

# SOME BASIC REFERENCES FOR THE TEACHING OF UNDERGRADUATE STATISTICS<sup>1</sup>

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## 1. INTRODUCTION

Over the past 25 years or so there has been a growing interest and amount of research work into the teaching of probability and statistics. This interest and research has been reflected in the five International Conferences on Teaching Statistics, the establishment of journals such as *Teaching Statistics* and the *Journal for Statistics Education* as well as an increasing number of articles in other journals and papers at other conferences. Initially the emphasis was on school pupils but, increasingly, there has been an emphasis on teaching undergraduates.

In their bibliography, Sahai, et al (1996) list 2367 references up until the year 1994. With so much published work it is difficult for newcomers to the field to know where to start. The following list of basic references attempts to pull together the various strands of research about undergraduate teaching so that new lecturers will be able to get a quick overview of current thinking and where it has come from. The many older references are to give an historical context and reflect the influences on today's practice.

As in all such summary bibliographies there is a lot of subjectivity in the choice of what to include. It was difficult to decide whether or not to include textbooks. In the end I decided to include a few that had been particularly influential on the way statistics is taught at undergraduate level. I have not included any of the very interesting references that are specific to the school level because this would have made what was intended to be a short list even longer than it has become. The list has been circulated amongst a lot of people working in the field of statistical education and I have benefited from their advice. In the final analysis, though, the final decision was mine and any errors and omissions are mine. I would welcome correspondence about any important contributions that are missing and any references that I have included that you think should not be.

## 2. CONFERENCES

### 2.1. ICOTS-1

References included in D. R. Grey, P. Holmes, V. Barnett, & G. M. Constable (Eds.) (1982), *Proceedings of the First International Conference on Teaching Statistics*. Sheffield, U.K.: Teaching Statistics Trust. *Particularly:*

Barnett, V. Why teach statistics, 3 – 15.

Ehrenberg, A. S. C. We must preach what is practised, 215 – 218.

Joiner, B. L. The case for using computers in teaching statistics, 307 – 312.

Snee, R. D. Cooperation between University and industry statisticians in the United States, 491 – 502.

Mead, R. Teaching experimental design in the computer age, 591-602.

Shauhgnessy, J. M. Misconceptions or probability, systematic and otherwise; teaching probability and statistics so as to overcome some misconceptions, 784 – 801.

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<sup>1</sup> *Statistics Education Research Journal*, 1(2), 49-53, <http://fehps.une.edu.au/serj>  
*International Association for Statistical Education*

## 2.2. ICOTS-2

References included in R. Davidson & J. Swift (Eds.) (1986), *Proceedings of the Second International Conference on Teaching Statistics*, Victoria, Canada: University of Victoria Conference Services. *Particularly:*

Speed, T. Questions, answers and statistics, 18 – 28.

Barnett, V. Statistical consultancy, a basis for teaching and research, 303 – 307.

Anderson, C. W., & Loynes, R. M. University statistics – what are we trying to teach and how? 317 – 321.

Vännman, K. Statistics in industry and implications for teaching, 355 – 356.

Hunter, J. S. Bayesian approach to teaching engineering statistics, 380 – 384.

## 2.3. ICOTS-3

References included in D. Vere-Jones (Ed.) (1991), *Proceedings of the Third International Conference on Teaching Statistics*. Voorburg, The Netherlands: International Statistical Institute. *Particularly:*

Garfield, J. B. & delMas, R. Students' conceptions of probability, 1, 340 – 349.

Jolliffe, F. The loss of intuition – a lesson for the teacher, 1, 350 – 356.

Konold, C., Pollatsek, A., Well, A., Hendrickson, J. & Lipson, A. The origin of inconsistencies in probabilistic reasoning of novices, 1, 357 – 362.

McConway, K. Sixteen years of statistics at a distance, 1, 390 – 399.

Martin, P. Teaching introductory statistics at tertiary level: a shift in emphasis, 2, 56 – 60.

Oosthuizen, J. H. Teaching and learning statistics, 2, 61 – 66.

McGillivray, H. Teaching large classes of science and engineering students, 2, 67 – 72.

Lock, R. H. Alternative introductions to applied statistics for mathematics students, 2, 91 – 94.

Lock, R. H. Some favourite data sets: using the computer on real data in class, 2, 222 – 227.

