



TEACHING & LEARNING
RESEARCH INITIATIVE
NĀU I WHATU TE KĀKAHU, HE TĀNIKO TAKU

Doing research that matters

Dr. Rosemary Hipkins

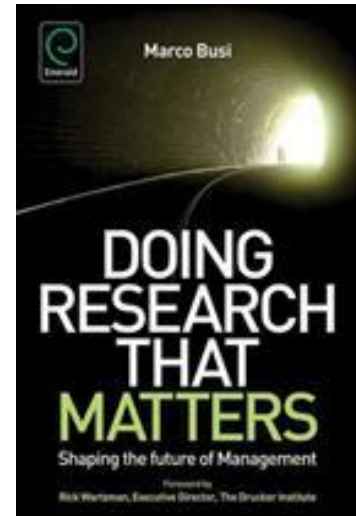
**Presentation at Statistical Education Day, New Zealand
Statistical Association Conference, Wellington,
November 26, 2014**



The challenge

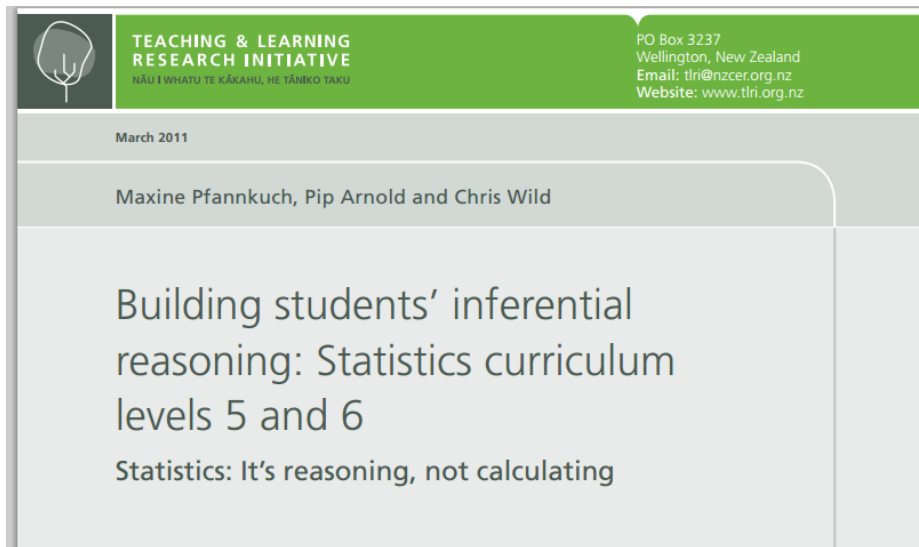
Education is awash with research, with more being done all the time.

How would you define research that matters?



Researchers want their work to matter, so how can we increase the likelihood that it will?

I explored this question by retrospectively investigating two high-impact TLRI projects in statistics education



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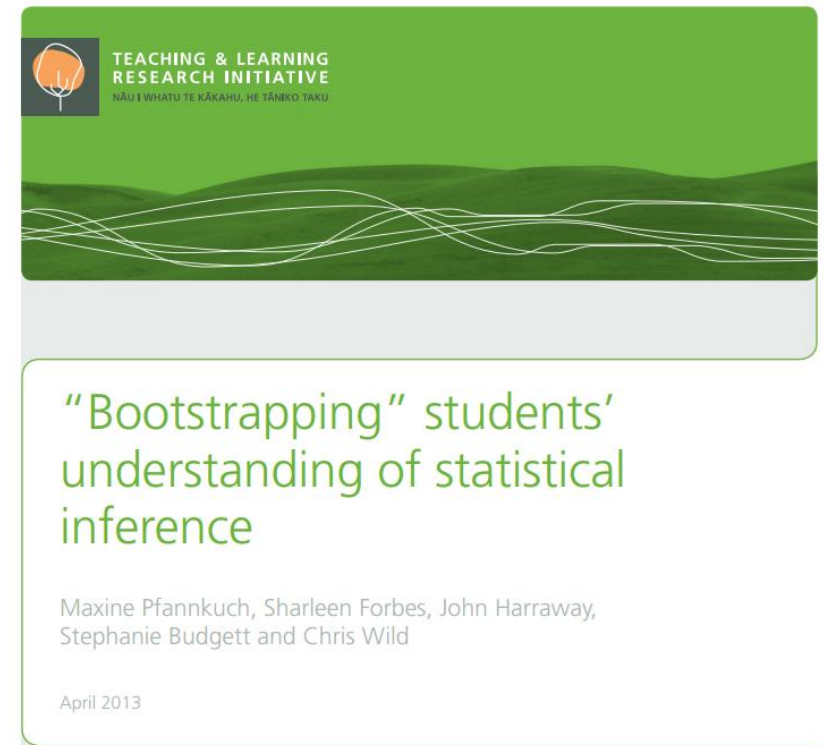
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March 2011

