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An Analysis of Student Engagement When Taught In classes of Different Sizes in Rural, Regional and Metropolitan Campuses Of an Australian University.

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This study investigates the impact of class size on student engagement and student performance. It is based on an analysis of student university enter scores, student grades and student evaluations in metropolitan, regional and rural campuses of an Australian university during trimester 1 of years 2008, 9 & 10. Past literature appears to support the predominant influence of the class size effect on learning, though some findings are mixed and inconclusive. Contrary to the accepted view that higher entry level scores result in higher grades and, conversely, lower entry level scores result in lower grades, the findings suggest that factors other than entry level scores, contribute to student outcomes and student engagement. The study reveals that student satisfaction of teaching quality is higher in the rural and regional campuses where the cohorts are smaller than at the metropolitan campus. This may be an indication that class size seems to have a predominant influence on student engagement and learning outcomes.

Field of Research: Student engagement

Keywords: Class size, Student engagement, Student performance, Learning environment, Victorian ENTER scores.

1. Introduction

This study investigates the impact of the size of classes on student outcomes in an Australian university (The University) that has three campuses: a metropolitan, a regional and a rural campus. The genesis of the research is the ongoing debate among academics as to whether there is a correlation between class size and student learning outcomes as reflected in student grades and student evaluation of their teaching and learning experiences.

This research was undertaken in the Business Faculty of The University. Students undertake tencore units, available on and offcampus, as part of their Bachelor of Commerce degree. Each unit has a common curriculum taught on all campuses with identical assessment across all campuses. Core units on the Metro campus are large with cohorts of over 500 students. The unit coordinator is often the unit chair and has the responsibility for designing the course guide, web site for learning (similar to WebCT), assignments, examinations, marking guides and all other administration details to do with teaching staff, other campuses, students and partner

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institutions which are also delivering the same unit. Often, these administration roles necessitate the academic being able to take only some lectures and possibly no tutorials.

The teaching staff in the core units at the Metro campus can be made up of 10 or more full time and part time teaching staff. Communication from the coordinator to the large teaching staff and then down to the student can be difficult at times. Since The University provides a large range of online resources, it has been suggested anecdotally that Metro campus students are often inclined to use these online teaching resources rather than regularly attend face to face classes.

In the case of the Regional campus, it is usual for students in core units to be taught by the same regional academic in all of the lectures, however, since most core units at the Regional campus have over 200 students, two or three part time tutors are employed to take tutorials. On the Rural campus classes are smaller in the core units where often around 50 students are enrolled, so it is usual for one academic to teach and deliver all lectures and tutorials in that core unit.

The aim of this research is to assess the validity of the past research findings in relation to the teaching and learning outcomes of the target university by investigating whether there is a link between class numbers and student performance and if so why does this link exist? The research is directed by two main research questions:

1. Are there differences in the student grades between different campuses?
2. Is there a relationship between student grades and student evaluation of teaching of units

2. Literature Review

The higher education (HE) landscape in Australia has changed dramatically over the past two decades. The changes were driven by a number of interrelated factors such as the intervention of government, the growth and diversity of the student population, varying expectations of students of their study outcomes, the impact of information and communication technology (ICT), increasing acceptance of the need to prepare students for the global knowledge economy and above all the competitive nature of the higher education market. Additionally, with higher education being made available to a greater percentage of the domestic and international population, today's university classes are increasingly becoming larger and more diverse than they once were and thus these changes present significant pedagogical challenges.

One of the major challenges facing universities is to maintain uniform academic standards across all student groups in order to promote positive student engagement. Many university campuses are currently faced with the problem of large classes and the pedagogical challenges related to teaching in large classes have been documented by many researchers. Most of the research done in the last decade appears to support the predominant influence of the size effect on learning though some findings are mixed and inconclusive.

Following a meta-analysis of the impact of class size on student achievement, Glass and Smith (1979) conclude that there is a significant relationship between class size

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and student achievement and smaller classes provide better learning outcomes. In contrast, large classes with limited teacher and peer interactions, a high level of student anonymity, and a didactic teaching approach produce low motivation and engagement among students.

Similarly, Nye et al (2001), based on a four year project in the USA, report that students in smaller classes are more engaged and perform better than in larger classes. The participatory nature, higher peer interactions within classes and the personal attention given to students by teachers make smaller classes more effective than larger classes in motivating students, thus producing attitudinal changes and enhancing higher order thinking and reasoning. Tran (2008) and Lacina (2002) contend that lecturers with closer interaction and continuous dialogue with students play a significant role in enhancing student engagement with their academic studies. These levels of engagement are generally found in smaller university campuses and smaller classes.

