

Marked for success –
secondary school
performance and university
achievement

Keith Comer, Erik Brogt
& Kaylene Sampson

Academic Development Group
University of Canterbury

Overview

- Background and context
- Biological sciences
- Methods
- Results
- Discussion

Scope and aim

- Inform policy, in particular enrolment policy
- Curriculum / academic development
- Scholarship of Teaching and Learning

New Zealand tertiary system

- Funding capped for domestic students
- Economic downturn increases enrolments
- Tertiary Education Commission published league tables on completion of courses, completion of qualifications, progression to higher level study, students retained in study

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Consequence

- Pressure to enroll selectively, **but...**
- University Entrance requirements are set nationally, **however...**
- Universities can limit entry to programmes based on secondary or tertiary performance

NCEA best-80

- National Certificate of Educational Achievement introduced in 2004
- Domains typically have 24 credits
- UE = 42 credits (2 “domains” of 14 + 14)
- Excellence, Merit, Achieve
- Best 80 credits from 5 domains: E=4, M=3, A=2
- Range of scores: 56 - 320

Limitation of entry

- Programme entry based on best-80 score
- Canterbury committed to open entry: “Firm but fair”
- However, it is useful to examine factors that are associated with tertiary success to better inform secondary students as to their preparation

Case study: Biological Sciences

- Interested in advice to secondary schools in terms of preparation
- 3 core courses in first year
 - BIOL 111: Cellular biology and biochemistry
 - BIOL 112: Ecology, evolution and conservation
 - BIOL 113: Diversity of life

Previous work

- Compare secondary to tertiary performance
 - Based on number of credits only
- Focus groups with students
 - Potential issues with English, Maths with Stats
- Statistical analysis showed no association
- Credits, domain status in Biology, Chemistry did show associations

