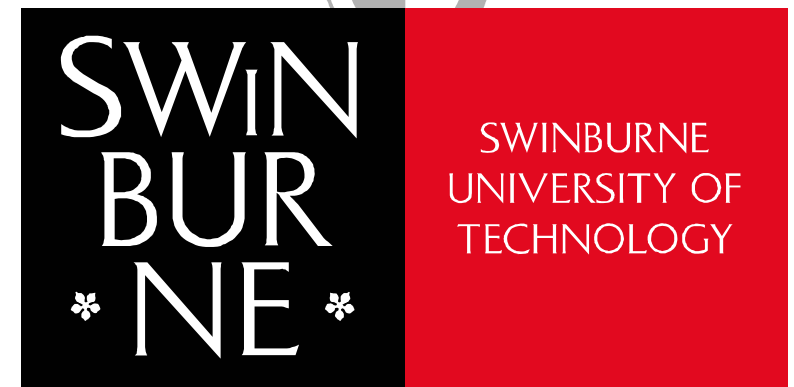


A Report from OZCOTS 2008

Brian Phillips

Australia



OZCOTS 2008

- The 6th Australian Conference on Teaching Statistics, OZCOTS 2008, was held in Melbourne as an overlapping satellite to the AS Conference
- It combined the interests of the Stats Ed Section of the SSAI with activities of
- Helen MacGillivray's Australian Learning and Teaching Council (ALTC) Senior Fellowship.

The OZCOTS 2008 program

- Six invited papers, eighteen contributed papers, and two forums.
- The six invited speakers were members of the Helen's Fellowship international collaborative team
- The meeting was supported by the ASLP fellowship, the ASC and the Victorian Branch of the SSAI.
- The program details are available on the web, see
- <http://sky.scitech.qut.edu.au/~macgilli/ozcots2008//>

The invited papers

- Chris Wild (NZ): “Applied Statistics as a growth engine for statistics programs”
- Rob Gould (USA): “Technological Literacy and Statistics Education: a call for thought and research”
- Peter Petocz (Aus): “On becoming a statistician”
- Adrian Bowman (UK): “Statistical cartoons: the role of graphics in understanding statistics”
- Larry Weldon (Can): “Experience first, logic later”
- Michael Martin (Aus): “What lies beneath: inventing new wheels out of old”

Two forums

- **Forum 1: What resources do university teachers of statistics need and want?**
- **Michael Martin, Larry Weldon, Peter Petocz**



- **Forum 2: Where to from here?**
- **Chris Wild, Rob Gould, Adrian Bowman**



On Cooperation and Competition

Chris Wild, University of Auckland, New Zealand

Three self-evident truths

■ **Competition:**

Where? With whom? How?”

Groups that cannot attract good people and cannot attract students to study in them whither and die.

■ **Cooperation:**

Where? With whom? How?

What are my ‘communities of common interest?

■ **Organisation:** “How can we organise cooperation so that each cooperator can benefit personally?”



Chris Wild 2



- Problems with trying to convert students with no prior interest in introductory statistics courses (St Paul)
- Reputation as being the most mind-numbingly boring on the planet.
- Much historical baggage could be cut – eg hand held calculations, mathematics, other pre-requisites ...
- If the hordes were pounding on our door demanding to be let in, we could afford to lay down very stringent mathematical conditions for entry.

Chris Wild 3



- Bring in bright people from wherever we can find them and design our programmes to enable them to succeed
- Most of us can't realistically work any harder

The only way forward is to be smarter

- Cooperative model at Auckland
- Abandoned individual teaching materials in favour of working collectively on a common product used by all, becomes independent of presenter.

On Becoming a Statistician

Peter Petocz and Anna Reid

Macquarie University, Sydney

- University students generally look beyond their classes and curriculum towards their future professional life.



Peter summarised several components of their research into students' conceptions of statistics, their learning of statistics, and their perceptions of future professional work.

- Question: When did you first feel you were a statistician, and what prompted this?

Peter Petocz 2: Research program



- Used phenomenographic analysis which includes
 - a theory of learning focused on the variation in students' conceptions of any particular phenomenon
 - sees learning as the process of broadening views from narrower or more limited.
- ontological aspects ... broadest conceptions
 - the philosophical study of the nature of being, existence or reality in general, as well as of the basic categories of being and their relations.
- Used student comments

Statistical cartoons: The role of graphics in understanding statistics

Adrian Bowman, The University of Glasgow, Scotland



Aims to

- to make it easy to access gui controls
- to provide specific teaching and learning tools which use these controls

Applications in

- teaching (in lectures)
- learning (by students)
- consulting
- research
- prototyping

Adrian Bowman 2

Use of tcltk package in R software

- Explained how you can apply R functions through buttons, sliders and other types of graphical control.
- In particular plotting activities which allows the user to interact with a plot in a very effective manner.
- The tcltk package provides extensive tools for this, see <http://www.ggobi.org/rgtk2>



What lies beneath: inventing new wheels from old

Michael Martin, Australian National University, Australia

■ What is the problem?

