposefully unenrol from their course for as much as a year. These students “eventually exit the system”, but as Norton et al. (2018, p. 49) argue, there is more that universities could do, particularly with respect to making students more aware of the significance of census dates, to reduce the financial loss to these “very disengaged students”.

When viewed at the course or student-level of analysis, as appears to be the case for Norton et al. (2018), “ghosting behaviours” are taken to be *total* and assumed to apply equally across a student’s full suite of unit enrolments. There appears to be little recognition in either the studies by Wimshurst and Allard (2008) and Norton et al. (2018) of the potential for what may be called “strategic” or “partial” ghosting behaviours at the unit level. Strategic ghosting would be indicated by, for example, instances where a student has passed three of their units but receives a “0” in the fourth. However, Norton et al. (2018) appear to assume that the “very disengaged students” ghost their full course enrolment while Wimshurst and Allard (2008) simply do not address the question. In sum, the current literature has yet to explore the relative incidence of what might be called “strategic”, “partial” or “total” ghosting behaviours among Australian university students.

From “ghost students” to non-participating enrolments (NPEs)

If we are to effectively address the challenge of ghosting behaviours in Australian higher education, we require a naming convention and definitional formula that can be shared across institutions in the way that other common metrics, such as the “completion rate”, have been. Drawing on the language of Clarke et al. (2000) and Hodges et al. (2013), we believe the term *non-participating enrolment (NPE)* serves this purpose well. It has the advantage of describing both the behaviour of failing to participate—thereby distinguishing it from failure types that involved some level of student engagement with assessments—but also captures the scale of the behaviour which we have found can be limited to a single unit enrolment. In this way, our suggestion is to extend the understanding of NPEs described by Clarke et al. (2000) and Hodges et al. (2013) as a program or course-level phenomenon, to now be applied to the unit-level of enrolment. We can then distinguish between what might be called “total” course-level NPE and “partial” unit-level NPE behaviours. Other possible terms, such as “passive withdrawal”, run the risk of confusing NPE behaviours with officially recognised forms of early or late withdrawal. Another candidate term might be “inactive students”, but again, the term is too totalising in that it suggests the student is inactive in all of their unit enrolments, which may not be the case. The term “inactive students” is used by Masserini and Pratesi (2016) to describe what Australian institutions frequently refer to as “deferred enrolments” or “AWOL students”, or students who are not actively enrolled in their course. The term “inactive” is also now strongly identified within the e-learning literature as students who are inactive in online learning platforms or specific learning activities (see, for example, Sunar et al. 2020).

Importantly, the term “non-participating enrolment”, or “NPE result”—in some necessary cases, “NPE failure”—in our estimation, has the virtue of recognising the significance of the outcome, but also goes some distance towards overcoming the risk of adding to a “deficit discourse” within university cultures (McKay & Devlin, 2016; Smit, 2012). While NPEs are indeed a form of failure, they are likely to embody important differences when compared to what might be called “engaged failures”, or instances of failure where a student may have been fully or partially engaged with the unit, yet still failed. As Fassett and Warren (2004) have warned, the rhetorical conventions adopted by students, teachers and researchers around the concepts of student “success” and “failure” have the power of “reifying educational identities” within static categories of “good” or “at-risk” (p. 36). We believe the term “non-participating enrolments” has the virtue of leaving open the causal or explanatory factors that may have contributed to the result, and further distinguishes the phenomenon from more common and less problematised notions of failure.

Our proposed formula for identifying NPE failures within any given institution is relatively simple. By our definition, an NPE failure is any credit-bearing unit attempt that results in a reported failure and a numeric mark of zero. This excludes any results where a student would have been sufficiently motivated to seek a late withdrawal before the ‘academic

penalty' census date. The definition is also maximalist in nature, as it excludes any numeric marks greater than zero, or fail grades that receive partial credit. The NPE classification is then preserved for only the most severe non-participating results. It is a simple formula, but one that can be easily implemented in any institution that requires both pass/fail designation and a numeric mark to be submitted for record keeping. Later in this report we return to issues relating to the diversity of grade scales in Australian universities and further describe the implications for NPE definitions and reporting.

Part Two: Quantitative study of NPE results

Research aims

Utilising a large multi-year dataset of commencing domestic bachelor students sourced from a large public (Table A) Australian university, we sought to:

1. quantify patterns of NPE results and contrast these with conventional unit failures
2. examine the extent to which student equity categories are linked to a higher risk of NPE behaviour
3. describe the relationship between NPE results and rates of student retention and completion, particularly for students from equity groups
4. analyse, via multivariate regression, the extent to which potential mediating factors—particularly studying part-time, ATAR, age and field of study— influence the NPE rates of equity cohorts.

Definitions

Definitions of NPE, Retention and Completion

We define **non-participating enrolments (NPEs)** as unit attempts that result in a failing grade and a numeric mark of 0. Therefore, we do not consider NPEs to include instances where a student sought an early or late withdrawal from the unit. Once again, our NPE definition could be considered conservative, or perhaps maximalist, given that it includes only the clearest examples of unit-level disengagement where a student achieved zero credits for the assessments. Our definition would not include individuals who, for example, completed an early assessment task with even a minimal weighting towards a final numeric mark, but then subsequently disengaged from the unit without withdrawing. In cases such as this, the student would be likely to have achieved a very low mark, but one that is still greater than “0”. We also note that in this report we frequently refer to non-NPE failure types collectively as “non-zero failures”. Later in this report we delineate the important differences between what we have termed “total” and “partial” NPEs.

We calculated **retention** using the Australian Government “new normal” method, which counts students as retained if they had not completed in their commencing year or the following year, and remained at the institution in the following year regardless of whether they were in the same course. This also means that we use student identifiers rather than unique student course commencements to form the calculation. Our data did not allow us to track student movements to other institutions, so for the purposes of calculating student retention and completion we could only account for students within our sample institution. Therefore, *retention* in this report should be understood as *institutional retention*.

In order to analyse **six-year completion** rates we took the 2012 commencing cohort and coded students as either having completed or not completed by the end of 2017. Due to the limitations of our data we could not calculate six-year completion rates consistent with the sectoral completion rates published by the Government. Instead we calculate a six-year completion indicator based on institutional completion outcomes. As with the retention calculation, some portion of students calculated as having not completed are very likely to have completed at other institutions. Importantly, non-completion here does not necessarily mean that the student left the study institution. While our data did not allow us to differentiate between types of non-completion, some students remained enrolled at the institution but had not yet completed after six years. Almost by definition, students who have failed a unit will take longer to complete their degree because they will likely have to repeat at least one unit.

While this does not change the results of our analysis, it should be considered when interpreting the findings.

Defining equity groups

In this report, we consider four nationally recognised equity groups using Australian Government definitions as closely as our sample would allow.²

- Indigenous students include students who identify as Aboriginal and/or Torres Strait Islander at the time of enrolment.
- Students from non-English speaking backgrounds (NESB) are defined as speaking a language other than English at home and had arrived in Australia less than 10 years before they commenced their course.
- Low SES students are defined according to whether the postcode of their permanent home of residence is within the bottom quartile of the working age population along the Australian Bureau of Statistics (ABS) Socio-Economic Indexes for Areas (SEIFA) Index of Education and Occupation. In our sample, students commencing prior to 2016 were counted according to the 2011 SEIFA and for students commencing from 2016 the 2016 SEIFA was used.
- Students from regional and remote areas were defined according to whether the postcode of their permanent home residence was designated as regional or remote by the ABS Australian Statistical Geography Standard (ASGS) classification of regions.

It should be noted that regional and remote students are typically understood as two distinct equity groups (Koshy, 2018), but for the purposes of this report, we have combined the relatively small number of remote students with the much larger regional student cohort. Given the low numbers of remote students in our dataset, if we did not combine them with the regional cohort, the results for remote students would need to be suppressed for privacy reasons. This report does not include analysis of NPE outcomes for Women in Non-Traditional Areas (WINTA) or students with disability. Both groups are recognised equity groups in Australia, but our data do not allow for their inclusion in this study.

Description of the data

The dataset for this study was sourced from a large public (Table A) university with both metropolitan and regional campuses. We were provided with anonymised student enrolment records between 2012 and 2017 for commencing domestic bachelor students. The broad timeframe allows for analysis of six-year completion rates and more robust attrition measures. The data includes student socio-demographics, unit results and marks, course characteristics, course completion year indicators, and institutional retention indicators.

Our study is concerned with an analysis of units graded with marks on a numerical scale between 0 and 100, we therefore excluded a small number of students enrolled in units that were marked using non-numeric grades. We also excluded a small number of students enrolled in units assigned with uncommon equivalent full-time study load (EFTSL) values, which meant all units in the sample were weighted uniformly. A small number of students under the age of 18 at the time of enrolment were also removed from the dataset as a condition of our institutional research ethics approval. Taken together, the pooled data sample for all in scope commencing student observations contains results for 254,014 completed units and 38,214 first-year students.

² See the HEIMS glossary for further reference: <https://heimshelp.education.gov.au/resources/glossary>

Student-level descriptive statistics of the data sample are provided in Table 1. Firstly, the table provides student counts and share percentages for each cohort variable. Secondly, the table provides rates for commencing students who recorded at least one unit fail (all fail types) or at least one NPE during their commencing year. It is important to keep in mind that these are student-level statistics and indicate the percent of students who recorded one or more of the two failure outcomes during the whole of their commencing year of study. These rates are therefore higher than what we would expect to see with a unit-level analysis. Further descriptive statistics are provided in Tables A1 and A2 of the Appendix, which provide unit-level counts and rates for fail and NPE results, as well as retention and six-year completion rates.

Table 1: Student-level summary statistics for the sample

| Variable | | Students <i>n</i> = | Share (%) | 1 or > fail student rate (%) | 1 or > NPE student rate (%) |
|------------------------|------------------|------------------------|-----------|------------------------------------|-----------------------------------|
| Socioeconomic status | Low | 7,763 | 20.3 | 36.6 | 11.1 |
| | Medium | 20,394 | 53.4 | 33.1 | 10.7 |
| | High | 8,970 | 23.5 | 31.4 | 10.5 |
| | NA | 1,087 | 2.8 | 29.5 | 10.3 |
| Regional/Remote status | Regional/Remote | 11,686 | 30.6 | 28.9 | 9.5 |
| | Metropolitan | 25,492 | 66.7 | 35.5 | 11.3 |
| | NA | 1,036 | 2.7 | 29.4 | 10.3 |
| Indigenous status | Indigenous | 295 | 0.8 | 45.4 | 20.0 |
| | Non-Indigenous | 37,919 | 99.2 | 33.2 | 10.6 |
| NESB | NESB | 2,265 | 6.0 | 36.2 | 9.8 |
| | Non-NESB | 35,949 | 94.0 | 33.1 | 10.8 |
| Student gender | Female | 24,188 | 63.3 | 28.2 | 8.7 |
| | Male | 14,026 | 36.7 | 42.1 | 14.2 |
| Attendance type | Full-time | 28,787 | 75.0 | 30.1 | 8.6 |
| | Part-time | 9,427 | 25.0 | 43.2 | 17.2 |
| Age | 18-20 | 24,679 | 64.6 | 34.3 | 9.4 |
| | 21-24 | 7,694 | 20.1 | 36.4 | 14.2 |
| | 25-29 | 2,887 | 7.5 | 28.8 | 12.9 |
| | 30-39 | 1,803 | 4.7 | 21.5 | 10.1 |
| | 40-49 | 808 | 2.1 | 20.9 | 10.3 |
| | 50 & over | 343 | 0.9 | 21.0 | 9.3 |
| Basis of admission | Secondary school | 22,923 | 60.0 | 34.1 | 9.9 |
| | Other | 15,266 | 40.0 | 32.2 | 11.9 |
| ATAR | Below 50 | 3,990 | 10.4 | 51.8 | 15.7 |
| | 50-59 | 5,692 | 14.9 | 46.7 | 13.8 |
| | 60-69 | 6,950 | 18.2 | 35.4 | 10.1 |
| | 70-79 | 6,487 | 17.0 | 24.7 | 7.7 |
| | 80-89 | 4,469 | 11.7 | 14.3 | 5.0 |
| | 90-99.95 | 2,196 | 5.7 | 6.6 | 2.2 |
| | No ATAR | 8,430 | 22.1 | 37.4 | 14.3 |
| Overall | | 38,214 | 100.0 | 33.3 | 10.7 |

High-level findings of fail and NPE outcomes

Student-level

At the student-level of analysis, several interesting high-level findings can be gleaned from Table 1. First, we find that the experience of receiving at least one fail and/or NPE result is relatively common for the domestic commencing bachelor students in our sample. One in three students failed at least one unit in their commencing year, and one in 10 registered at least one NPE result. Across equity groups, the share of students with a fail or NPE result was mixed. Low SES students had a slightly higher rate of students with fail and NPE results than did High SES students. Indigenous students had a much higher rate of students that recorded a fail or NPE than did Non-Indigenous students. On the other hand, Regional and Remote students had a lower rate of students with a fail or NPE results than Metropolitan students. NESB students had a slightly higher rate of students with a fail, but slightly lower for NPE results, compared to other students.