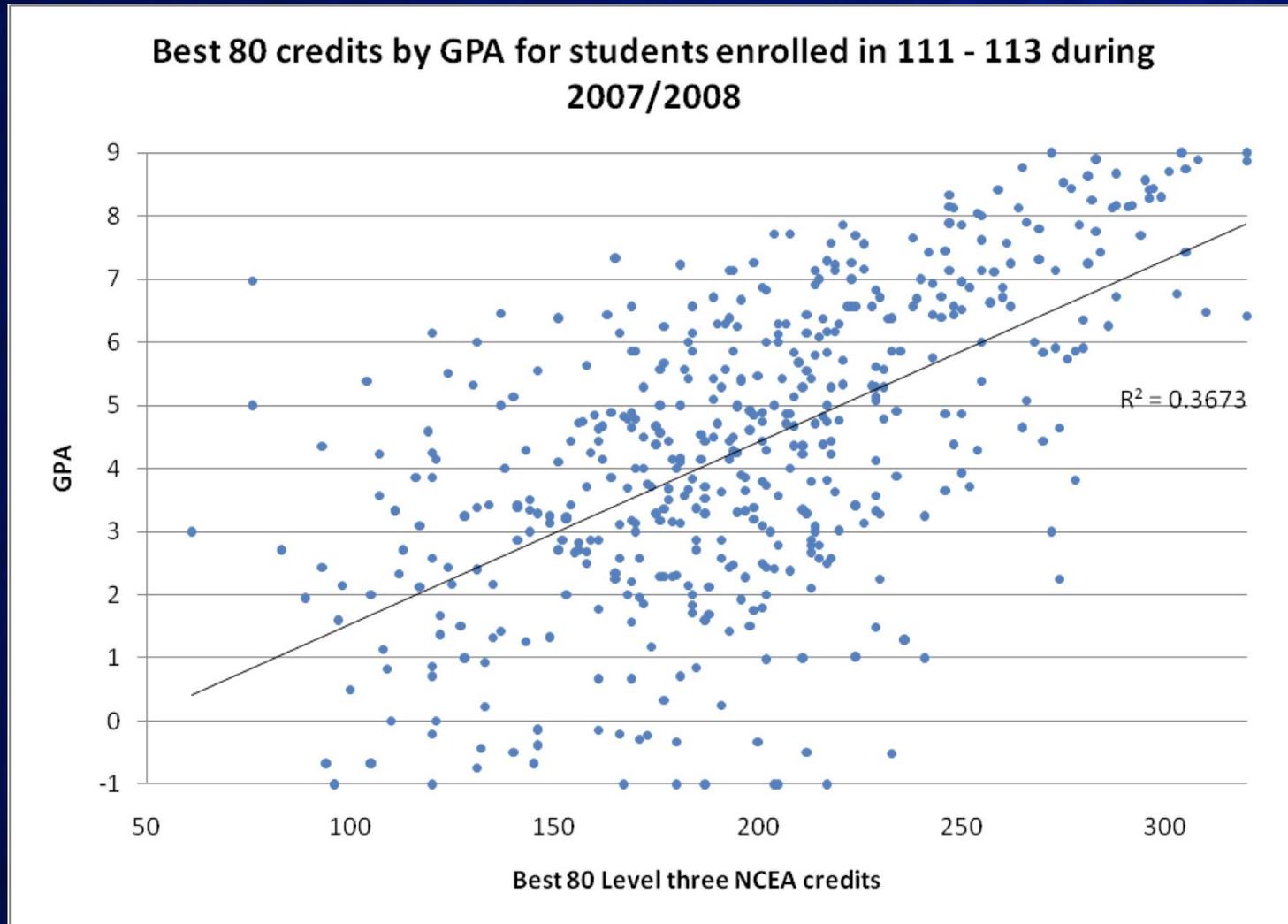
Methods

- Broad to focused analyses
 - Best-80 versus GPA
 - Best-80 versus outcome grade in biology courses
 - Secondary pathway versus outcome grade in biology courses

Data

- 448 student records
 - Partial NCEA records
 - University GPA
 - Grades in BIOL 111, 112, 113 in 2007 / 2008

Results: Best-80 versus GPA



Results: Best-80 versus outcome grade

Course	N - cases	Spearman	R ²	P
BIOL 111	341	.57	.32	<.001
BIOL 112	272	.51	.26	<.001
BIOL 113	271	.53	.28	<.001

Recall best-80 versus GPA: $r = .61$

Pathway versus outcome grade

- Four groups:
 - Chemistry + Biology domain
 - Chemistry domain only
 - Biology domain only
 - Neither domain

Analysis

- Chi-squared analysis on grade distributions

	Biology	Chemistry
BIOL 111	Weak	Strong
BIOL 112	Moderate	Moderate
BIOL 113	Weak	Strong

Analysis

- Chi-squared analysis on grade distributions
- ANCOVA
 - Correlate best-80 with outcome grades by domain group per course
 - Remove non-significant groups
 - Control for best-80

Results

Pearson Correlation Coefficients

Course	Chem + Biol	Chem only	Biol only	Neither
BIOL 111	.61	.46	.38	ns
BIOL 112	.54	ns	.51	ns
BIOL 113	.72	ns	.45	ns

Results: BIOL 111

Course	Chem + Biol	Chem only	Biol only	Neither
BIOL 111	.61	.46	.38	ns

- Significant group membership
 - Chem + Biol versus Biol only
- No significant interaction group * best-80
- Explained variance: .38

Results: BIOL 112

Course	Chem + Biol	Chem only	Biol only	Neither
BIOL 112	.54	ns	.51	ns

- No significant group membership
- No significant interaction group * best-80
- Explained variance: .36

Results: BIOL 113

Course	Chem + Biol	Chem only	Biol only	Neither
BIOL 113	.72	ns	.45	ns

- Significant group membership
 - Chem + Biol versus Biol only
- *Significant interaction* group * best-80
- Explained variance: .45

Summary

- Higher best-80 scores associated with higher performance
 - “Success predicts success”
- Analysis of secondary pathway explains slightly more variance
 - Need to control for secondary performance
- Secondary school chemistry more beneficial than biology for first year biology

That's all nice, but...

- Correlations in the order of $r = 0.6$
- Not all students enter university via NCEA

Major confound:

- Failing grades (E) include no-show students

Questions

- Are the secondary performance indicators sufficiently robust to base enrolment policy on?
- How do we ensure equity in enrolment for students not entering via NCEA?
- Should students be required to have a particular secondary pathway preparation?