Other researchers, however, disagree on the actual effect of class size and argue that several other factors can influence student engagement in classes and hence the learning outcomes. For example, Gilbert (1995) contends that what is going on in the class room is more important for student learning than the size of the class. His research indicates that class size has only a minimal effect on higher order reasoning and motivation of students and no effect at all on student grades. He further contends that the effect of class size is more relevant to first year undergraduates who are in need of greater personal attention during the early stages of transition to the higher education environment, which are the group that we shall be researching.

Experienced senior students, in contrast, appear to show a preference for larger classes as instructor effectiveness has been found to be as good or better in the best large classes as in the best small classes. Blatchford and Mortimore (1994) support this view as they found no consistent evidence to suggest that learning outcomes are linked to class size except to the contrary in that larger classes can lead to better learning outcomes. Some early researchers, while acknowledging the challenges of teaching in large classes stress that learning outcomes are based on a complex number of factors such as instructor effectiveness (Gilbert 1995), learning centred campuses (Barr and Tagg 1995), classroom techniques (Kezar, 2000) and student approaches to learning and engagement to tasks (Biggs, 1999). Devlin et al (2009) view teaching quality as multidimensional and that the institutional environment plays a major role in teaching quality and student learning outcomes.

While there is debate on what kind of teaching encourages effective learning (Biggs 2003), there is strong agreement among some researchers that teaching which enhances positive student engagement in learning is a major determinant of high quality learning outcomes (ACER, 2008). According to the findings of the Australian Survey of Student Engagement (AUSSE), student engagement encompasses aspects of teaching as well as "broader student experience, learners' lives beyond university and the institutional support" (AUSSE 2010,p3). Devlin et al (2009) argue that the nature and the degree of student engagement are largely dependent on the capacity for universities and staff to create an environment in which students are involved in the constructing their own learning. Such involvement by students will lead to active participation in lifelong learning opportunities after graduation and the acquisition of skills, tools and experiences that could be used to enhance career

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opportunities in the knowledge economy(Chalmers, 2007). Issues such as quality and innovative teaching, student feedback, curricula and assessment practices, use of technology and institutional support are part of the reform agenda of universities to sustain a learning environment where students are engaged in their learning(Devlin et al., 2009). Good learning outcomes are therefore the result of quality teaching and the learning environment that students experience in universities.

3. Methodology

The research in this study sought to examine nine of the ten coreunits of the Bachelor of Commerce degree offered by 'The University' using quantitative data obtained from public data available from various departments within the university. The sample size was 22,223 student responses over the three year period, which was deemed to be of significant size for a study of this nature by the research team. To the best of our knowledge no similar study has been carried out in a Victorian university covering Metropolitan, Regional and Rural campuses.

The study investigated three areas:

- The number of students who responded to (Student Evaluation of Teaching Units [SETU] requests as a percentage of the total campus cohort.
- The academic results of students by unit/campus and their ENTER scores.
- A comparison of campus academic results with the SETU findings to determine if there are correlations between the size of the cohort and student engagement and outcomes.

The study concentrated on identifying whether student engagement differs across different cohorts at the Metro, Regional and Rural campuses of The University . The base data used was:

1. The SETU information from Trimester 1 of 2008, 2009 and 2010. Students were asked to rank their agreement of comments. The specific areas of analysis from this data were:
 - Question 1. This unit was well taught.
 - Question 5. The teaching staff gave me helpful feedback and
 - Question 7. I would recommend this unit to other students.
2. ENTER scores which are publically available and identify specific entry level scores for the Metro, Regional and Rural campuses for 2008-2010.
3. Academic results. Overall student results were obtained from The University. Data was aggregated for anonymity and there were no student identifiers, hence no ethics approval was required.

The following hypotheses were tested in the study:

1. H_0 - The distribution of grades is independent of campus.
 H_1 - The distribution of grades is dependent on campus

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- 2.H₀. There is no relationship between the SETU response rate and the campus.
 H₁ - There is a relationship between the SETU response rate and the campus.

All data was collected in SPSS and Excel format for analysis.