Unit-level

When observed at the unit-level, we find that for many students, failure and NPE results were an exception to an otherwise satisfactory level of academic achievement. Taken as a proportion of all units attempted by the commencing students in our sample, 13.7 per cent of all unit attempts resulted in a failure (all types) and 3.7 per cent resulted in an NPE (Appendix – table A1). **Figure 2** shows the distribution of fail marks (all types) for our pooled enrolment data, and highlights those results we define as NPE. NPE results accounted for 26.8 per cent of all fail marks for the students in our sample, with remaining fail marks dispersed inconspicuously between marks of 1 and 49.

Count of units by unit mark

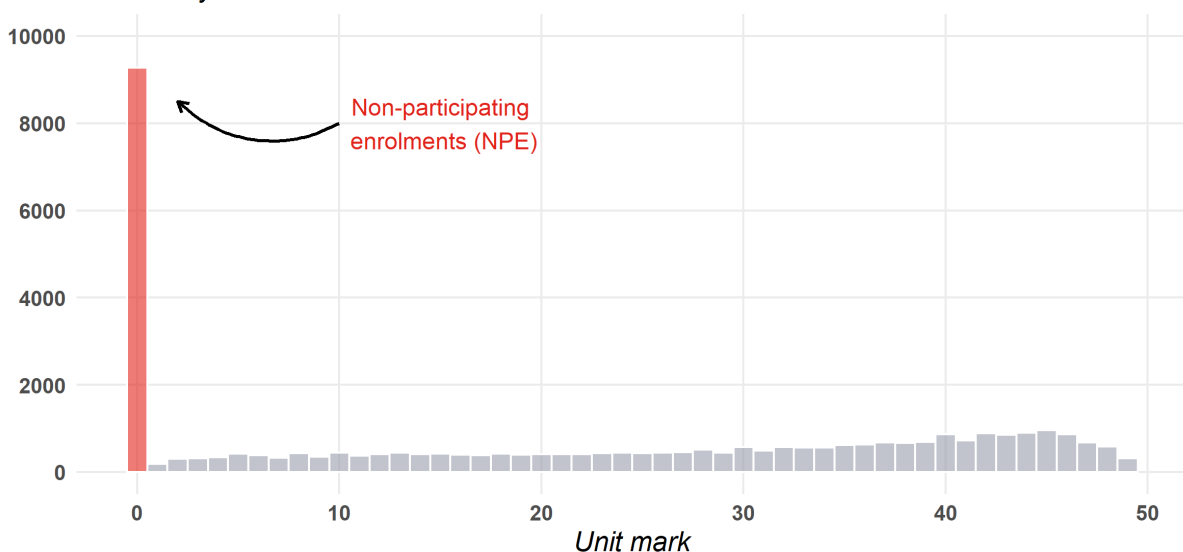


Figure 2: Distribution of fail marks for units completed by commencing domestic bachelor students between 2012 and 2017

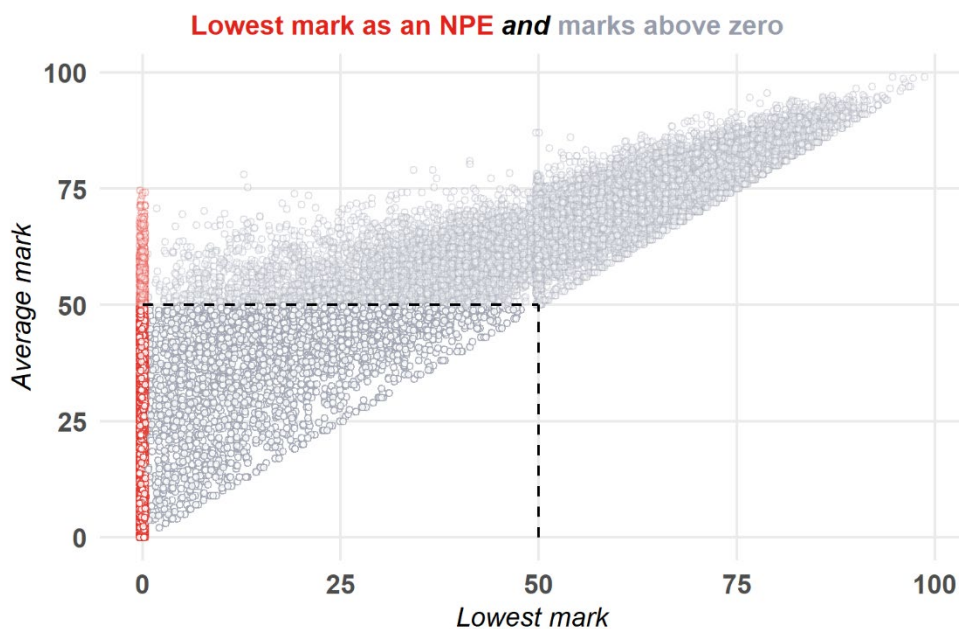
Aggregating unit-level results to the student/course-level

Marks are given at the unit-level, but our analysis was concerned with student and course level outcomes, so we had to find a way to aggregate unit-level marks. To do this, we derived four new variables that aggregate numeric mark information up to the higher student/course level.

- **Lowest mark** is taken as the lowest mark a student achieved across all units completed in their commencing year.

- **Average mark** is the mean of all marks a student achieved across all units completed in their commencing year.
- **NPE student** is an indicator assigned to a student if they registered an NPE mark for at least one of any units they completed in their commencing year.
- **Fail student** is an indicator assigned to a student if they registered a fail mark for at least one of any units they completed in their commencing year.

It is important to note that if we were to use average mark as our sole metric of analysis, we would only be picking up on students who had achieved an NPE in all of their commencing year units — what we term “total NPEs”, students with an average mark of zero, that we discuss further in the next subsection. To model the impact of registering an NPE result (a unit mark of zero), while also controlling for a student’s overall achievement, in **Figure 3** we plot lowest unit mark against the student’s average mark. At our study institution, a fail mark is a unit attempt that receives a numeric mark that is below the 50 per cent pass threshold. There are a very small number of borderline failure marks that may be assessed as a “conceded pass”, but these are very rare in our data and needn’t be considered in this analysis.



Notes: Observations have been slightly 'jittered' to draw out NPE observations.

Figure 3: Lowest marks plotted against average marks for commencing domestic bachelor students between 2012 and 2017

The first thing to note in **Figure 3** is that registering a fail mark does not necessarily reflect a student’s overall, or average, academic achievement in their commencing year. The chart shows a broad spread of average marks for students who registered at least one fail (their lowest mark was below 50). In fact, many students who receive a unit failure as their lowest mark, will still achieve a satisfactory average mark in excess of 50 per cent.

Moreover, we can see that a significant minority of students who registered an NPE result as their lowest mark (the red points in Figure 3) performed satisfactorily when viewed at the level of average mark (> 50 per cent). This indicates that for a proportion of students who receive an NPE result as their lowest mark, they remain engaged in other units. This is a significant finding and suggests that for some students NPE behaviours may be “strategic” decisions to, perhaps, sacrifice one of their units while focusing on the others. This does not,

however, shed any light on why the student fails to officially withdraw from the unit and thereby avoid both academic and financial consequences.

"Total" and "partial" NPEs

Building on the base concept of NPE, and the observation that some NPE results may represent a student's "strategic" decision to disengage, we can also delineate between cases of "total" and "partial" NPE results at the student level. We take "total NPEs" to be students who achieved an NPE in all of their enrolled units, while we define "partial NPEs" as students who registered at least one NPE result, but otherwise achieved a non-zero mark in at least one of their other units. In **Figure 4** we group students by whether their lowest mark was an NPE result (the top bar) or a fail mark higher than an NPE, also described as a non-zero failure (the lower bar).

The upper bar on the chart summarises average mark outcomes for all students who received an NPE result as their lowest mark. The bar indicates that of all students who received an NPE result, just 16.5 per cent would be classed as *total NPEs* (in red), or students who received NPEs in all their enrolled units during their commencing year. Taken as a percentage of all student-level enrolments in our sample, total NPEs accounted for just 1.88 per cent of all commencing domestic bachelor students. It is important to distinguish total NPEs given that they likely represent a clear example of deeply disengaged or "non-genuine" students. But at a rate of just 1.88 per cent, the number of students who fit into this *total NPE* category of commencing students is small, although not insignificant when generalised across the sector. Again, every year many thousands of Australian university students are likely to meet this definition of *total NPE*.

Avg. marks are categorised by whether the mean mark was an NPE failure, a non-zero failure, or a pass

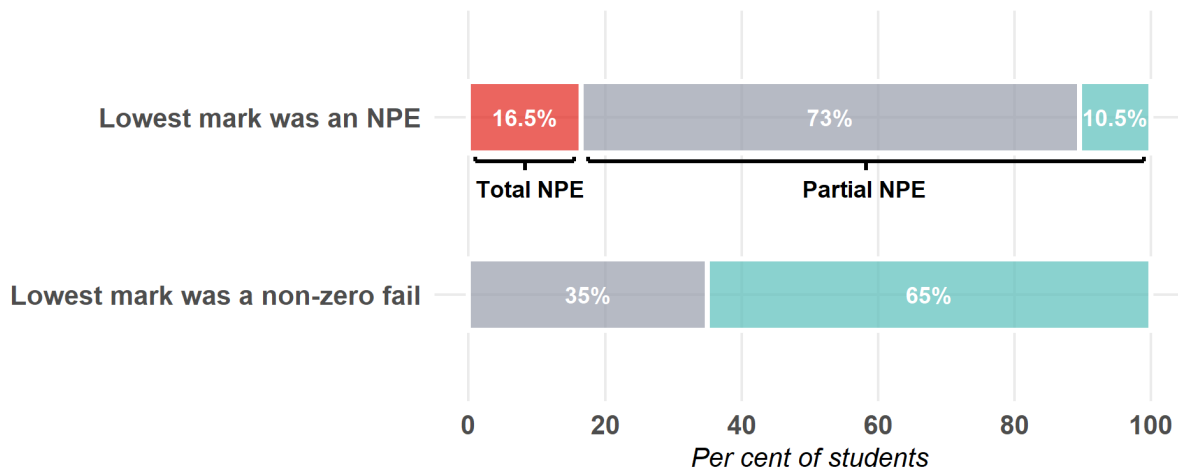


Figure 4: Student who achieved at least one NPE fail or non-zero fail by their average academic achievement in their commencing year

The remainder of the upper bar of **Figure 4** depicts the 83.5 per cent of students who received an NPE as their lowest mark, but who attained an average mark that was above zero (in grey and blue). We classify these students as *partial NPEs* given that they had at least one unit outcome that was greater than zero. This is a significant group given that we cannot easily conclude that they were completely disengaged from their studies and it would require further investigation to determine their status as being either a "genuine" or "non-genuine" student at the course-level. When compared to the total sample in our study, we find that partial NPEs make up 8.9 per cent of all student-level enrolments within our study population. Digging deeper still, we see that 10.5 per cent (in blue) of all students who receive an NPE as their lowest mark, still manage to achieve a satisfactory, or passing, average mark across all their units. These higher-performing *partial NPEs* are rare and account for just 1.1 per cent of all commencing students in our sample. These students raise

important questions about “strategic” NPE behaviours, but these are questions that only a qualitative study could likely answer in full.