Maxine Pfannkuch, Pip Arnold and Chris Wild

Building students' inferential reasoning: Statistics curriculum levels 5 and 6

Statistics: It's reasoning, not calculating



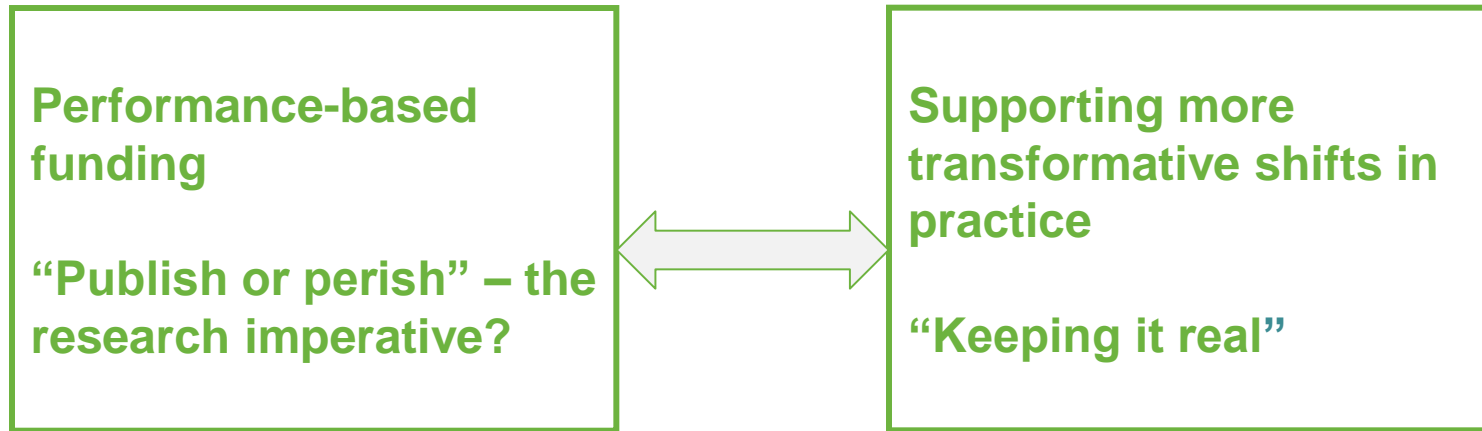
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"Bootstrapping" students' understanding of statistical inference

Maxine Pfannkuch, Sharleen Forbes, John Harraway, Stephanie Budgett and Chris Wild