Limitations

Small class sizes at the Rural campus make it difficult to generalise results, however they can provide indicative results. A further limitation is in the mix of students. The Metro campus has a large International population and for many, English is not their first language so there may be inherent issues with their learning outside of class size. Both the Regional and Rural campuses have a much lower percentage of international students compared to the Metro campus.

4. Results and Discussion

4.1 Student Grades across Campus

With regard to the impact of the campus size on student performance (Grades), results indicate that there is a significant relationship between campus and grades (p -value < 0.05) (see Table 1 & 2). The Rural campus appears to have a more even distribution of grades and a higher percentage of Higher Distinction grades (HD)s whereas the other campuses have a higher percentage of credit grades (C) relative to the remaining grades. The Rural campus has a higher percentage of HDs and fails (N), whereas the Metro and Regional campuses have a higher percentage of Cs, therefore the null hypothesis is rejected and alternate hypothesis accepted: the distribution of grades is dependent on campus.

Table 1: Campus and student Grades- Cross tabulation

Campus Location	HD	D	C	P	N	Totals
Metropolitan count	1709	3769	4780	3910	2985	17153
Metropolitan Percentages	10.0%	22.0%	27.9%	22.8%	17.4%	100.0%
Regional count	503	895	1144	905	816	4263
Regional Percentages	11.8%	21.0%	26.8%	21.2%	19.1%	100.0%
Rural count	108	158	191	177	173	807
Rural Percentages	13.4%	19.6%	23.7%	21.9%	21.4%	100.0%
Total count	2320	4822	6115	4992	3974	22223
Total Percentages	10.4%	21.7%	27.5%	22.5%	17.9%	100.0%

Grade data provided is based on all first trimester on campus units associated with Bachelor Commerce core units. Average percentage distributions aggregated over all first trimester first year units 2008 to 2010 comprising the Bachelor Commerce course.

Table 2: Campus and Student grades - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.565 ^a	8	.000
N of Valid Cases	22223		

4.1 Student Grades and SETU Data

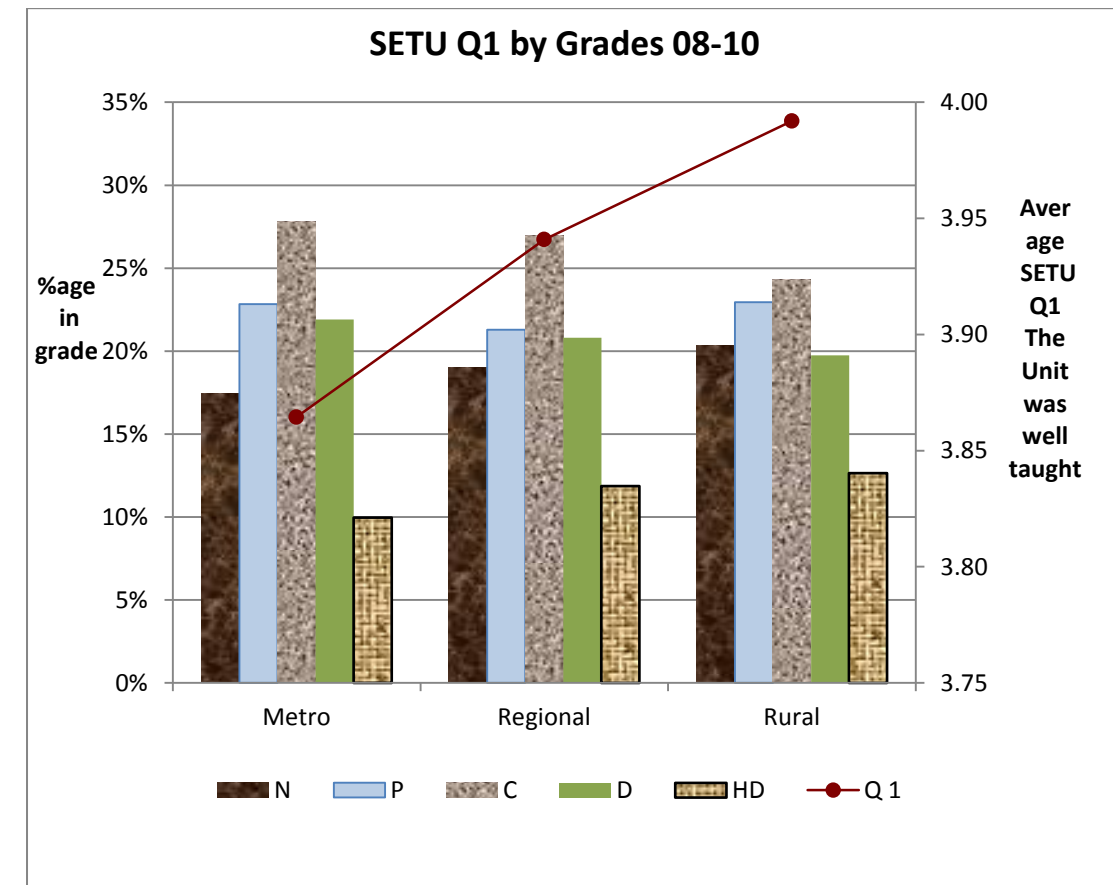
Grade data is based on all first trimester on campus core units associated with Bachelor of Commerce units. An average percentage of distributions taken over the three individual years with yearly data aggregated over all first trimester first year units comprising the Bachelor Commerce courseis used.

