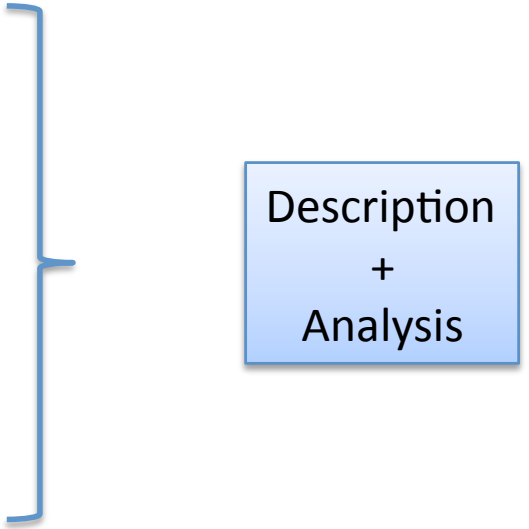
Analysis of statistical data

Back to our classic abstract

- This is the way the world is
- This is what is wrong with the world
- This is my startling/innovative idea
- Here is what I found



Quantitative Analysis

The process of presenting and interpreting numerical data

descriptive statistics and inferential statistics

- Descriptive statistics
  - measures of tendency
    - averages - mean, median and mode
  - measures of variability
    - around the average
    - range and standard deviation
    - Provide a picture of collected data
- Inferential statistics
  - outcomes of statistical tests
    - supports deductions from the data
    - tests hypotheses
  - relates findings to sample/ population

Think about the disciplinary perspective

- Your supervisors
- Their preferred texts
- Their preferred tools
  - Simple choice
    - Excel
    - SPSS
  - Get some specialist training
  - Get some experience
- Your community/ies of practice
  - Summer schools
  - Publications/consensus
    - Review
    - Update

See next slide to understand what I mean

Example of a disciplinary perspective

PHARMACEUTICAL STATISTICS
Pharmaceut. Statist. 2005; **4**: 129–139
Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/pst.168

Web-based resources to assist the statistical analysis and presentation of data

Mark A. Mullee*,†
Research & Development Support Unit, University of Southampton, Southampton, U.K.

The intention of this article is to highlight sources of web-based reference material, courses and software that will aid statisticians and researchers. The article includes websites that: assist in writing a protocol or proposal; link to online statistical textbooks; and provide statistical calculators or links to free statistical software and other guidance documents. Copyright © 2005 John Wiley & Sons, Ltd.

Keywords: ***website; statistical textbook; statistical calculator; statistical software***

1. INTRODUCTION

When working day to day as an applied statistician it will often be the case that questions are asked by colleagues or you wish to obtain a quick answer to a problem. The World Wide Web, books and journals offer a vast array of resources to support both the statistician and other researcher-author or colleagues in their consulting and teaching. All the websites (and links) quoted in the paper were last accessed on 21 March 2005.