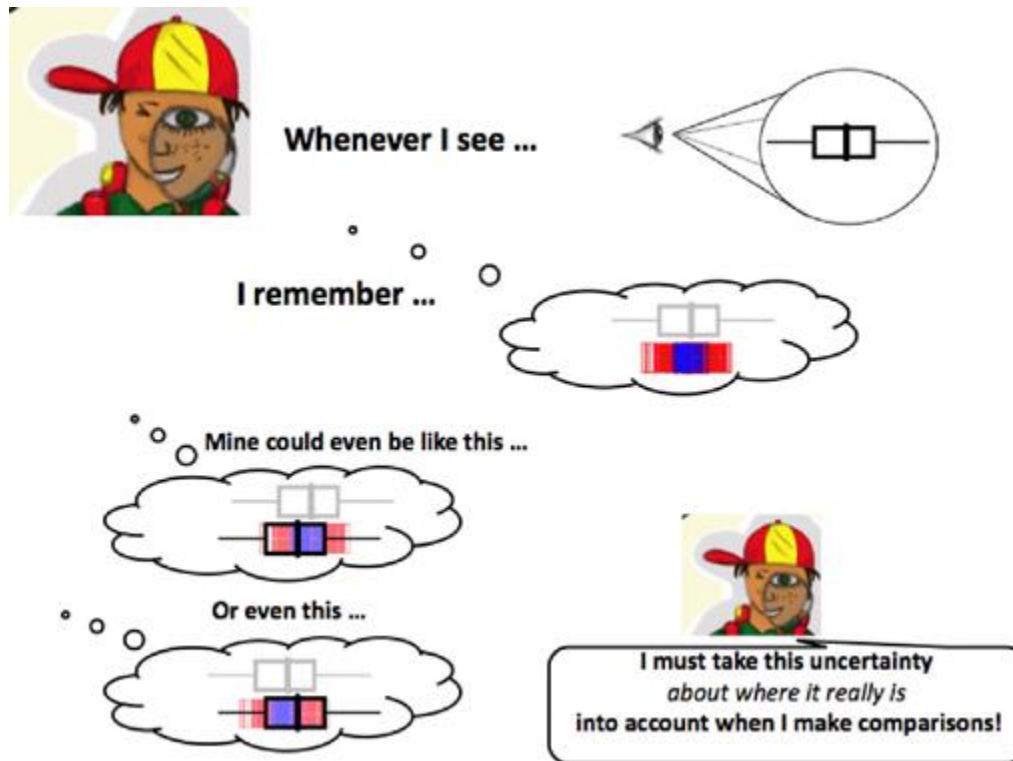
April 2013

Policy settings can create perverse incentives



The idea of **“scholarship in practice”** bridges this unfortunate binary in disciplines such as education (Singer-Gabella, 2011)

1. Beginning with a compelling conception of ends



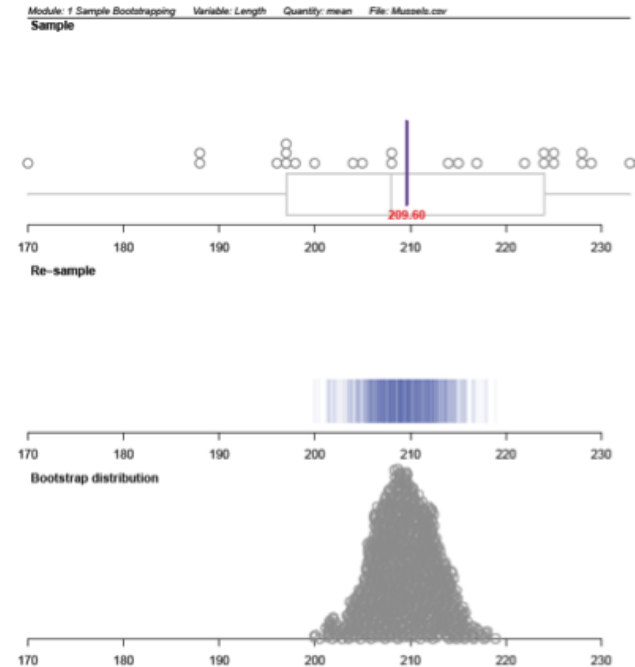
The researchers aimed to support a **wide range** of students to build their **statistical literacy**