SETU results were obtained for the unit level, on campus Bachelor Commerce units.

The Average was taken over the three individual years with yearly data aggregated over all units.

As Figure 4.1 indicates, the average score for SETU Question 1: ‘The unit was well taught’ distinctly improves when moving from Metro to Regional to Rural campuses, indicating that students are likely to be more satisfied with the teaching and the feedback they receive from their teachers in the Rural and Regional campuses where the cohorts are smaller, than at the Metro campus.

Figure 1: Student Grades and SETU data



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4.2 SETU Response Rate and Campus

In determining whether there are significant differences in the response rates of students to the SETU at the three campuses, results indicate that a significant relationship does exist between campus and the SETU response rate (with a p-value of 0.000) as shown in Tables 4.3 & 4.4 (below). The Rural campus has a higher response rate than the Regional campus and the Regional campus has a higher response rate than the Metro campus. As a result, the alternative hypothesis: there is a relationship between the SETU response rate and the campus, is accepted.

Table 3: Campus * Response Cross tabulation

Campus Location	Didn't respond to evaluation request	Did complete evaluation survey	Totals
Metropolitan count	11355	5798	17153
Metropolitan Percentages	66.2%	33.8%	100.0%
Regional count	2374	1889	4263
Regional Percentages	55.7%	44.3%	100.0%
Rural count	408	399	807
Rural Percentages	50.6%	49.4%	100.0%
Total count	14156	8067	22223
Total Percentages	63.7%	36.3%	100.0%