2. GUIDELINES FOR WRITING DISSERTATIONS IN MICROSOFT

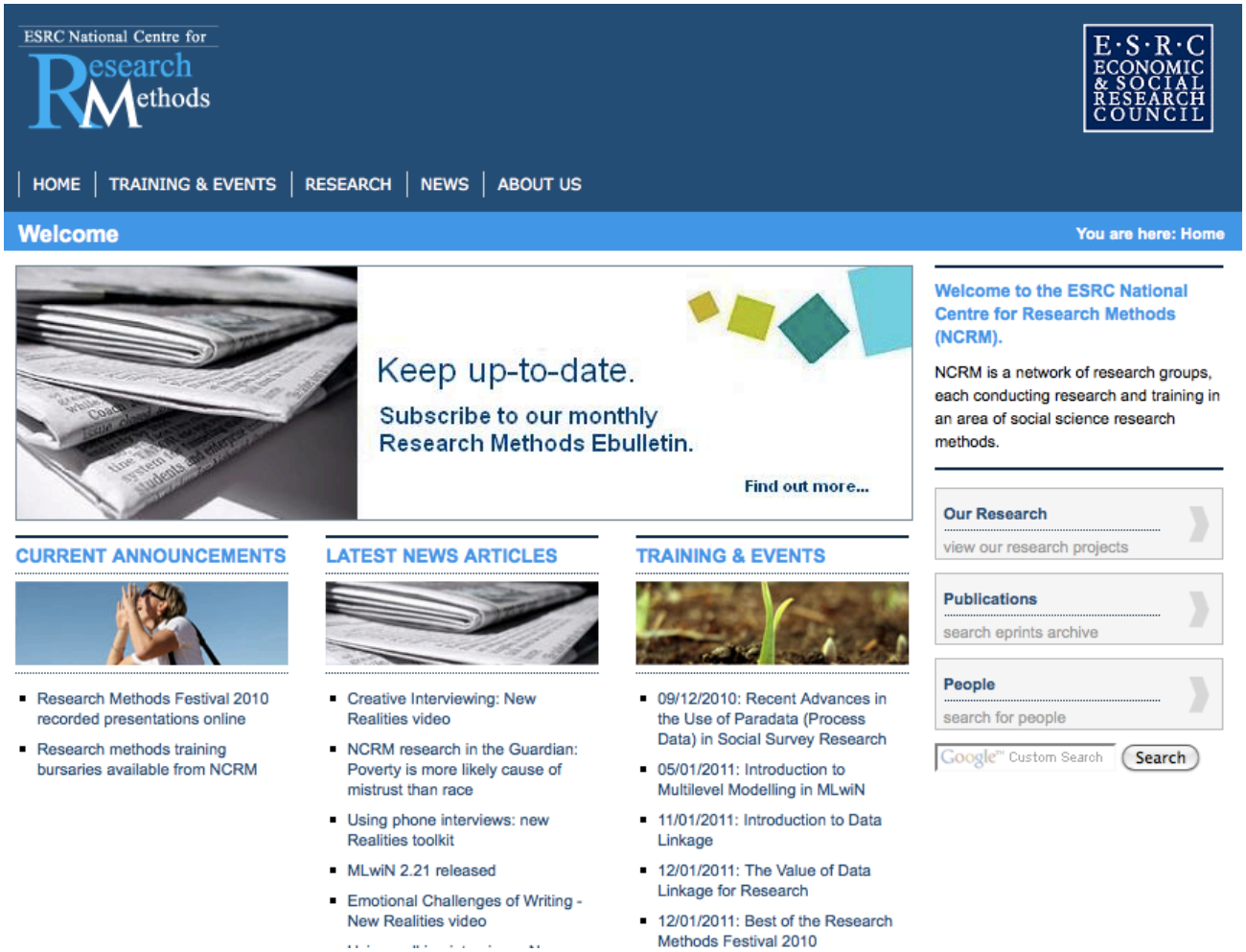
You need to decide your approach

- When you plan your study
- When you review your statistics
  - Preparation is part of that process
    - Generic – get training/attend specialist modules
    - Discipline – sanity check, participate in the dialogue
    - Just in Time – review what the current view is
    - Sanity Check – discuss with your supervisor and peers

Online textbook

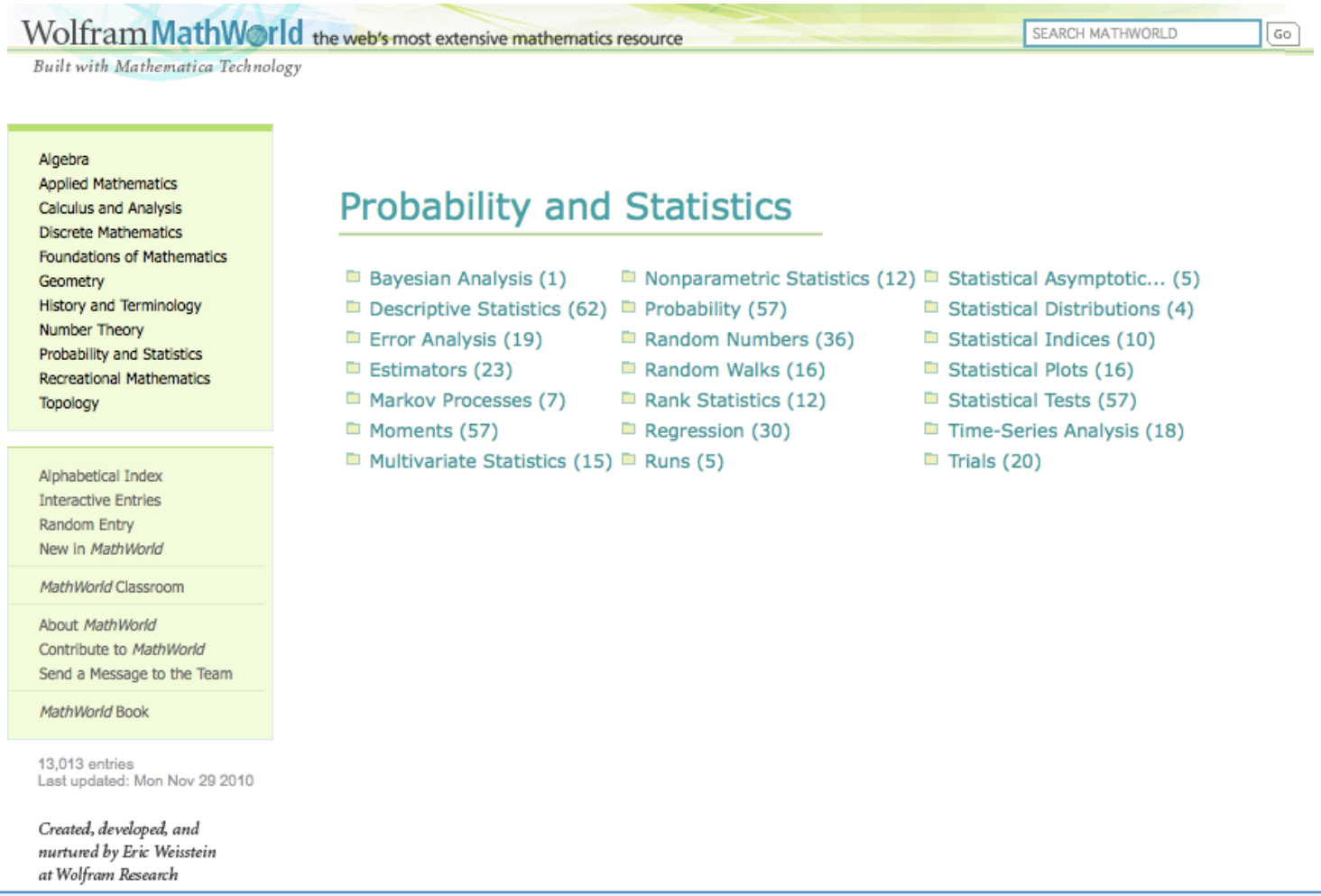
http:// www.statsoft.com/textbook/stathome.html