2. Designing convincing investigations of practice

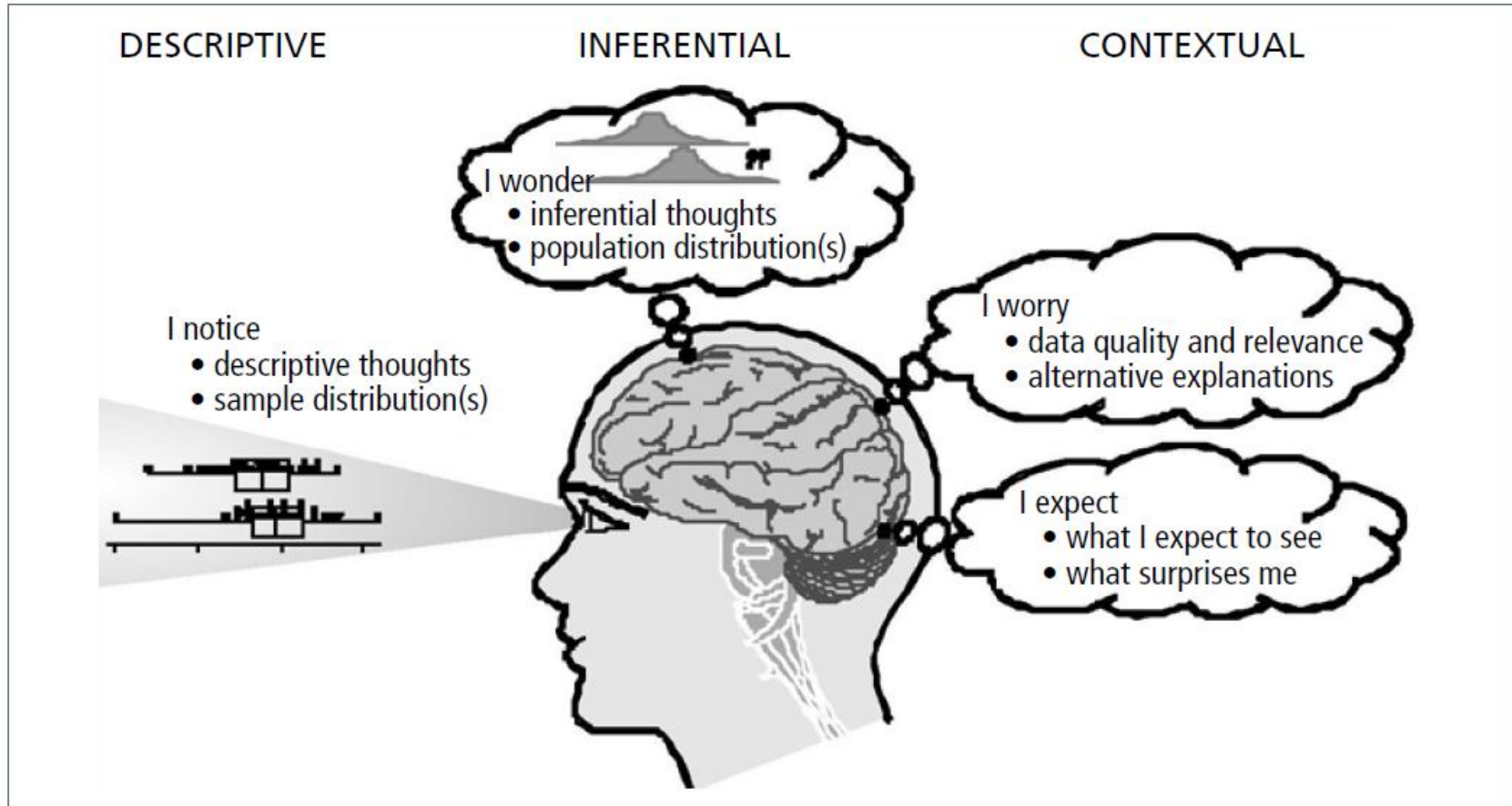
Design research provided a robust methodological framework for testing teaching approaches, including the use of hands-on simulations and animations

Robust **design principles** informed the materials developed

- Avoid cognitive overload
- Direct attention to salient features
- Build familiarity before adding new concepts
- Combine pictorial, verbal and movement elements in key actions



2. Designing convincing investigations of practice (cont): Clear **achievement criteria** underpinned data gathering plan



3. Resources as products of scholarship in practice

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Resources for teaching statistics

Welcome

CensusAtSchool New Zealand – TataurangaKiTeKura Aotearoa aims to be the first port of call for New Zealand teachers looking for information and support for their teaching of statistics. The site contains a large number of original quality teaching resources including workshops, presentations, classroom activities, research papers, interactive data analysis tools, real student data sets and essential links to other statistics websites.