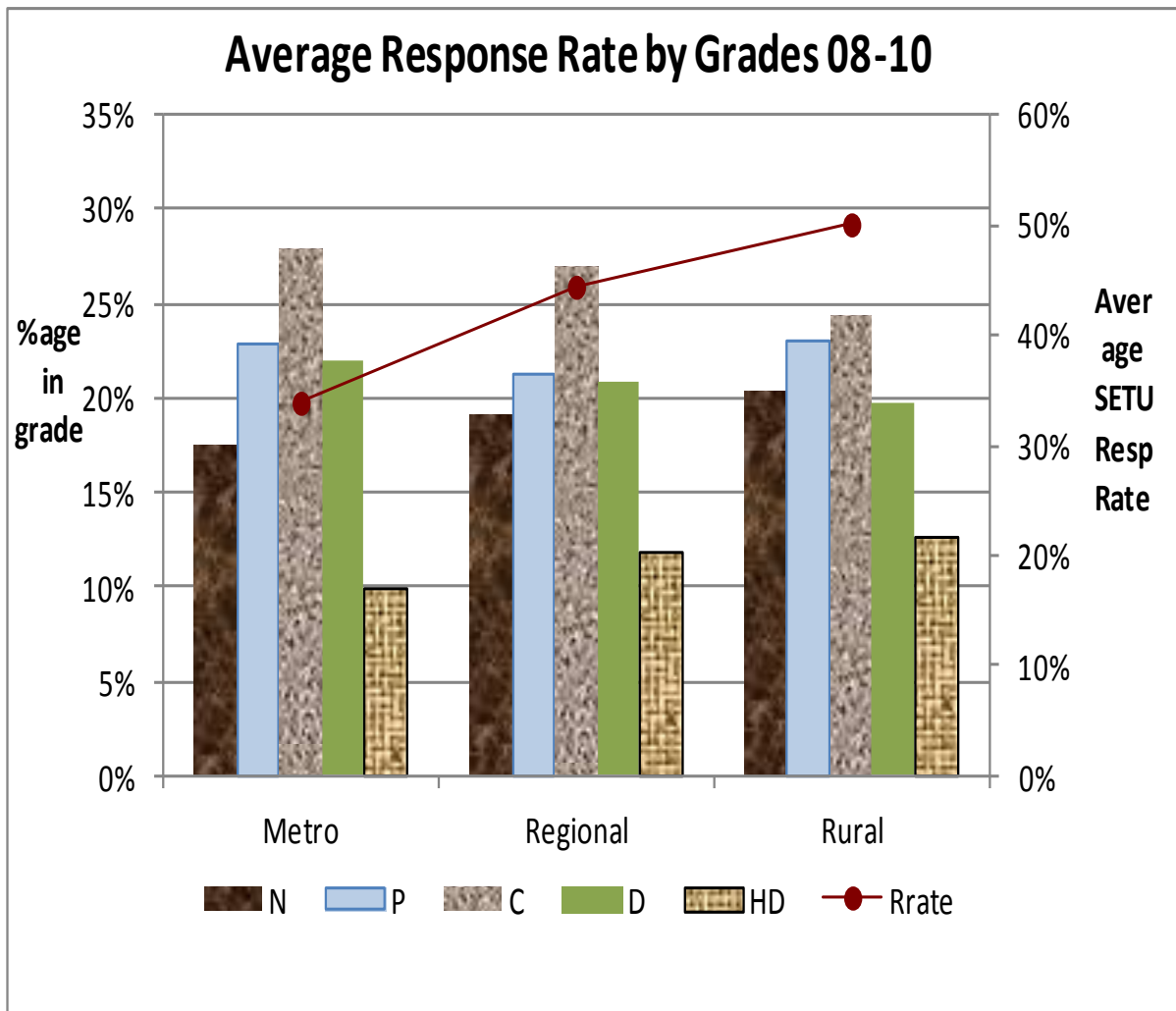
Table 4: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	198.741 ^a	2	.000
N of Valid Cases	22223		

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The average response rate to the SETU questionnaire also improves progressively from the Metro to the Regional then to the Rural campuses. It does appear from Figure 2(below) that the smaller the campus the better the response rate. Anecdotal evidence suggests that the response rate is a good indicator of student attendance and engagement rates in lectures and tutorials. If this is the case, then the results indicate that in 'Face To Face' teaching situations, students on the Rural Campus are the most engaged and that Regional students are more engaged than Metro students.