Importantly, we can see that for the great majority of students who receive at least one NPE result, the average mark is still within the unsatisfactory range of below 50 per cent. These students make up the red (16.5 per cent) and grey (73 per cent) portions of students depicted on the upper bar chart, making for a total of 89.5 per cent of all students who received at least one NPE in their commencing year.

The average performance for students that received a non-zero fail as their lowest unit mark appears to be much better than it does for NPE results. The lower bar of **Figure 4** depicts average unit results for these students. We see that 35 per cent (in grey) will achieve an unsatisfactory average mark that is below 50 per cent overall. However, a much greater share of students (65 per cent) with a lowest unit mark in the range of 1–49, will achieve satisfactory academic results when viewed at the level of average mark.

In sum, we can see that there is a stark difference in the likely average outcome for students who receive an NPE result, when compared to those that receive non-zero failures, or failures in the range of 1–49. Upon this analysis, NPE results look to be far more predictive of further negative outcomes than do other types of failure. To further test this high-level observation, we now turn to a series of more refined regression analyses.

Regression analysis

Regression methodology

We estimated a series of models for retention and six-year completion based on: 1) whether a student had received an NPE unit result, and 2) whether the student had achieved a fail mark of any type. Given that each of these is a dichotomous outcome, we have opted to apply logistic regression models that took the following general form:

$$\ln\left(\frac{p(y)}{1-p(y)}\right) = \beta_0 + \beta E + \beta X$$

In the case of our retention and completion models, y is an outcome variable that is positive in the case where a student was retained or had completed in six years; E is a vector containing the derived variables for lowest mark; and the parameter X is a vector of covariates, which include equity and demographic variables and course characteristics, and a control for average marks.

Our retention and completion models include a measure for the lowest and average mark a student achieved in their enrolment year. We included both measures because we wanted to capture whether NPE and other fail marks were associated with retention and completion outcomes for students, even when students had otherwise done well in their other units.

For our NPE and fail models, y is an outcome variable that is positive in the case where a student achieved at least one fail or NPE mark in their commencing year; E is a vector containing the equity variables; and the parameter X is a vector of covariates which include ATAR and course characteristics.

Our strategy for dealing with missingness in the data (NA values in table 1) for each model was listwise deletion. A count of the observations used for each model is found at the bottom of each of the model summary tables in the appendix.

We use various packages in the R statistics platform for all analysis. The results of the estimates are presented as average marginal effects (AME) with a 95 per cent confidence interval calculated using the R package ‘*margins*’, though we also include the logistic coefficients in the appendix tables (table A3 and A4). Average marginal effects provide an

intuitive metric for interpreting results from nonlinear models such as logistic or probit models (Leeper, 2018; Mize, 2019). AMEs calculate the marginal effect of a given variable for every value in the sample, and then average these effects out. In our case, where all except one of our explanatory variables are categorical, they tell us the average percentage-point change in the probability of an affirmative response compared to the baseline (omitted) category. For example, in our retention model an AME estimate of 0.028 for low SES students would indicate that on average low SES students have a 2.8 percentage point higher probability of being retained compared to high SES students.

Predicting student behaviour is notoriously difficult and, while our models are built using detailed student enrolment data, they are limited in what they can explain. Previous models of attrition and WAMs have only been able to explain a small amount of the variation in respective outcomes (See for example Tables 8 and 9 in Li & Carroll (2017), or Appendix A in HESP (2017)). To assess goodness of fit, we follow the work of Li and Carroll (2017) and calculate a pseudo- R^2 for each model. In this case, we use McFadden's pseudo- R^2 , which evaluates the fit of the overall model compared to a null model that only includes the intercept. On this basis, we find that our models fit the data to a similar magnitude as other models in the literature (for example, an attrition model of commencing students in Li & Carroll (2017) had a pseudo- R^2 of 0.094, compared to 0.169 in our retention model). There remains, however, a large unexplained component in the NPE, fail, retention, and completion behaviour we model, and our output should be interpreted with this in mind.

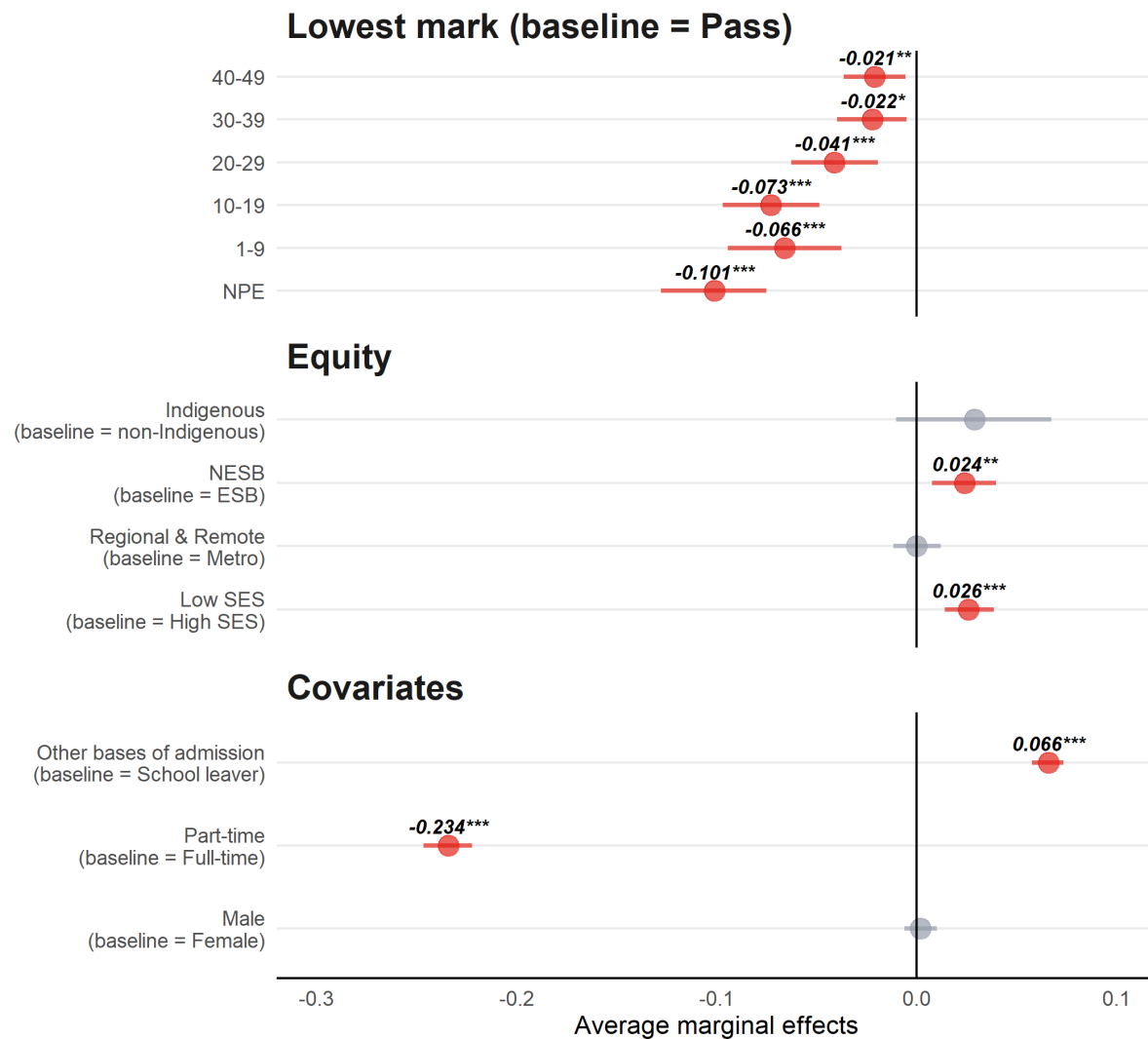
NPE and institutional retention

The overall retention rate for our sample was 78.5 per cent, which was slightly below the unweighted national average new normal retention rate between 2012 and 2017 of 81.6 per cent (DESE, 2020c). Only 17.5 per cent of students with an NPE fail in all units undertaken, what we refer to as "total NPEs", were retained at the institution after their commencing year. This compares to a retention rate of 50.3 per cent for students with an NPE as their lowest mark, but who had higher marks in other units, what we refer to as "partial NPEs". In contrast, students who passed all of their units had a retention rate of 85.6 per cent.

We conducted a multivariate regression on retention outcomes which included *lowest* marks and *average* marks across a student's commencing year to control for overall academic performance. Figure 5 plots out the average marginal effects for the regression output. Controlling for overall academic performance, students with an NPE failure on average were 10.1 percentage points less likely to be retained at the institution compared to students with a pass grade as their lowest mark.

All things held constant, we found no adverse effects associated with equity membership. On the contrary, we found that low SES students were more likely to be retained at the institution than were high SES students, and the same held for NESB students. Results for Indigenous students, and regional and remote students, were not statistically significant. Consistent with other studies of student retention (HESP, 2018; Norton et al., 2018), we found that studying part-time was a major risk factor for not being retained by the institution. Students studying part-time were 23.4 percentage points less likely on average to be retained compared to students studying full-time. School leavers were on average 6.6 percentage points less likely to be retained than non-school leaver students. It is important to reiterate that this is only a measure of institutional retention and does not account for students transferring to other institutions. Inter-institutional transfer is an under-researched area in Australian higher education, but likely accounts for a non-trivial portion of institutional attrition for many universities.

Significant and not significant



Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
 95% confidence interval bands shown. The model includes controls for broad field of education, campus location, and average mark.
 A full list of coefficients and AMEs are in table A3 of the appendix.

