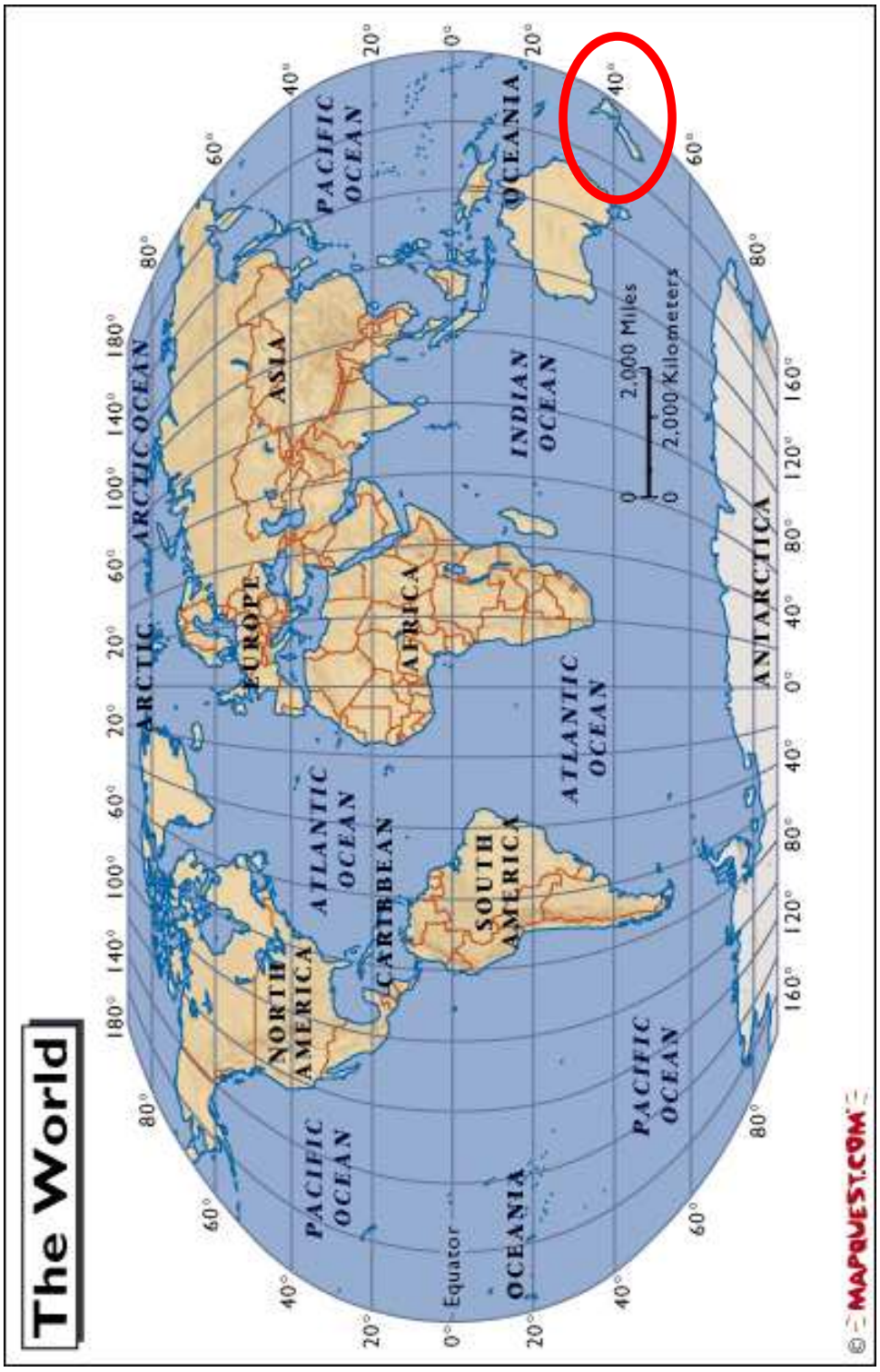
New Zealand


The World
PACIFIC OCEAN
ARCTIC OCEAN
ASIA
EUROPE
AFRICA
INDIAN OCEAN
OCEANIA
ATLANTIC OCEAN
NORTH AMERICA
CARIBBEAN
SOUTH AMERICA
ANTARCTICA
Equator
2,000 Miles
2,000 Kilometers
MAPQUEST.COM

University of Otago

Our Introductory Programming Course

From 1999: Java, Koffman and Wolz

About 350 students each year

Compulsory for major in Computer Science or Information Science

May be taken as an elective by any student

No prior or concurrent math requirement (or any other requirement for that matter)

Our CS Education Research

Change to Java, change in teaching orientation

Course Coordinator originally a psychologist

I’m originally a piano teacher

Failure rate is high; students who fail often surprised

Observation: “studying hard” has little effect

Started asking “what’s the difference between an effective novice and an ineffective novice?”

Reviewed literature: found the standard stuff on experts vs novices. (Published in *Computer Science Education* as *Learning and Teaching Programming: A review and discussion*, Robins, Rountree and Rountree, 2002 if you’re interested.)

Our Empirical Research

We felt we needed to be able to say what *our* students were like.

Ran a survey over 2 semesters to try to gauge strength associations between background/expectations and success in our course.

Most obvious result:

	Pass	Fail	Total
Answered	345 (73%)	127	472
Did not answer	152 (55%)	124	276
	497 (66%)	251	748

Questions

Gender

Age

Full-time status

Year at university

Major subject

How keen are you to take this paper?

Recent math (school, uni, other, none)

Background (Humanities, Science, Commerce)

Do you know a programming language already?

How difficult do you expect this paper to be?

How much work do you expect this paper to be?

What grade do you expect to get?

Are you going to continue in Computer Science?

Results

All questions **except** gender and full-time status showed some better-than-chance association.

Notably Strong:

80% of students aged 16–18 passed,
72% of 19–21,
54% of 22-24,
74% of 25+

90% of students who expected to get an A passed.

85% of students who said they were extremely keen to sit the paper passed.

68% with school as most recent math passed,
78% with university math passed,
81% who reported “other” passed,
58% of those who reported “none” passed.

Danger Zones and Success Zones

First year:

Not looking for an A and

Not majoring in cosc or info and

Neither “extremely keen” nor “neutral”

Group size: 38, Pass 53%

Second year:

Not looking for an A and

No recent university or “other math”

Group size: 29, Pass 38%

Third year:

Background not reported as science

Group size: 20, Pass 40%

Fourth year:

Don’t know a programming language and

Think difficulty will be same or easier

Group size: 12, Pass 33%

Success Zone

All years:

Expect an A and

Background is science

Group size: 84, Pass 88%

All years:

Expect an A and

Background is science and

Age is 16–18

Group size: 31, Pass 100% (90% B or better)

What Next?

How to get the message across to students?

Aptitude test development

Early mastery tests

Epistemological beliefs

Analogies