Figure 2: Average Grades and SETU response rates

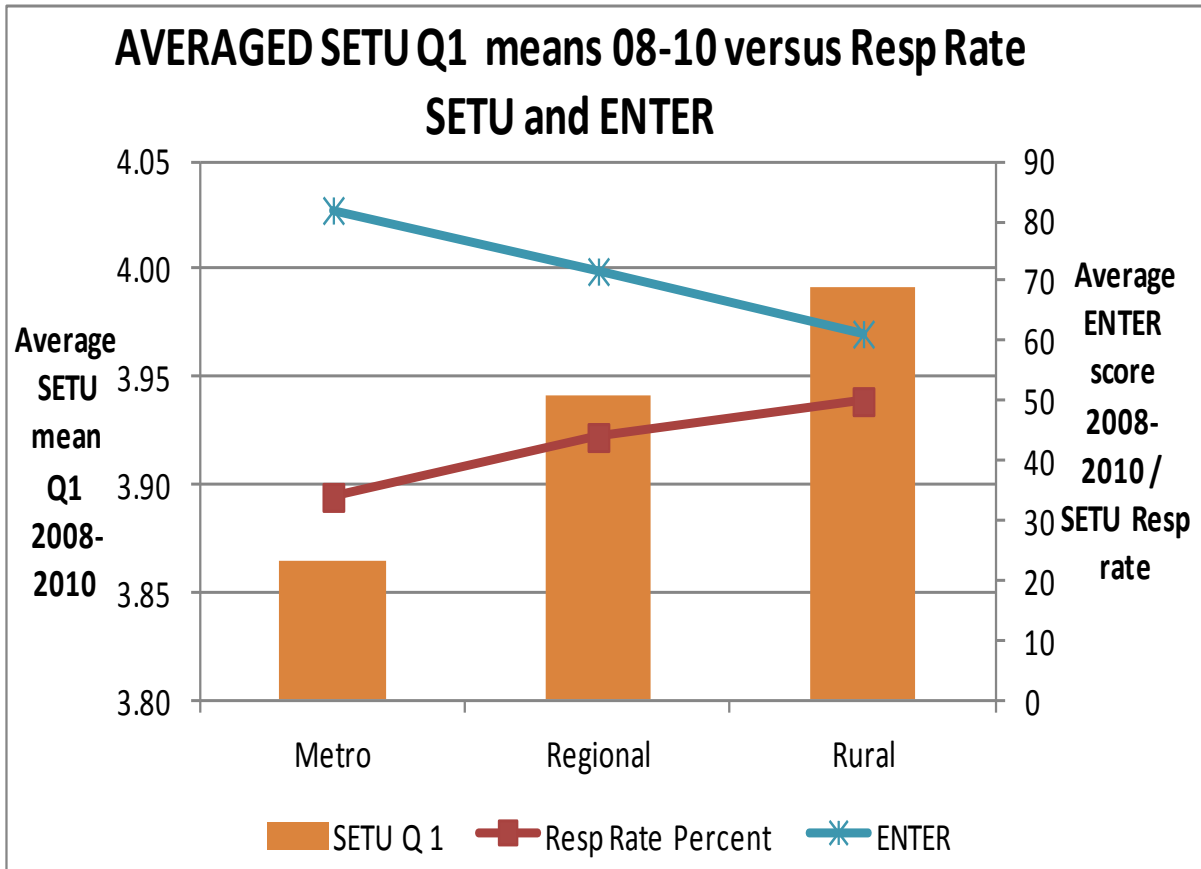


4.3 Average Responses to SETU Q1, ENTER Scores and Q1 Results

The chart below demonstrates the clear improvement in the SETU survey feedback for question one (Q1) as well as increased response rates as one moves from the Metro to the Regional to the Rural campuses. In contrast the average Median ENTER of the past three years for the Bachelor of Commerce declines by virtually 10 points as one moves from the Metro to the Regional and Rural campuses.

The higher response rates and higher satisfactions rates with the quality of their teaching at country campuses indicates that even with lower enter scores, students can be still be successfully engaged in their learning process.