Vännman, K. Encouraging the engineering student to feel the importance of statistics – some ideas, 2, 245 – 254.

Schuenemeyer, J. H. Training statisticians to be consultants, 2, 439 – 445.

## 2.4. ICOTS-4

References included in Y. Escoufier & A. El-Ghazali (Eds.) (1994), *Proceedings of the Fourth International Conference on Teaching Statistics*, Vols. I and II. Voorburg, The Netherlands: International Statistical Institute. These proceedings were produced *before* the conference and only a few entries have the full presentation; most have only the abstracts. Full reports are given separately for the research papers in J. B. Garfield (Ed.), (1994), *Research Papers from the Fourth International Conference on Teaching Statistics*, Minneapolis, MN, University of Minnesota.

## 2.5. ICOTS-5

References included in L. Pereira Mendoza (Chief Editor) (1998), *Proceedings of the Fifth International Conference on Teaching of Statistics* Volumes 1, 2, and 3. Voorburg, The Netherlands: International Statistical Institute. *Particularly:*

Scheaffer, R. L. Statistics education – bridging the gaps among school, college and the workplace, 1, 19 – 26.

Section on Statistical Education at Post-Secondary Level, 1, 121 – 280.

Section on Research on Teaching Students at Post-Secondary Levels, 2, 693 – 750.

## 2.6. ICOTS-6

References included in B. Phillips (Ed.) (2002), *Proceedings of the Sixth International Conference on Teaching Statistics*. Cape Town: International Association for Statistics Education (CD ROM). ). *Particularly:*

Cobb, G. W. The American Statistical Association's undergraduate statistics education initiative.

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Bishop, A. J. et al. (Eds.) (1996). *International handbook of mathematical education*. The Netherlands: Kluwer. *Particularly:*

Borovcnik, M. & Peard, R. *Chapter 7: Probability*, 239 – 287.

Clarke, D. *Chapter 9: Assessment*, 327 – 370.

Shaughnessy, J. M., Garfield, J. B. & Greer, B. *Chapter 6: Data handling*, 205 – 237.

Bowman & McColl, J. (1999). *Statistics and problem solving: Computer based studies from the STEPS project*, London: Arnold.

Fisher, R. A. (1925). *Statistical methods for research workers*. Edinburgh: Oliver & Boyd.

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#### 4. SOME INFLUENTIAL TEXTBOOKS

- Barnett, V. (1999). *Comparative statistical inference (3<sup>rd</sup> edition)*. New York: Wiley.
- Berry, D. A. (1996). *Statistics: A Bayesian perspective*. Belmont: Duxbury Press.
- Cobb, G. W. (1998). *Introduction to design and analysis of experiments*. New York: Springer Verlag.
- Freedman, D., Pisani, R. & Purves, R. (1997). *Statistics (3<sup>rd</sup> edition)*. New York: WW Norton
- Moore, D. S. & McCabe, G. P. (1999). *Introduction to the practice of statistics (3<sup>rd</sup> edition)*. New York: Freeman.
- Rossman, A. J. & Chance, B. L. (2000). *Workshop statistics: Discovery with data (2<sup>nd</sup> edition)*. New York: Springer Verlag.

#### 5. JOURNALS AND REGULAR PUBLICATIONS

- Journal of Statistics Education*. An online journal of the American Statistical Association at <http://www.amstat.org/publications/jse>
- Teaching Statistics*. Although primarily aimed at the teaching of statistics in schools this journal does contain articles that are relevant for teaching at first year university level. <http://science.ntu.ac.uk/rsscse/ts>
- American Statistical Association: Proceedings of the Section on Statistical Education*. These are produced each year after the ASA Annual conference. <http://www.amstat.org/publications/>
- Newsletter of the IASE Statistical Education Research Group*. Available online from <http://www.ugr.es/~batanero/sergroup.htm>
- The American Statistician*, published by the American Statistical Association, has a fairly regular feature called *Teacher's Corner* and publishes other articles on teaching statistics at the undergraduate level.

#### 6. ARTICLES

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- Wild, C. J. & Pfannkuch, M. (1999). Statistical thinking in empirical enquiry (with discussion). *International Statistical Review*, 67, 223 – 266.

## 7. GENERAL BIBLIOGRAPHY

A very full bibliography of references in statistical education up to 1994 is given in:

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