Figure 5: Average marginal effects for retention model

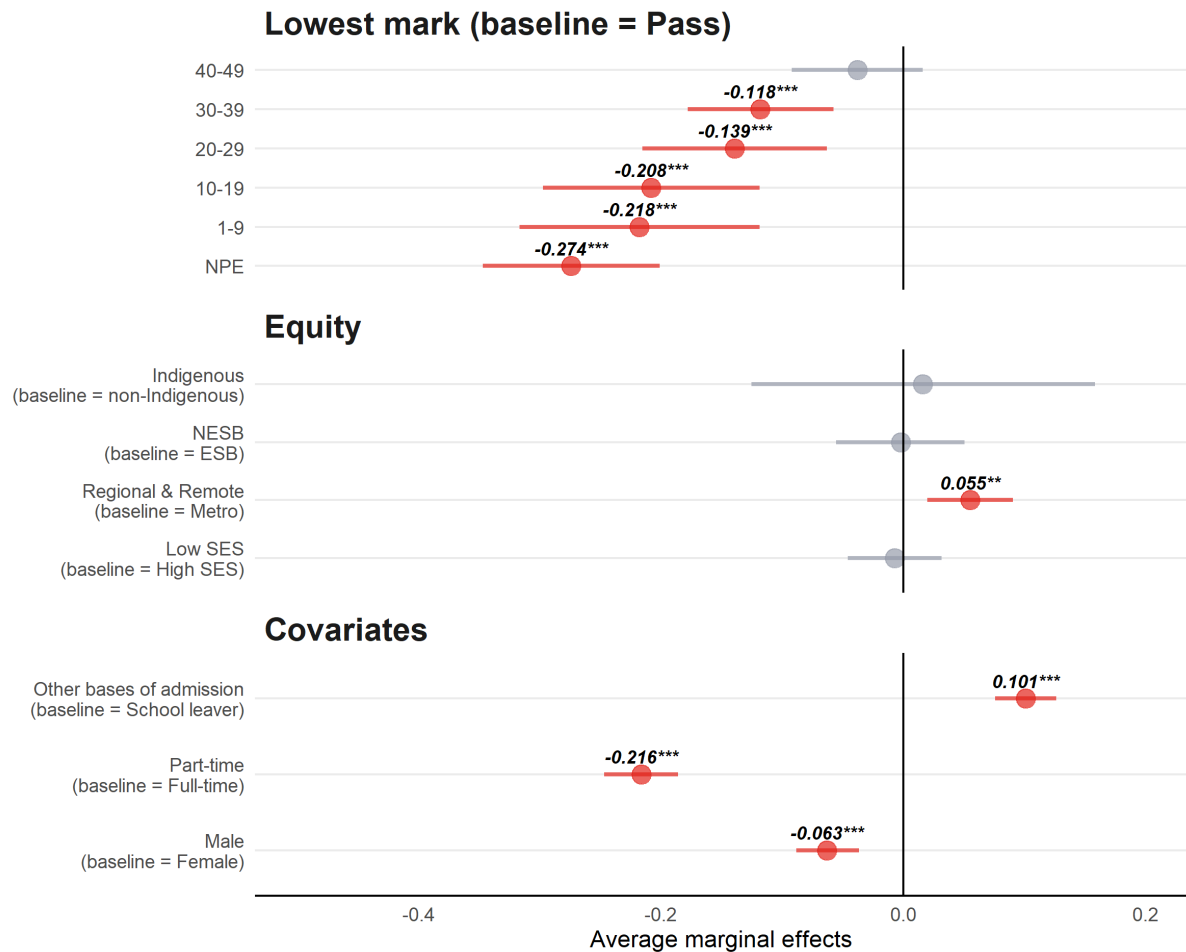
NPE and six-year completion

The overall institutional six-year completion rate for the 2012 commencing year sample was 48.8 per cent. Less than five per cent of students (4.5 per cent) who achieved an NPE in all their commencing year units had completed after six years, and for students with an NPE as their lowest mark just 11 per cent had completed.

Given these raw overall completion rates, it was not surprising that our multivariate regression analysis found a substantial non-completion risk for all fail marks after controlling for overall academic achievement and other covariates. Students who in their commencing year had achieved at least one NPE result were 27.4 percentage points less likely to have completed within six years compared to students who passed all of their units (see Figure 6).

All things held constant, we found no significant adverse effects associated with equity membership. Like our retention model, students domiciled in regional and remote areas were more likely to have completed over six years than students from metropolitan areas. Male students were more at risk of non-completion than female students. Consistent with our retention model, part-time study was a major risk factor for non-completion.

Significant and not significant



Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
 95% confidence interval bands shown. The model includes controls for broad field of education, campus location, and average mark.
 A full list of coefficients and AMEs are in table A3 of the appendix.

Figure 6: Average marginal effects for six-year completion model

Likelihood of receiving a fail or NPE result

Results from our retention and six-year completion modelling show that NPE results and other fails are strongly associated with course non-completion and attrition. When commencing year marks are taken into account in our retention and completion models, we find no negative equity effects. However, as found in our sample description (Table 1), equity groups appear to have more members that registered a fail or NPE unit result. Additional research is required to confirm, but this suggests that academic achievement may be a mediating factor in the relationship between equity group membership and both retention and completion outcomes. In this section of the analysis we model the likelihood of a student failing a unit or registering an NPE result in their commencing year.

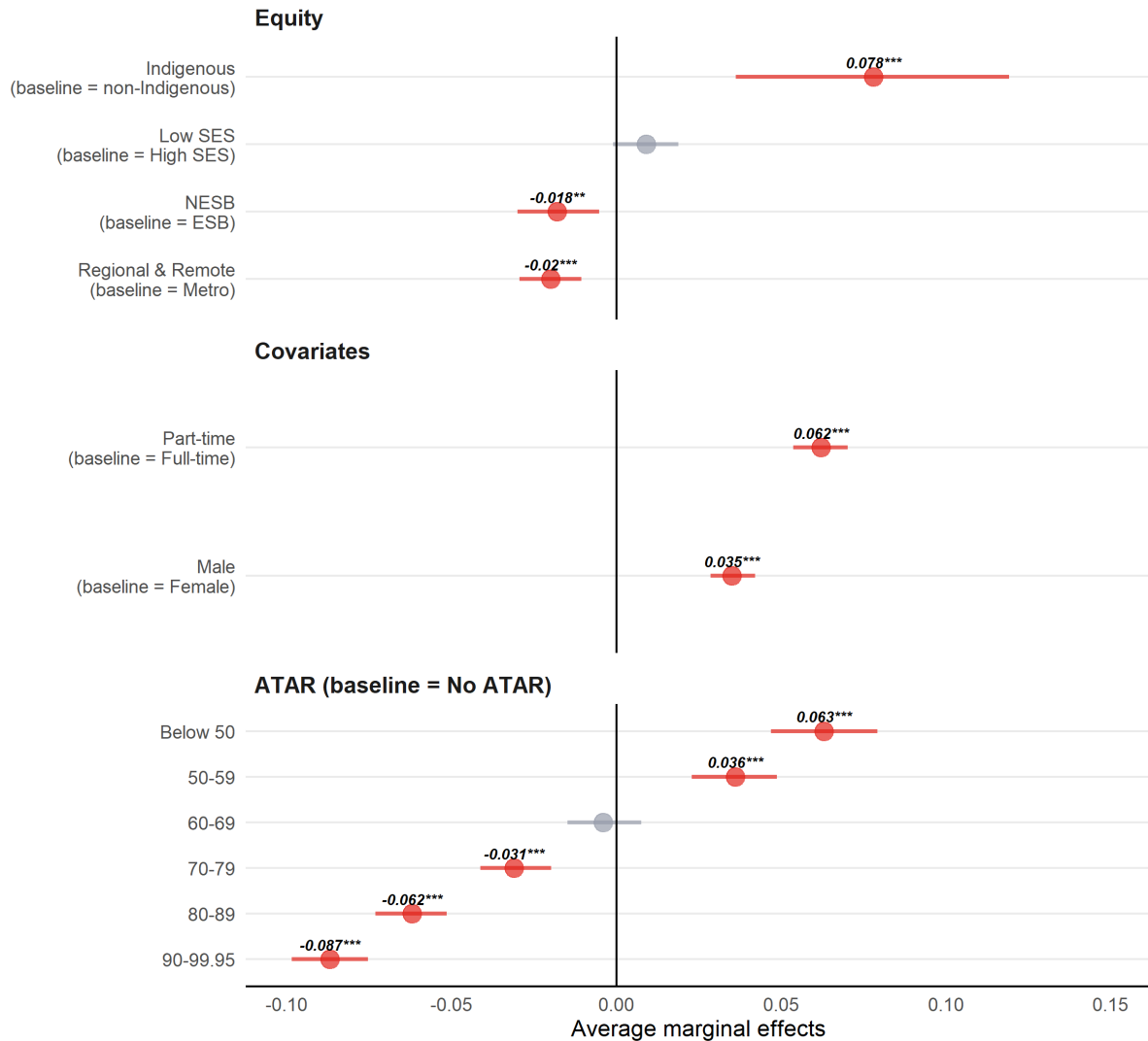
Likelihood of NPE

Figure 7 plots average marginal effects for a regression estimating the likelihood of a student registering at least one NPE fail in their commencing year. All else held constant, we find Indigenous students were the only equity group at a major risk, at 7.8 percentage points more likely on average to have registered an NPE than non-Indigenous students. Low SES students showed no significant higher risk of having registered an NPE result than high SES students. Being admitted to a course on a low ATAR was associated with an elevated risk of registering an NPE result, and the risk declined with higher ATAR intervals. NESB students had a lower risk (-1.8 percentage points) of receiving an NPE result than students from

English-speaking homes. Regional and remote students were also less likely to have registered an NPE result compared to metropolitan students.

Part-time attendance was also a major risk factor and was associated with a 6.2 percentage point increase in risk of registering an NPE fail compared to full-time students. Male students were 3.5 percentage points at higher risk on average of registering an NPE than female students.

Significant and not significant



Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
 95% confidence interval bands shown. The model includes controls for student's age, broad field of education, and course location.
 A full list of coefficients and AMEs are in table A4 of the appendix.

Figure 7: Average marginal effects for NPE model

Likelihood of failure

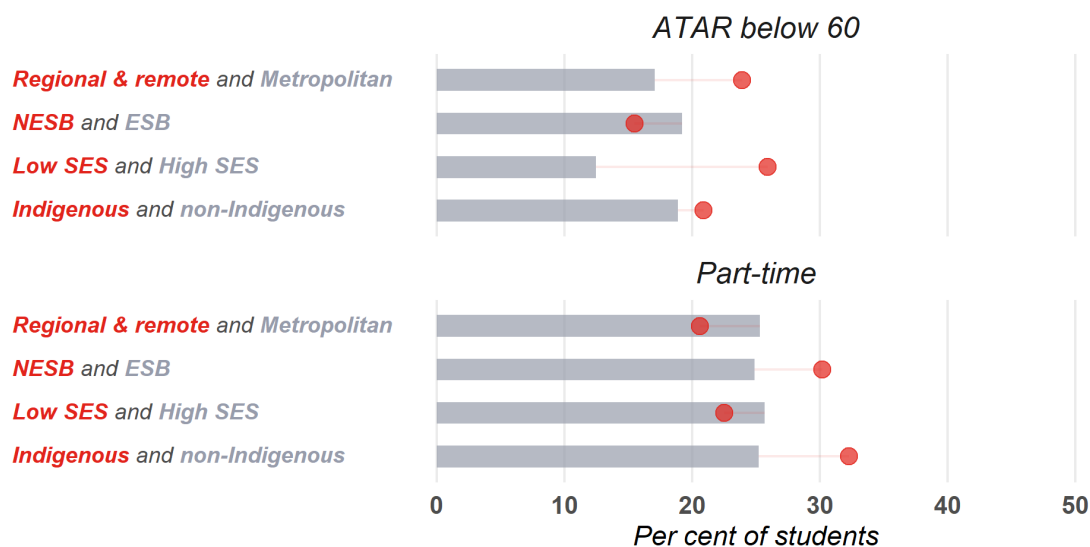
Results from our model for likelihood of unit failure (reported in table A4 of the Appendix) found similar effects to the NPE model for Indigenous students, who were found to be at higher risk of unit failure than non-Indigenous students by an average of 12.3 percentage points. In contrast to the NPE model, low SES students were found to have a 5.1 percentage points higher likelihood, on average, to have failed a unit than high SES students. Regional students were 5.1 percentage points less likely to be at risk than students living in metropolitan areas.

Part-time study was found again to be associated with an increased likelihood of unit failure of 12.2 and 11.2 percentage points, respectively. Male students had an eight percentage point higher risk of unit failure compared to their female classmates. Again, ATAR effects were linear by ATAR interval, with higher ATARs at a much lower risk of failure, while lower ATARs were at an elevated risk.

Equity students and course-related risk factors

Our models found that course-related factors such as part-time study and low ATAR were generally much stronger predictors of NPE and unit failure than most equity group membership statuses. This does not, however, indicate that there is no reason for vigilance regarding NPE results among equity cohorts. For instance, even though we found no statistically significant association between low SES and the incidence of an NPE result, raw NPE and fail rates are higher for low SES students than high SES students (Table 1).