Figure 3: Average responses to SETU Q1, ENTER scores and Q1 Results

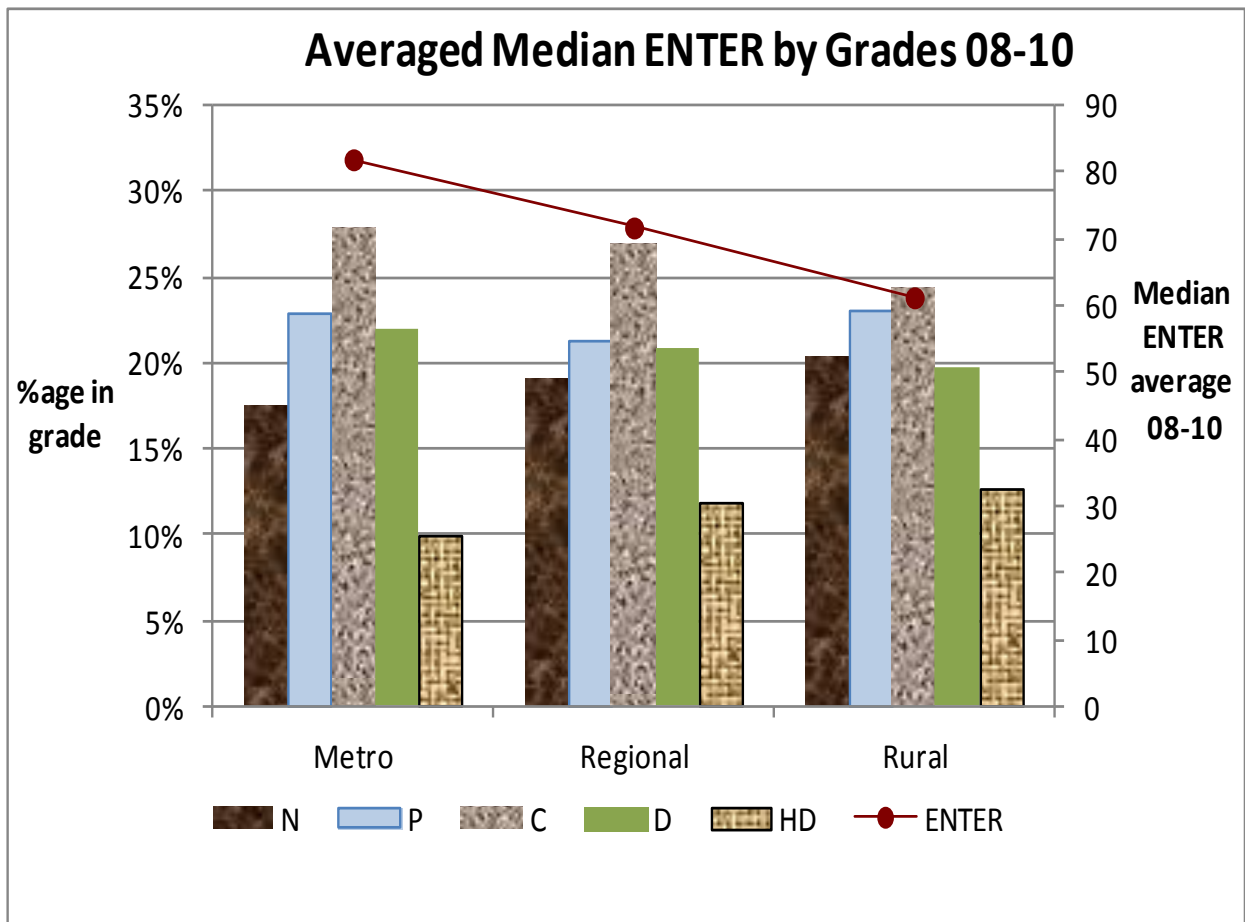


The interest in these responses is that students from our Metro campus with a higher ENTER score are less enamoured with the teaching experience provided to them than the Regional and Rural campus students. If the curriculum is the same; the assignments are the same; the marking is cross campus and moderated, then one of two things can be at play here: class size engagement or staff engagement with the class. Of great interest is that this data is from the first trimester of the students first year of study when one would expect students to be most eager in their studies and the contrast between students' experiences of university should be less marked.

4.4 Average Median ENTER by Campus and Grades

Figure 4(below) shows the Median ENTER scores attained by those commencing the Bachelor of Commerce course at the Metro, Regional and Rural campuses. The Median ENTER scores are 82 (Metro), 72 (Regional) and 62 (Rural). Despite having ENTER scores 20 points less than Metro, Rural High Distinctions (HDs) are higher than at Metro and also higher than Regional. The main correlation appears to be that the higher the enter score the more likely that a credit average will be achieved.