- Impenetrable
- Jargon
- Fear of maths? Fear of stats?
Confidence (no, not the interval!!!)
- Formulas, formulas, formulae
- “Process” over “Thinking”
- Answers are paramount
- “Destination” more important than “journey”
- Counter-intuitive (Monty Hall, Birthday problem, Simpson’s paradox)



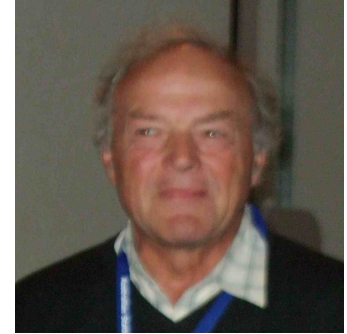
Michael Martin 2



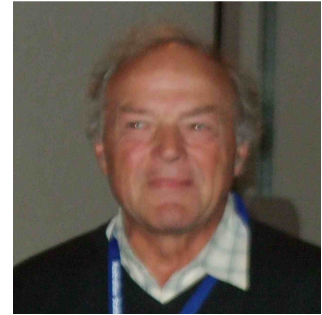
- Less jargon – but how do students then progress into a world where those terms are used freely?
- What do formulae *mean*?
- “Thinking” over “process”
- Intuition – many times it *does* make sense!
- Stories – real world, real life, fun, scary, topical
 - e.g. Statistics cures cholera!
 - Lack of Statistics destroys shuttle!!
- Analogies enrich the learning experience
 - allow previous knowledge and understanding to be “transplanted” into new settings
 - de-mystify statistics by relating it to the familiar

Experience Early, Logic Later

Larry Weldon, Simon Fraser University, Canada



- Statistics educators have been trying to improve undergraduate statistics instruction for decades.
- Some progress – but...
- Textbooks influenced teaching style and content
 - Changed, but not solved the pedagogical problems.
- Wants to encourage a focus on the student motivation for the subject, even at the expense of the usual list of inferential tools.



Larry Weldon 2

- If we want to attract and retain students' interest in statistics, we need to consider charm!
- And, if we want students to understand the whole process of data analysis, we need to give them experience with the whole process of data analysis.
- What seems to be missing is the immersion of students in the entire process of data-based research along with frequent interactivity with the instructor.
- Proposal for new undergraduate statistics course

How Technologically Literate Does a Statistically Literate Person Need to be? *A call for thought and research.*

Robert Gould, UCLA, USA



- Concepts of statistics literacy
 - H.G.Wells 1904 quote
 - ... it is as necessary to be able to compute, to think in averages and maxima and minima, as it is now to be able to read and write.
- Statistics Consumers vs. Statistics Producers
- Regardless of their major, statistics can teach them to better consume and produce data

Robert Gould 2: Students have changed!

- Students now swim in data
- mp3's: manage, process, edit(?)
- Myspace/facebook
- GIS/GPS
- iPhone/Blackberry/cell
- "Personal" data streams aka self-surveillance data
- Twitter



Robert Gould 3: Challenge to the Profession?

- Should we be training data scientists?
- How?
- How do we prepare statisticians for data types and technologies we cannot conceive?
- “Medium is the message”: are “data” and “technology” different concepts?



Forum 1.1: What resources do university teachers of statistics need and want?



Peter Petocz; Larry Weldon; Michael Martin

- Control of area
- Are we statisticians OR statistical educators?
- Controlled by Maths Depts. wrt finances, publishing, respect
- Competition for resources.

Forum 1.2: Need for freedom



- Issues of constraining baggage
- Maths = context-free vs stats = immersed in context
- Need freedom to do what we should be doing
- Need to share across disciplines and get involved in education groups within these.
- Do we see ourselves as teaching statistics or as teaching students to learn statistics?

Forum 1.3: Research Issues



- Stats educ research needs respect.
- Lacks credibility with Maths or Stats or with Education
 - Current ERA journal rankings at B (JSE) and C (SERJ)
- Some suggestions:
 - try publishing in other journals
 - emphasise the importance of research for teaching

Forum 1.4: Some suggestions



- Share resources amongst ourselves?
- No need for anyone to feel isolated – we have a shared purpose. Access resources!
- Use existing material (appropriately acknowledged) rather than trying to reinvent everything
- “What is stats education for?” No unique answer – eg stats in psychology
- Best chance of reaching students is as postgrads
- Use our own stats ed professional group to lobby more

Forum 2: Where to from here?



2.1: NZ School developments - Chris Wild

- Significant and exciting developments at the school level for both primary and secondary school Maths and Stats.
- Significant conceptual change
- Detective posters
- www.censusatschool.org.nz/2008/new-curriculum
- Do teachers have the necessary narrative skills?



Forum 2.2: US college developments - Rob Gould

- A significant component of higher ed is the 2yr college which carries out up-skilling and bridging for low-performing groups of students – have no entry requirements.
- NCTM standards have recently been re-published with a swing away from stats and towards pure maths

Forum 2.3: UK college developments - Adrian Bowman



- The research assessment exercise changes the way people do research - stats doesn't fit easily
- Trends in student numbers indicate that undergrads are not coming into stats
- A move towards 4yr PhD programs including 6mths of coursework is growth area for teaching of stats.
- Academy for P/G Teaching of Stats (APTS) has set up 1wk intensive cross-institutional course

Forum 2.4: Some Australia developments - ABS

- Push towards a National Curriculum – We need to influence what goes into the curriculum (eg CensusAtSchools)
- Concern re decline in students taking up stats
- How can agencies such as ABS, CSIRO work with stats educators to increase the profile of stats?
- Need cooperation between statisticians, teachers and workplace
- Teachers need PD – they cannot be expected to teach stats well with no background

Forum 2.5: General Discussion

- Cooperation is essential. We need the advantage of a bigger body – stop knocking research statisticians. In UK the RSS successfully represents researchers and educators
- Cannot convert most of our students into the statistics profession but can encourage their use and understanding of stats
- Postgrad students still need rich learning experiences as well as good modelling of how to teach
- There is hope when Kevin Rudd, PM, talks about the need for evidence-based decisions.