To further evaluate the equity dimensions of NPE and unit failure, we examine the share of equity students in part-time study and those admitted with a lower ATAR, within our study sample. Figure 8 utilises red dots to plot the share of each equity group, while the grey bars indicate shares for the non-equity comparison group. Low SES students had much higher shares of students admitted with an ATAR below 60 (26 per cent compared to 12 per cent for high SES students), while also maintaining a smaller proportion of students in part-time study. In other words, higher raw rates of NPE among low SES students is likely explained by their overrepresentation among those admitted with a low ATAR. Despite having a higher share of students admitted with low ATARs (24 per cent compared to 17 per cent for metropolitan students), students from regional and remote areas had lower rates of students with NPE and fail results.



Notes: Both of these course related variables are chosen because they are shown to be significant risk factors in our models

Figure 8: Equity groups by the share of students in part-time study and admitted with an ATAR below 60

Our models found that, even after controlling for other risk factors, Indigenous students had a significantly higher likelihood of NPE and fail than non-Indigenous students. Yet Indigenous students are slightly overrepresented among low ATAR students and have a much greater share of students studying part-time (32 per cent compared to 25 per cent for non-Indigenous students). NESB students had a smaller share of students with a low ATAR but were overrepresented among those enrolled part-time. This may help explain why the raw fail rate reported in Table 1 for NESB students is higher than that of English-speaking background students.

Part Three: Discussion of findings and addressing the NPE challenge

Discussion of quantitative findings

The scope and scale of NPE results

We have seen that the scale of student failure and NPE results are significant and frequently overlooked by a sector that has instead focused on the more palatable “success rate”. At our sample institution, around 10 per cent of commencing bachelor students recorded at least one NPE result and 3.7 per cent of all unit enrolments resulted in an NPE. This result is close to the 4.3 per cent reported by Wimshurst and Allard (2008) in their earlier unit-level study of FNS results in a single university faculty. While these percentages may appear to suggest that NPE results are a relatively small problem in Australian higher education, if generalised across the entire sector, NPE results likely represent a significant portion of overall student failure, and large sums of student debt and CSP funding.

To demonstrate the potential or estimated scale of NPE results across the sector, we can apply the rates found in this study to national data concerning student enrolments and EFTSL load. In 2019, Australian universities reported a commencing domestic bachelor population of 252,904 students (DESE, 2020a). Therefore, if we were to generalise our finding that 10 per cent of these students may record at least one NPE result in their commencing year, we find that as many as 25,290 Australian students, within this cohort, may have been affected by NPE results in just this one year. We can further estimate the impact at unit-level by determining the overall EFTSL load for this cohort in the same year. In 2019, Australian universities reported a total EFTSL of 198,158 for the cohort (DESE, 2020b).

It is important to note that these estimates are for a limited domestic commencing bachelor cohort. Although it has not been a focus of this research report, we know that NPE results are not limited to commencing cohorts, but rather, extend throughout the undergraduate years and into postgraduate study. In fact, the study of FNS results by Wimshurst and Allard (2008, p. 694) found that while commencing students recorded higher rates of overall failure, FNS results were not significantly related to year level within their regression analysis. This indicates that NPE results are equally common throughout the undergraduate years and further suggests that the total scale of NPE results are much greater than what we have estimated above.

The rates of NPE found in our study of domestic bachelor-level students are much lower than the estimated non-participation rates observed in Hodges et al.’s (2013) study of enabling programs, which averaged around 17 per cent (p. 54). The gap is possibly even larger than it appears due to the fact their study only counted *total NPEs* in their definition of non-participating students. One of the reasons for this dramatic difference is likely to relate to differing thresholds for financial commitment. Wimshurst and Allard (2008), in their study of FNS grades, found that deferring student fees, as opposed to paying student contributions upfront, was the single strongest predictor of reporting an FNS grade. Importantly, this was back in the 1998–2000 period when there was a substantial discount for upfront payment and deferring course fees was not a foregone conclusion. The dramatically higher non-participation rate in enabling programs is likely to reflect the fact that 97 per cent of enabling students participate in programs that are prevented by legislation from charging student fees (Pitman et al., 2016). In the case of domestic bachelor students, there is a financial cost for NPE, but it is blunted as an incentive due to the Higher Education Loans Program (HELP) income contingent loan system. Future research should investigate the effect of student fees, and the HELP, by exploring NPE trends by student fee type sector wide.

The significance of NPE results

Our quantitative analysis has shown that unit-level NPE results are strongly associated with student attrition and non-completion. Based on multiple regression modelling, we found that the effect size of NPE results on attrition and non-completion is larger than other types of failure, such as non-zero failures — or those with a mark between 1 and 49. This suggests that it is not only unit-level failure that demands much greater attention across the higher education sector, it also *how*, or the way in which, a student fails that matters greatly. This further suggests that student success and failure are poorly understood if we limit ourselves to thinking in the *either/or* binary outcomes of passing or failing. The manner of student failure carries important attendant information that should be carefully considered by universities, government and higher education researchers.

NPE and equity cohorts

From an equity perspective, our analysis shows that students from equity backgrounds are not at a substantially higher risk of NPE, save for Indigenous students, who were found to have a much higher risk of being NPE. Nevertheless, given that NPE students incur a financial cost but no benefit from their enrolment, there is an imperative for reducing NPE amongst equity cohorts, particularly those who were already facing financial hardship.

While students from low SES backgrounds were found to have a slightly higher raw NPE, once mediating variables were controlled for, we found that there was no statistically significant difference in the risk of NPE. This result mirrors recent research focusing on the impact of SES on failure and attrition, which has generally found that SES does not, by itself, have a strong relationship to failure and attrition. Elevated attrition and non-completion among low SES students are instead explained by mediating factors such as lower prior academic achievement and studying part time (Li & Carrol, 2017; Walker-Gibbs et al., 2019). Interestingly, NESB students and students from regional and remote areas were both found to have a lower likelihood of reporting an NPE. These results broadly reflect the previous work of Wimshurst and Allard (2008) who found Indigenous status had a substantial effect on the likelihood of receiving an FNS grade and that NESB students were no more likely to report an FNS grade.

It is clear from our research that NPE is of particular concern for Indigenous cohorts and is likely to be connected to the comparatively poor retention and completion outcomes for Indigenous students in higher education generally (Edwards & McMillan, 2015; Li & Carrol, 2017). The high rates of NPE may suggest that the disengagement of Indigenous students from higher education is likely to occur early in the student life cycle, and even before the semester commences. Disengagement in the pre-semester period is not uncommon, and has been highlighted by Castleman and Page (2014) who referred to the phenomenon as the “summer melt”. To improve outcomes for Indigenous students, interventions may need to focus on the period between initial enrolment and the census date, but further research is required.

Higher rates of NPE for Indigenous students could also help explain the paradox highlighted by Asmar, Page, and Radloff (2015) who found that, despite poorer retention and completion outcomes, Indigenous students reported comparatively high scores on student engagement related scales. One possible explanation for this is that by the time institutional surveys such as the Student Experience Survey are conducted, many Indigenous students may have already disengaged from their studies, and thereby would not have been surveyed.

Analysis of descriptive statistics shows that NPE accounts for a larger proportion of total fails for Indigenous students compared to non-Indigenous students. Once the proportion of students who had an NPE failure was subtracted from the proportion of students who had

failed overall, we observed there was little difference between the two cohorts in the proportion of students who had an ‘earned’ failure. Further research is required to understand if this trend is replicated sector wide, to examine the reasons Indigenous students are much more likely to have NPEs and to inform potential interventions. Nonetheless, studies in the US of interventions designed to reduce the incidence of summer melt show that interventions can be effective, particularly for students from equity backgrounds (Castleman & Page, 2014, 2015; Castleman, Page, & Schooley, 2014). One particular study found that amongst low income students, academic advising was effective in reducing the incidence of summer melt by between eight to 12 percentage points (Castleman et al., 2014). Our research suggests that interventions specifically targeted at addressing NPE amongst Indigenous students could lead to substantial improvement in overall success, retention and completion rates.

The significantly increased risk of NPE among Indigenous students also highlights the potential for unintended consequences if more punitive approaches, such as forcibly unenrolling students prior to census, are used to address the issue. Previous research suggests that early indicators of potential NPE, such as failure to log into the learning management system early in the semester, are far from perfect, with a sizable number of students successfully completing subjects despite a delay in engagement (Stephenson, Cakitaki, & Luckman, 2018). From an equity perspective, such interventions would disproportionately affect Indigenous students and could undermine progress towards the *Closing the Gap* target of increasing the proportion of young Indigenous Australians with a post-school qualification (Department of the Prime Minister and Cabinet, 2020). While more research is required on effective NPE reduction strategies, we would favour approaches that focus on increased academic advising that anticipates and responds to NPE events.

Our research has also identified students with low ATARs, and those studying part-time, as being particularly susceptible to NPE results and institutions should be vigilant for NPE among these students. The findings broadly reflect the work of Wimshurst and Allard (2008) who similarly identified lower university entry scores and studying part time as predictors of receiving an FNS grade.

The mystery of NPE behaviours

Given that NPE results come at a high financial and academic cost to the individual student, it is something of a mystery as to why the phenomena remains relatively common, and likely impacts tens of thousands of Australian students each year. As an exclusively descriptive and correlational study, this report is unable to shed light on many of the important questions concerned with the “why”, or causal factors, associated with NPE behaviours. In the absence of an in-depth qualitative study—or one that directly surveys students with a record of NPE—we may still evaluate and propose theories that attempt to explain why students may choose to not participate in individual or multiple units. In doing so, we also present suggestions for future research into the NPE phenomenon.

As we detailed in Part One, there have been few studies concerned with NPE-like behaviours, but among these few, several theories have been floated for what may be motivating this form of student disengagement. It has been suggested that students may, in some cases, be exploiting government student assistance schemes (Clarke et al., 2000, p. 98), while others hypothesise that students are simply ignorant of census dates and their implications (Norton et al., 2018). While both of these issues could well play a role in NPE behaviour, our research, which shows that students are rarely NPE in all of their units, could suggest that their motivations are more complex. The fact that 83.5 per cent of NPE students were NPE in only some of their units suggests that

students could be acting selectively or strategically. Moreover, the finding of Wimshurst and Allard (2008) that year level was not predictive of FNS results, indicates that second and third year students are equally likely to receive FNS/NPE results. Taken together, these findings suggest that NPE behaviours are not limited to fully disengaged or non-genuine students in their first year of study.

Our findings suggest that the NPE phenomenon is much more diverse and complex than these theories allow for. We argue that future research should attempt to capture the qualitative dimensions of NPE behaviours. We further suggest that future research would benefit from exploring the NPE phenomenon as it takes place at the “educational interface” between institutional and student characteristics as described by Kahu and Nelson (2018). Specifically, we believe it is likely that the four “psychosocial constructs” described within their “educational interface framework” are likely to be highly salient within the NPE discussion. Recalling that Kahu and Nelson (2018, p. 64) propose four “mediating mechanisms” within their framework, we believe the mechanisms of “self-efficacy”, “emotions”, “well-being” and “belonging” are likely to be highly relevant in explaining NPE behaviours as an interaction effect between student and institution.

Drawing particularly on the role of self-efficacy and belonging, some NPE behaviours may be explained, at least in part, by what have been called “performance-avoidance” goals or behaviours — i.e. working to avoid situations where one may perform poorly (Jury, Smeding, Court, & Darnon, 2015). Performance-avoidance helps to describe what many teachers have witnessed in students who may find it psychologically protective to fail a unit or assignment via non-participation, rather than participate, and still risk what is sometimes called an “earned failure”. It may be that what we have described as “strategic” and “partial” NPE behaviours can be further explained by this motive of performance avoidance. But like Kahu and Nelson (2018) have argued, future studies should not neglect to investigate institutional characteristics that may influence mediating factors such as self-efficacy and belonging.