It also facilitates the collection of real, relevant student data through its biennial online census for Years 5-13 as part of the international CensusAtSchool project.

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Term 4 November Updates for Mathematics and Statistics

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Box 2: Generalising the resource production question to other projects

- Will the resource illustrate the scope and reach of a new idea? How will it do this?
- Will the resource open a space for creative imagining of new possibilities? (Who will be involved in this imagining and how will they do it?)
- Will the resource act as a 'thinking object' for teachers or other partners? (Could use of the resource reveal specific instances of cognitive dissonance to prompt a rethinking of personal ideas/practices?) Who will scaffold and prompt the thinking needed to reveal any dissonance in beliefs and practices?
- Could the use of the resource allow practical barriers and challenges to emerge and be debated? Who should participate in these practical learning conversations?

(TLRI Project Plus Report, page 23)

4. Advancing the knowledge and skills of teachers and other educators: TLRI projects require researchers to build genuine **partnerships** with teachers....

I went in with 'old' ideas and was challenged, but I never felt I couldn't argue my case

We weren't just some teachers. We were talented statistics teachers with strong guidance from statisticians in the team

4. Advisors can also play a key **partnership** role as co-researchers, supporters of the teachers, and in wider dissemination ...

It's not just about 'you're a good teacher, you can do this'. You've got to know why and where you are going.

A strength of the TLRI is that it reaches teachers on the periphery, not just the teacher researchers

5. Leveraging change at the policy level...

NZC

redevelopment of statistics strand, with explicit reference to statistical literacy

NCEA

new achievement standards reflect achievement objectives in NZC

Support from education committee of NZ Statistics Association helps achieve both sets of changes



6. Robust reflective critique informs research that matters, and continues to monitor consequences



Traditional scholarship



Scholarship in practice

Maxine and Chris present and debate their work at the Royal Statistical Society in London

Two ways this TLRI Project Plus research could matter:

- Inform new TLRI applications
- Inform IES planning and choices

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from the Ministry of Education

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HOME: News > Launch of the Teacher-led Innovation Fund

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Launch of the Teacher-led Innovation Fund

11 November 2014

The Teacher-led Innovation Fund is now live and teachers can apply for funding on this website.

Part of Investing in Educational Success, \$10m has been made available to help teachers come up with new ways of helping children and young people succeed at school. It will offer them the time and resource to develop and test their research ideas.

Applications for funding in the 2015/16 financial year will close on 20 February 2015 and the first projects will be approved in June 2015.

Hipkins, R. (2014) *Doing research that matters: A success story from statistics education*. Wellington, TLRI Project Plus.

http://www.nzcer.org.nz/system/files/TLRI_Project%20Plus%28v7%29Web.pdf

Pfannkuch, M., Arnold, P., & Wild, C. J. (2011). *Building students' inferential reasoning: Statistics curriculum levels 5 and 6. Statistics: It's reasoning, not calculating*. Retrieved from <http://www.tlri.org.nz/tlri-research/research-completed/schoolsector/building-students-inferential-reasoning-statistics>

Pfannkuch, M., Forbes, S., Harraway, J., Budgett, S., & Wild, C. (2013). *Bootstrapping students' understanding of statistical inference*. Retrieved from http://www.tlri.org.nz/sites/default/files/projects/9295_summary%20report.pdf

Singer-Gabella, M. (2012). Toward scholarship in practice. *Teachers College Record* 114(8), 1-30.