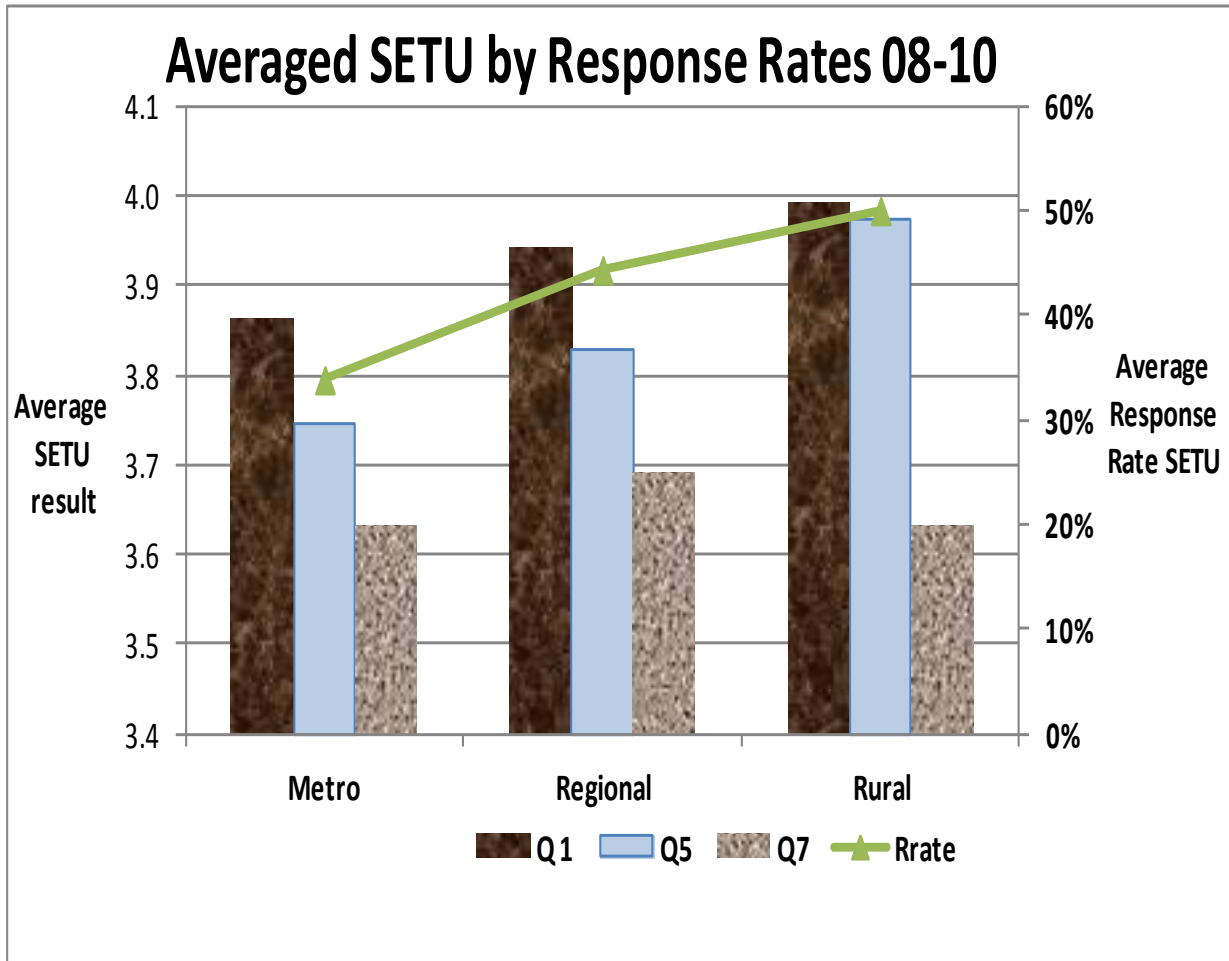
Figure 4: Average Median ENTER by Campus and Grades



4.5 Average SETU results by Question, Response Rate and Campus

Figure 5 consolidates the results of the three key SETU questions and Average SETU response rate by campus. It demonstrates the improved SETU results and response rates as one moves from the Metro to Regional to Rural campuses. Not only do students at the Rural campus have a higher rating than both Metropolitan and Regional campuses on Q1 (the unit was well taught) but also on Q 5 as well (the teaching staff gave me useful feedback). Q7 (I would recommend this unit to others) showed little difference between the Metro campus and the Rural campus with the Regional campus recording the highest response rate for this question.

Figure 5: Average SETU results by Question 1, 5 & 7, Response Rate and Campus.



5. Conclusions and Recommendations

This research sought to determine if there were differences in respect to the size of class and student engagement with the education process. Anecdotal evidence suggested that there might be some validity to the belief that smaller class sizes produce not only greater engagement but that Regional and Rural students might appreciate and value their classes more so than their Metro counterparts.

The comparative analysis of this research data confirmed this belief. The results suggest that as one moves from the larger classes of the metropolis to the more intimate regional and rural classes, students tend to respond better to the educational experiences that they receive. This is evidenced by higher than expected academic results, higher student engagement in the unit evaluation process and satisfaction with the quality of the teaching.

According to Gilbert (1995) the effect of class size is more relevant to first year undergraduates who are in need of greater personal attention during the early stages of transition to higher education environment. This research supports Gilbert's (1995) findings. Students at Rural and Regional campuses with smaller class sizes are more likely to have closer relationships with staff. As a result of this closer contact with staff, students are more likely to achieve higher grades than their ENTER

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scores would indicate; they are more likely to be engaged; readily respond to unit evaluation surveys and be more satisfied overall with the quality of their teaching. They appear to feel supported and this feeling in turn produces results that are counterintuitive to what one would expect based on ENTER scores alone.

The small number of students at the Rural campus is a limitation of this research, making it difficult to generalise findings, however it appears that in respect to SETU responses the further from the Metro campus that one is educated, the more students appear to value the educational experiences provided.

This research is in one university across one trimester across 3 years of core offerings in that trimester, so it is limited in its applicability. Further research is required to determine whether these findings are consistent across other universities of a similar profile and one needs to consider what other factors might affect student engagement and outcomes in these situations.

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