Future studies of NPE should not neglect to question what NPE behaviours may be signalling in relation to institutional quality and inclusivity. For instance, it could be that high NPE rates indicate that students are being provided with poor academic advice at enrolment and that university study did not meet their expectations. Poor admissions practices, inadequate prerequisites, or institutional policies allowing for late unit enrolments may also play a role. In still other cases, institutions may need to confront the uncomfortable possibility that poor teaching and curriculum design may be contributing to the problem. For example, we would hypothesise that universities with widely adopted early assessment policies—policies that require units to offer a weighted, although low-stakes, assessment in the first week or two—have a lower NPE rate than those that do not. What is certain, is that more research is needed.

University grading scales and HEIMS reporting

Capturing NPE outcomes at the university level

Addressing the NPE challenge will also require much greater conformity in data collection and reporting of unit-level results from across the university sector. Among the 37 Table A, or public universities in Australia, there exists a tremendous diversity in institutional marking practices and grading scales. While our definition of NPE was created to be flexible and easily adopted between institutions, some hurdles remain. A full review of grading policies and procedures among Australia’s universities is well beyond the scope of this report, but we can highlight some of the more pressing issues that have worked to obscure the NPE problem.

First, it should be noted that several Australian universities already maintain standalone grade descriptors that seek to capture NPE-like results. But these can cause inconsistencies in reporting when they are not based on a numeric mark (of 0–100), and therefore depend on individual assessors being familiar with the grade descriptor and using it consistently. In their study of FNS grades, Wimshurst and Allard (2008) indicate that FNS grades at their study institution were not based on a numeric unit outcome—such as a “0” mark—but were instead a qualitative grade description that had to be actively selected by the academic staff member reporting unit grades. Considering this, they found that the FNS grade was being used inconsistently between the academic divisions or programs within their study institution. They note that different academic areas appeared to “have applied different criteria, standards or other practices when determining final grades” and further noted the wide disparity in the use of FNS grades between areas (p. 695).

It is likely that this inconsistency of reporting is repeated at other institutions that maintain confusing, or apparently overlapping grade descriptors for NPE-like outcomes. For example, a number of Australian universities use a numeric marking scale of 0–100 but describe two different grades that could be equally taken to be NPE-like results. An “N” grade is taken to be a failure assessed in the range of “0–49%” while an “NA” grade is described as a “Fail - No Attempt” (for just one example, see Swinburne University of Technology, 2020). In cases such as this, it appears that an NPE-like result could fit either description. Our study institution maintains a similar grading scale, but we find that like Wimshurst and Allard (2008), the “NA” grade appears to be used inconsistently and does not clearly match failures assessed with a numeric mark of “0”. Where grade descriptors overlap, or are not clearly distinguished, we are likely to find localised institutional drift, with different academic areas applying these results in divergent ways. It was for this reason that in this study, we define NPE results using the numeric mark alone and have ignored the less frequently used non-numeric descriptor.

This definition works well for most Australian universities where a numeric unit result, but specifically a 0–100 mark, is recorded for all credited units attempted. In these cases, an institution does not necessarily require a dedicated grade descriptor for NPE but can calculate these after the fact using only the numeric results of “0”.

There are, however, a few Australian universities that do not report numeric marks of 0–100 at the unit level. Griffith University (2020) and The University of Queensland (2020) are two examples of such institutions. Instead, these universities use qualitative grade descriptors of unit-level grades and assign a numeric result on a scale of 1–7 to each grade. Therefore, our proposed universal NPE definition, based as it is on the assumption of a 0–100 scale, will not easily work.

This does not mean, however, that these universities are unable to record NPE-like results. On the contrary, both Griffith University and The University of Queensland currently maintain standalone grade descriptors for NPE-like outcomes. Griffith University (2020) allows a grade of FNS, or “Fail No Assessment Submitted”, to be recorded in the event that a student “(d)id not present any work for assessment...”. Similarly, The University of Queensland (2020) allows a grade of “X”, or “(n)o assessable work received”, to be recorded in the case of what we have called NPE results. In cases such as these, it is even more imperative that institutions work to ensure that NPE-like results are being clearly and consistently captured by the academic staff responsible for the reporting of unit-level results.

Capturing NPE outcomes at the national level

The tremendous diversity in grading practices among Australian universities is further reflected in the government’s requirements concerning the unit-level collection of higher education statistics. Perhaps because of this diversity, DESE requires very little

of universities in relation to unit-level outcome reporting. Collected via the HEIMS, current reporting of unit-level outcomes via element 355 within the Unit of Study Completions (CU) submission, does not differentiate between types of failure. Element 355 only captures three relevant outcomes at the unit level: 1) withdrew without penalty, 2) failed, 3) or successfully completed all requirements (DESE, 2020f). The simplicity of data capture in element 355 has allowed for the diversity of grading scales to continue in Australian universities, but it has also worked to obscure important unit-level outcomes such as NPE results. Moreover, the lack of national data capture has meant that research projects that depend exclusively on HEIMS data, without the supplementation of institutional data, have been unable to access, recognise or evaluate NPE results.

We believe that changing HEIMS element 355 to include a category for NPE results would greatly improve awareness of the issue and allow regulatory bodies such as the Tertiary Education Quality and Standards Agency (TEQSA) to act on the issue. Changes to government reporting would also likely bring greater consistency to grading practices throughout the sector and more closely attune institutions to NPE behaviours.

From a governmental perspective, there are clear financial incentives to addressing the issue of NPE, and the recent “Job-Ready Graduates” reforms are likely to draw greater attention to phenomenon such as NPEs. The introduction of the 50 per cent pass rule and the introduction of a “genuine student” test means there will be increasing emphasis placed on issues such as NPE.

NPEs and academic progression policies

Given the severity, scope and prevalence of NPE outcomes in Australian higher education, we recommend that institutions review their academic progression and monitoring policies to include an NPE strategy. Like the grading scales we reviewed above, Australian universities embody a diversity of approaches to academic progression policies, or what may be called “academic probation” in many North American universities. Given the diversity in grading scales and progression policies it is difficult to make blanket recommendations for the inclusion of NPE within these processes. Universities in Australia have defined unsatisfactory progress according to different formula and grading scales, but each is required—by *The Higher Education Standards Framework* (1.3.4)—to monitor and assess the satisfactory progression of their students. Some consider unsatisfactory progress to be attained once 50 per cent of a student’s semester unit load is failed, or when a student’s grade point average drops below a certain threshold.

No matter what the system may be, we recommend policies and procedures be adopted that recognise the qualitative differences between failure types. Given that NPE results indicate a far more pronounced form of student disengagement and come with increased likelihood of attrition and non-completion, we argue that academic progression policies should distinguish between NPE and other types of failure. Where some policies require students to fail 50 per cent or more of their load before interventions are triggered, we argue that a single NPE result should trigger an academic advising intervention.

Conclusion

In this research report, we have outlined the scope, scale and significance of NPEs in Australian higher education and further delineated the significance of NPE results for equity cohorts. We found that although unit-level failure has been widely neglected as a topic of academic research, NPE results weigh heavily on overall university success rates and present a distinct challenge as compared to other types of failure. We estimate that as many as 10 per cent of commencing domestic bachelor students will acquire an NPE result and these will account for as much as 3.7 per cent of all unit-level outcomes for this cohort. We also estimate that as many as 25,000 commencing domestic bachelor level students—just a fraction of the overall student population—will receive an NPE each year. Representing tens of thousands of unit failures every year, NPE results also exact a sizable financial burden on Australian students and on government budgets that support CSPs.

While we found that equity group membership wasn't strongly predictive of NPE results for all but Indigenous students, we also found that equity groups in our sample had high rates of other predictive variables, such as low ATAR and studying part-time. Furthermore, the longer-term financial burden on debt incurred via NPE results is likely to more significantly impact students from disadvantaged backgrounds. Future research should focus on qualitative research designs that are better suited to discovering more refined factors contributing to NPE behaviours. This research should focus also on discovering the differences between students who may be classed as *total NPEs* and those who express *partial NPE* behaviours. The field of higher education research and equity research would clearly benefit from better understanding the personal and institutional factors contributing to NPE behaviours.

Research should also focus on differentiating patterns and factors related to NPE behaviours in different learning contexts, but particularly in online settings where there is reason to believe that NPE behaviours are especially acute. Although we found that NPE behaviours are largely of equal prevalence across student cohorts, it may be the case that the reasons for NPE behaviours are different amongst groups. Qualitative studies should, therefore, seek to understand if there are differing motivational factors between, for example, low and high SES students.

This research report has also made the case for researchers to give more attention to different types of student failure and their potential significance in relation to student attrition and course completion. We maintain that success and failure are poorly understood if limited to overly generalised binary categories. Researchers should work to create a full taxonomy of student failure, one that would help us to better understand failure types and do so without fear of causing embarrassment to institutions or to the sector. Universities hold a duty of care towards their students and understanding the fullness of student failure is an important means towards fulfilling this duty.

We have also argued that universities should closely examine patterns of NPE within their own student populations and make efforts to bring institutional awareness to the problem. This can be done by creating unambiguous grade reporting procedures that can capture reliable NPE results. These results should be utilised by institutional planning and performance units to better inform institutional quality improvement efforts. Universities should also create NPE policies that include specified academic progression and monitoring processes for students who acquire an NPE result.

The DESE should add an NPE outcome to its list of five possible unit-level outcomes under HEIMS element 355. This would bring greater consistency to grading practices across the sector and would allow for a national picture of unit-level outcomes that goes beyond the all too binary "success rate" that registers only pass/fail outcomes.

Finally, we urge institutions and government to be cautious in their implementation of overly punitive policies and procedures in relation to NPE behaviours. In the absence of more research, the motivating causes and contributing factors related to NPE are not yet well understood. We would stress the need for caution and mindfulness as institutions seek to address failure of all types in the wake of the forthcoming “Job-Ready Graduates” 50 per cent failure rules. Caution is especially merited as we seek to further understand NPE behaviours among Indigenous students and other student cohorts for whom this and other research has shown higher levels of non-participation.

References

- Ajjawi, R., Dracup, M., Zacharias, N., Bennett, S., & Boud, D. (2020). Persisting students' explanations of and emotional responses to academic failure. *Higher Education Research & Development*, 39(2), 185-199. doi: 10.1080/07294360.2019.1664999
- Andrewartha, L., & Harvey, A. (2014). Willing and enabled: The academic outcomes of a tertiary enabling program in regional Australia. *Australian Journal of Adult Learning*, 54(1), 50-68.
- Asmar, C., Page, S., & Radloff, A. (2015). Exploring anomalies in Indigenous student engagement: findings from a national Australian survey of undergraduates. *Higher Education Research and Development*, 34(1), 15-29. doi: <https://doi.org/10.1080/07294360.2014.934334>
- Baik, C., Naylor, R., & Arkoudis, S. (2015). *The first year experience in Australian universities: Findings from two decades, 1994-2014*. Melbourne: Centre for the Study of Higher Education, The University of Melbourne. Retrieved from https://melbourne-cshe.unimelb.edu.au/data/assets/pdf_file/0016/1513123/FYE-2014-FULL-report-FINAL-web.pdf
- Bowen, H. R. (1980). *The costs of higher education: How much do colleges and universities spend per student and how much should they spend?*. San Francisco: Jossey-Bass.
- Castleman, B. L., & Page, L. C. (2014). A trickle or a torrent? Understanding the extent of summer "melt" among college-intending high school graduates. *Social Science Quarterly*, 95(1), 202-220.
- Castleman, B. L., & Page, L. C. (2015). Summer nudging: Can personalized text messages and peer mentor outreach increase college going among low-income high school graduates? *Journal of Economic Behavior & Organization*, 115, 144-160.
- Castleman, B. L., Page, L. C., & Schooley, K. (2014). The forgotten summer: Does the offer of college counseling after high school mitigate summer melt among college-intending, low-income high school graduates? *Journal of Policy Analysis and Management*, 33(2), 320-344.
- Clarke, J., Neil, C., Turner, L., & Birney, D. (2000). *The cost effectiveness of enabling and related programs in Australian tertiary education (unpublished report)*. Retrieved from https://enablingeducators.org/wp-content/uploads/2020/07/EIP_Report.pdf
- Department of Education and Training. (2015). *Completion rates of higher education students-cohort analysis, 2005-2014*. Canberra: Australian Government. Retrieved from <https://docs.education.gov.au/documents/completion-rates-higher-education-students-cohort-analysis-2005-2014>
- Department of the Prime Minister and Cabinet. (2020). *National agreement on closing the gap*. Canberra: Australian Government. Retrieved from <https://www.closingthegap.gov.au/sites/default/files/files/national-agreement-ctg.pdf>
- DESE. (2020a). Selected Higher Education Statistics, 2019 Section 1 - Commencing Students. Canberra: Australian Government. Retrieved from: <https://docs.education.gov.au/node/55052>
- DESE. (2020b). Selected Higher Education Statistics, 2019 Section 3 - Commencing student load. Canberra: Australian Government. Retrieved from <https://docs.education.gov.au/node/55054>
- DESE. (2020c). Selected Higher Education Statistics, 2019 Section 15 Attrition, success and retention. Canberra: Australian Government. Retrieved from: <https://docs.education.gov.au/node/55066>

- DESE. (2020d). Selected Higher Education Statistics, 2019 Section 16 Equity performance data. Canberra: Australian Government. Retrieved from: <https://docs.education.gov.au/node/55067>
- DESE. (2020e). *Factors affecting higher education completions*. Canberra: Australian Government. Retrieved from https://docs.education.gov.au/system/files/doc/other/transitions_predicting_completion_rates.pdf
- DESE. (2020f). HEIMSHelp, Unit of study completion status. Canberra: Australian Government. Retrieved from https://heimshelp.dese.gov.au/2018_data_requirements/2018dataelements/355
- DESE. (2020g). *Performance-based funding for the Commonwealth Grant Scheme for 2020, technical note*. Canberra: Australian Government. Retrieved from https://docs.education.gov.au/system/files/doc/other/performance-based_funding_scheme_technical_guide_final_3feb2020.pdf
- Devlin, M. (2013). Bridging socio-cultural incongruity: Conceptualising the success of students from low socio-economic status backgrounds in Australian higher education. *Studies in Higher Education*, 38(6), 939-949.
- Edwards, D., & McMillan, J. (2015). *Completing university in a growing sector: Is equity an issue?* Perth: National Centre for Student Equity in Higher Education, Curtin University. Retrieved from <https://www.ncsehe.edu.au/publications/completing-university-in-a-growing-sector-is-equity-an-issue/>
- Fassett, D. L., & Warren, J. T. (2004). "You get pushed back": The strategic rhetoric of educational success and failure in higher education. *Communication Education*, 53(1), 21-39.
- Gale, T., & Parker, S. (2012). Navigating change: A typology of student transition in higher education. *Studies in Higher Education*, 1-20. doi:10.1080/03075079.2012.721351
- Gale, T., & Parker, S. (2017). Retaining students in Australian higher education: Cultural capital, field distinction. *European Educational Research Journal*, 16(1), 80-96. doi:10.1177/1474904116678004
- Grebennikov, L., & Shah, M. (2012). Investigating attrition trends in order to improve student retention. *Quality Assurance in Education*, 20(3), 1-16.
- Griffith University. (2020). Grading schema. Retrieved from <https://www.griffith.edu.au/students/assessment-exams-grades/grades>
- Harvey, A., Cakitaki, B., & Brett, M. (2018). *Principles for equity in higher education performance funding*. Perth: National Centre for Student Equity in Higher Education, Curtin University. Retrieved from <https://www.ncsehe.edu.au/publications/principles-for-equity-in-higher-education-performance-funding/>
- Harvey, A., & Luckman, M. (2014). Beyond demographics: Predicting student attrition within the Bachelor of Arts degree. *The International Journal of the First Year in Higher Education*, 5(1). doi:10.5204/intjfyhe.v5i1.187
- HESP. (2018). *Final Report - Improving retention, completion and success in higher education*. Canberra: Australian Government. Retrieved from <https://docs.education.gov.au/documents/higher-education-standards-panel-final-report-improving-retention-completion-and-success>
- Higher Education Provider Guidelines 2012*. Canberra: Australian Government. Retrieved from <https://www.legislation.gov.au/Details/F2020C00676>
- Higher Education Standards Framework (Threshold Standards) 2015*. Canberra: Australian Government. Retrieved from <https://www.legislation.gov.au/Details/C2020A00093>

- Higher Education Support Act 2003*. Retrieved from <https://www.legislation.gov.au/Details/C2020C00197>
- Higher Education Support Amendment (Job-Ready Graduates and Supporting Regional and Remote Students) Bill 2020 (Cth)*. Canberra: Australian Government. Retrieved from https://parlinfo.aph.gov.au/parlInfo/download/legislation/bills/r6584_adopted/toc_pdf/20107b01.pdf;fileType=application%2Fpdf
- Hodges, B., Bedford, T., Hartley, J., Klinger, C., Murray, N., O'Rourke, J., & Schofield, N. (2013). *Enabling retention: Processes and strategies for improving student retention in university-based enabling programs*. Sydney: Office for Learning and Teaching. Retrieved from: https://enablingeducators.org/wp-content/uploads/2019/11/CG10_1697_Hodges_Report_2013.pdf
- Jury, M., Smeding, A., Court, M., & Darnon, C. (2015). When first-generation students succeed at university: On the link between social class, academic performance, and performance-avoidance goals. *Contemporary Educational Psychology*, 41, 25-36.
- Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, 38(5), 758-773. doi:10.1080/03075079.2011.598505
- Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher Education Research and Development*, 37(1), 58-71. doi:10.1080/07294360.2017.1344197
- Koshy, P. (2018). *Equity student participation in Australian higher education: 2012-2017*. Perth: National Centre for Student Equity in Higher Education, Curtin University. Retrieved from https://www.ncsehe.edu.au/wp-content/uploads/2018/12/Equity-Student-Briefing-Note_2017-18_Final.pdf
- Krause, K.-L., & Armitage, L. (2014). *Australian student engagement, belonging, retention and success: a synthesis of the literature*. York: The Higher Education Academy. Retrieved from https://www.heacademy.ac.uk/sites/default/files/resources/Australian_student_engagement_lit_syn_2.pdf
- Leeper, T. J. (2018). *Interpreting regression results using average marginal effects with R's margins*. Retrieved from <https://cran.r-project.org/web/packages/margins/vignettes/TechnicalDetails.pdf>
- Li, I. W., & Carrol, D. R. (2017). *Factors influencing university student satisfaction, dropout and academic performance: An Australian higher education equity perspective*. Perth: National Centre for Student Equity in Higher Education, Curtin University. Retrieved from <https://www.ncsehe.edu.au/publications/factors-influencing-university-student-satisfaction-dropout-and-academic-performance-an-australian-higher-education-equity-perspective/>
- Manny, A. (2020). *Socio-economic status and the ATAR*. Sydney: University Admissions Centre. Retrieved from <https://www.uac.edu.au/assets/documents/submissions/ses-and-the-atar-report.pdf>
- Masserini, L., & Pratesi, M. (2016). A sample survey on inactive students: Weighting issues in modelling the inactivity status. In G. Alleva & A. Giommi (Eds.), *Studies in Theoretical and Applied Statistics* (pp. 167-177). Cham, Switzerland: Springer. doi:https://doi.org/10.1007/978-3-319-27274-0_15
- McKay, J., & Devlin, M. (2016). 'Low income doesn't mean stupid and destined for failure': Challenging the deficit discourse around students from low SES backgrounds in higher education. *International Journal of Inclusive Education*, 20(4), 347-363.
- Mize, T. D. (2019). Best practices for estimating, interpreting, and presenting nonlinear interaction effects. *Sociological Science*, 6.

- Norton, A., Cherastidtham, I., & Mackey, W. (2018). *Dropping out: The benefits and costs of trying university*. Grattan Institute. Retrieved from <https://grattan.edu.au/report/dropping-out/>
- Peelo, M. (2002). Setting the scene. In M. Peelo & T. Wareham (Eds.), *Failing students in higher education* (pp. 1-12). Buckingham, UK: SRHE and Open University Press.
- Pitman, T., Trinidad, S., Devlin, M., Harvey, A., Brett, M., & McKay, J. (2016). *Pathways to higher education: The efficacy of enabling and sub-bachelor pathways for disadvantaged students*. Perth: National Centre for Student Equity in Higher Education, Curtin University. Retrieved from <https://www.ncsehe.edu.au/wp-content/uploads/2016/07/Final-Pathways-to-Higher-Education-The-Efficacy-of-Enabling-and-Sub-Bachelor-Pathways-for-Disadvantaged-Students.pdf>
- Smit, R. (2012). Towards a clearer understanding of student disadvantage in higher education: Problematizing deficit thinking. *Higher Education Research & Development*, 31(3), 369-380.
- Social Research Centre. (2020). *2019 SES Tables and Figures, 2019 Student Experience Survey national report*. Melbourne: Social Research Centre. Retrieved from <https://www.qilt.edu.au/qilt-surveys/student-experience>
- Stephenson, B. (2019, July 30). Universities must exorcise their ghost students. *Times Higher Education*. Retrieved from <https://www.timeshighereducation.com/opinion/universities-must-exorcise-their-ghost-students>
- Stephenson, B., Cakitaki, B., & Luckman, M. (2018). *Ghosts in the machine: Towards solving the mystery of non-participating enrolments (NPE) and understanding their importance for institutional analytics*. Paper presented at the Australasian Association for Institutional Research (AAIR) Forum, Melbourne.
- Sunar, A. S., Abbasi, R. A., Davis, H. C., White, S., & Aljohani, N. R. (2020). Modelling MOOC learners' social behaviours. *Computers in Human Behavior*, 107.
- Swinburne University of Technology. (2020). What your grades mean. Retrieved from <https://www.swinburne.edu.au/current-students/manage-course/exams-results-assessment/results/grades/higher-education-unilink-foundation/>
- The University of Queensland. (2020). UQ policy and procedures library, assessment - procedures. Retrieved from <https://ppl.app.uq.edu.au/content/3.10.02-assessment#Procedures>
- Walker-Gibbs, B., Ajjawi, R., Rowe, E., Skourdumbis, A., Krehl, M., Thomas, E., . . . Alsen, P. (2019). *Success and failure in higher education on uneven playing fields*. Perth: National Centre for Student Equity in Higher Education, Curtin University. Retrieved from <https://www.ncsehe.edu.au/publications/success-failure-higher-education-uneven-playing-fields/>
- Wimshurst, K., & Allard, T. (2008). Personal and institutional characteristics of student failure. *Assessment & Evaluation in Higher Education*, 33(6), 687-698.

Appendix

Table A1: Summary statistics for the unit level of observation for the sample

| Variable | | Units <i>n</i> = | Share (%) | Unit Fail (All Types) Rate (%) | Unit NPE Rate (%) |
|---------------------------|------------------|---------------------|-----------|--------------------------------------|----------------------|
| Socioeconomic status | Low | 52,575 | 20.7 | 14.8 | 3.8 |
| | Medium | 137,331 | 54.1 | 13.5 | 3.7 |
| | High | 59,040 | 23.2 | 13.0 | 3.5 |
| | NA | 5,068 | 2.0 | 14.8 | 4.6 |
| Regional/Remote status | Regional/Remote | 80,557 | 31.7 | 11.3 | 3.2 |
| | Metropolitan | 168,735 | 66.4 | 14.8 | 3.8 |
| | NA | 4,722 | 1.9 | 15.1 | 4.7 |
| Indigenous status | Indigenous | 1,820 | 0.7 | 22.8 | 8.5 |
| | Non-Indigenous | 252,194 | 99.3 | 13.6 | 3.6 |
| NESB | NESB | 14,621 | 5.8 | 15.3 | 3.3 |
| | Non-NESB | 239,393 | 94.2 | 13.6 | 3.7 |
| Student gender | Female | 162,614 | 64.0 | 11.0 | 3.0 |
| | Male | 91,400 | 36.0 | 18.5 | 4.8 |
| Attendance type | Full-time | 220,577 | 86.8 | 11.3 | 2.7 |
| | Part-time | 33,437 | 13.2 | 29.0 | 9.9 |
| Age | 18-20 | 176,032 | 69.3 | 13.1 | 2.9 |
| | 21-24 | 46,215 | 18.2 | 17.0 | 5.5 |
| | 25-29 | 16,492 | 6.5 | 13.9 | 5.5 |
| | 30-39 | 9,675 | 3.8 | 10.5 | 4.5 |
| | 40-49 | 3,988 | 1.6 | 10.1 | 4.8 |
| | 50 & over | 1,612 | 0.6 | 9.2 | 4.2 |
| Basis of admission | Secondary school | 165,684 | 65.3 | 13.2 | 3.1 |
| | Other | 88,231 | 34.7 | 14.5 | 4.6 |
| ATAR | Below 50 | 26,414 | 10.4 | 23.2 | 5.5 |
| | 50-59 | 38,827 | 15.3 | 19.3 | 4.5 |
| | 60-69 | 48,642 | 19.1 | 13.6 | 3.4 |
| | 70-79 | 46,232 | 18.2 | 8.6 | 2.4 |
| | 80-89 | 32,084 | 12.6 | 4.5 | 1.4 |
| | 90-99.95 | 16,249 | 6.4 | 1.8 | 0.6 |
| | No ATAR | 45,466 | 17.9 | 19.2 | 6.3 |
| Overall | | 254,014 | 100.0 | 13.7 | 3.7 |

Table A2: Summary retention and six-year completion rates for the sample

| Variable | | Retention rate (%) | Six-year completion rate 2012 cohort (%) |
|------------------------|------------------|--------------------|--|
| Socioeconomic status | Low | 79.0 | 45.3 |
| | Medium | 78.7 | 49.7 |
| | High | 77.4 | 49.4 |
| | NA | 79.1 | 53.2 |
| Regional/Remote status | Regional/Remote | 79.8 | 49.0 |
| | Metropolitan | 77.9 | 48.7 |
| | NA | 78.9 | 51.2 |
| Indigenous status | Indigenous | 75.0 | 42.9 |
| | Non-Indigenous | 78.5 | 48.8 |
| NESB | NESB | 81.1 | 48.3 |
| | Non-NESB | 78.3 | 48.8 |
| Student gender | Female | 79.5 | 52.3 |
| | Male | 76.7 | 42.1 |
| Attendance type | Full-time | 85.1 | 54.4 |
| | Part-time | 58.3 | 29.9 |
| Age | 18-20 | 79.1 | 49.3 |
| | 21-24 | 78.0 | 49.2 |
| | 25-29 | 76.6 | 44.4 |
| | 30-39 | 76.0 | 48.7 |
| | 40-49 | 78.4 | 47.1 |
| | 50 & over | 76.0 | 43.9 |
| Basis of admission | Secondary school | 78.0 | 47.4 |
| | Other | 79.1 | 51.0 |
| ATAR | Below 50 | 74.4 | 43.9 |
| | 50-59 | 75.8 | 43.6 |
| | 60-69 | 77.9 | 46.8 |
| | 70-79 | 80.6 | 52.2 |
| | 80-89 | 84.4 | 57.8 |
| | 90-99.95 | 89.4 | 56.4 |
| | No ATAR | 75.0 | 42.0 |
| Overall | | 78.5 | 48.8 |

Table A3: Results from retention and six-year completion logit models

| Variable | | Retention model | | Six-year completion model (2012 cohort) | |
|------------------------|------------------------------|----------------------|-------------------------------|---|-------------------------------|
| | | Estimate | AME | Estimate | AME |
| Lowest mark | Pass – baseline | | | | |
| | NPE | -0.660*** (0.078) | -0.101*** [-0.128, -0.075] | -1.334*** (0.199) | -0.274*** [-0.347, -0.201] |
| | 1-9 | -0.450*** (0.091) | -0.066*** [-0.094, -0.038] | -1.028*** (0.255) | -0.218*** [-0.317, -0.119] |
| | 10-19 | -0.491*** (0.076) | -0.073*** [-0.097, -0.048] | -0.978*** (0.226) | -0.208*** [-0.297, -0.119] |
| | 20-29 | -0.291*** (0.074) | -0.041*** [-0.063, -0.019] | -0.642*** (0.180) | -0.139*** [-0.215, -0.063] |
| | 30-39 | -0.163* (0.063) | -0.022* [-0.040, -0.005] | -0.541*** (0.141) | -0.118*** [-0.178, -0.058] |
| | 40-49 | -0.154** (0.056) | -0.021** [-0.036, -0.006] | -0.175 (0.126) | -0.038 [-0.092, 0.016] |
| Average mark | Avg. mark (continuous) | 0.027*** (0.001) | 0.004*** [0.003, 0.004] | 0.026*** (0.004) | 0.005*** [0.004, 0.007] |
| Indigenous status | Non-Indigenous - Baseline | | | | |
| | Indigenous | 0.222 (0.162) | 0.029 [-0.010, 0.067] | 0.081 (0.359) | 0.016 [-0.125, 0.158] |
| NESB | Non-NESB – Baseline | | | | |
| | NESB | 0.182** (0.065) | 0.024** [0.008, 0.040] | -0.012 (0.134) | -0.002 [-0.056, 0.051] |
| Socioeconomic status | High SES – Baseline | | | | |
| | Med SES | 0.131*** (0.036) | 0.018*** [0.008, 0.028] | 0.047 (0.073) | 0.010 [-0.020, 0.039] |
| | Low SES | 0.193*** (0.046) | 0.026*** [0.014, 0.039] | -0.035 (0.097) | -0.007 [-0.046, 0.031] |
| Regional/Remote status | Metropolitan - Baseline | | | | |
| | Regional & Remote | 0.002 (0.044) | 0.000 [-0.012, 0.012] | 0.275** (0.091) | 0.055** [0.020, 0.091] |
| Gender | Female – Baseline | | | | |
| | Male | 0.015 (0.031) | 0.002 [-0.006, 0.010] | -0.307*** (0.065) | -0.063*** [-0.088, -0.037] |
| Attendance type | Full-time – baseline | | | | |
| | Part-time | -1.393*** (0.033) | -0.234*** [-0.247, -0.222] | -1.063*** (0.082) | -0.216*** [-0.247, -0.186] |
| Basis of Admission | Secondary school – baseline | | | | |
| | Other | 0.499*** (0.032) | 0.066*** [0.058, 0.073] | 0.502*** (0.066) | 0.101*** [0.076, 0.126] |
| Controls | Broad field of education (9) | | Yes | | Yes |
| | Campus geography (3) | | Yes | | Yes |

| | | |
|----------------------------|----------------------|--------------------|
| Intercept | -0.594*** (0.150) | -1.124* (0.471) |
| Observations | 36,990 | 5,776 |
| Pseudo- R^2 (McFadden's) | 0.169 | 0.153 |
| Null deviance | 38,564.35 | 8003.65 |
| Model deviance | 32,049.20 | 6778.29 |
| $Prob > \chi^2$ | 0 | 0 |

Notes: * P<0.05, ** P<0.01, *** P<0.001

Standard errors of the estimate are shown in parentheses, and 95% confidence intervals of the AME's are shown in brackets.

Table A4: Results from NPE and Fail logit models

| Variable | | Fail model | | NPE model | |
|------------------------|---------------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| | | Estimate | AME | Estimate | AME |
| Indigenous status | Non-Indigenous - Baseline | | | | |
| | Indigenous | 0.609*** (0.130) | 0.123*** [0.070, 0.176] | 0.683*** (0.153) | 0.078*** [0.036, 0.119] |
| NESB | Non-NESB – Baseline | | | | |
| | NESB | 0.009 (0.052) | 0.002 [-0.018, 0.021] | -0.207** (0.080) | -0.018** [-0.030, -0.005] |
| Socioeconomic status | High SES – Baseline | | | | |
| | Med SES | 0.096** (0.031) | 0.018** [0.007, 0.029] | 0.069 (0.044) | 0.006 [-0.002, 0.014] |
| | Low SES | 0.264*** (0.038) | 0.051*** [0.036, 0.065] | 0.098 (0.056) | 0.009 [-0.001, 0.019] |
| Regional/Remote status | Metropolitan - Baseline | | | | |
| | Regional & Remote | -0.271*** (0.038) | -0.051*** [-0.065, -0.038] | -0.228*** (0.056) | -0.020*** [-0.029, -0.011] |
| Gender | Female – Baseline | | | | |
| | Male | 0.407*** (0.025) | 0.080*** [0.070, 0.090] | 0.380*** (0.036) | 0.035*** [0.029, 0.042] |
| Age | 18-20 – Baseline | | | | |
| | 21-24 | -0.126*** (0.036) | -0.025*** [-0.039, -0.011] | 0.234*** (0.051) | 0.022*** [0.013, 0.032] |
| | 25-29 | -0.490*** (0.052) | -0.092*** [-0.110, -0.074] | 0.100 (0.071) | 0.009 [-0.004, 0.022] |
| | 30-39 | -0.917*** (0.069) | -0.160*** [-0.180, -0.139] | -0.195* (0.093) | -0.016* [-0.030, -0.002] |
| | 40-49 | -0.942*** (0.098) | -0.163*** [-0.191, -0.135] | -0.331* (0.133) | -0.026** [-0.044, -0.008] |
| | 50 & over | -0.998*** (0.144) | -0.171*** [-0.211, -0.131] | -0.585** (0.203) | -0.042*** [-0.064, -0.019] |
| Attendance type | Full-time – baseline | | | | |
| | Part-time | 0.562*** (0.029) | 0.112*** [0.100, 0.123] | 0.618*** (0.038) | 0.062*** [0.054, 0.070] |
| ATAR | No ATAR – baseline | | | | |
| | Below 50 | 1.035*** (0.050) | 0.231*** [0.209, 0.253] | 0.557*** (0.066) | 0.063*** [0.047, 0.079] |
| | 50-59 | 0.600*** (0.042) | 0.132*** [0.114, 0.150] | 0.340*** (0.060) | 0.036*** [0.023, 0.049] |
| | 60-69 | 0.056 (0.041) | 0.012 [-0.005, 0.028] | -0.040 (0.063) | -0.004 [-0.015, 0.008] |

| | | | | | |
|----------|------------------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| | 70-79 | -0.490*** (0.045) | -0.093*** [-0.110, -0.077] | -0.377*** (0.072) | -0.031*** [-0.041, -0.020] |
| | 80-89 | -1.196*** (0.063) | -0.195*** [-0.212, -0.179] | -0.949*** (0.111) | -0.062*** [-0.073, -0.052] |
| | 90-99.95 | -2.050*** (0.130) | -0.269*** [-0.287, -0.251] | -1.752*** (0.249) | -0.087*** [-0.099, -0.075] |
| Controls | Broad field of education (9) | Yes | | Yes | |
| | Campus geography (3) | Yes | | Yes | |
| | Intercept | -0.541*** (0.099) | | -2.344*** (0.141) | |
| | Observations | 37,079 | | 37,079 | |
| | Pseudo- R^2 (McFadden's) | 0.117 | | 0.076 | |
| | Null deviance | 47,232.14 | | 25,256.08 | |
| | Model deviance | 41,723.07 | | 23,344.34 | |
| | $Prob > \chi^2$ | 0 | | 0 | |

Notes: * P<0.05, ** P<0.01, *** P<0.001

Standard errors of the estimate are shown in parentheses, and 95% confidence intervals of the AME's are shown in brackets.