National Centre for Research Methods



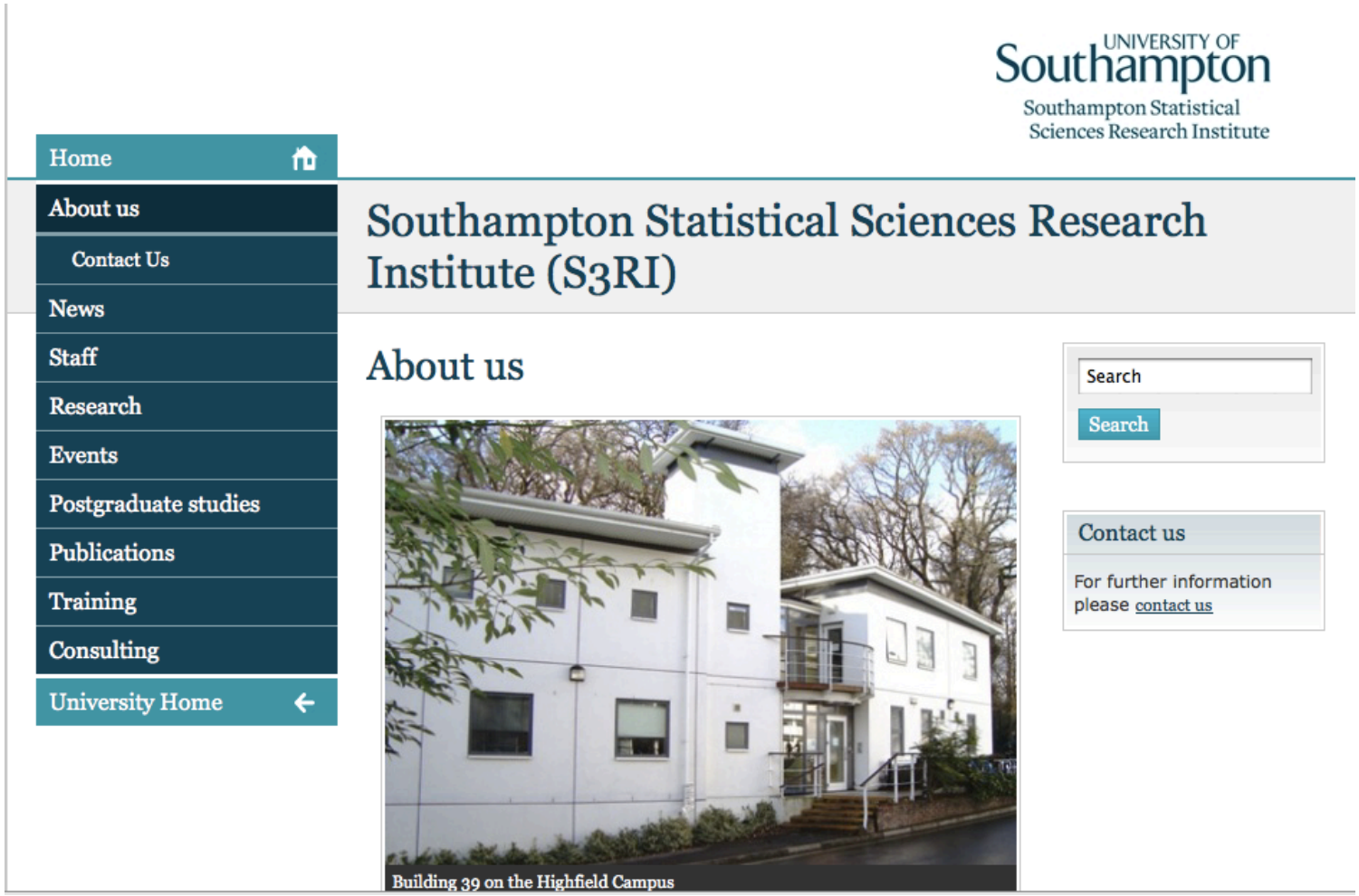
http://www.ncrm.ac.uk/

Analytical Statistical Methods

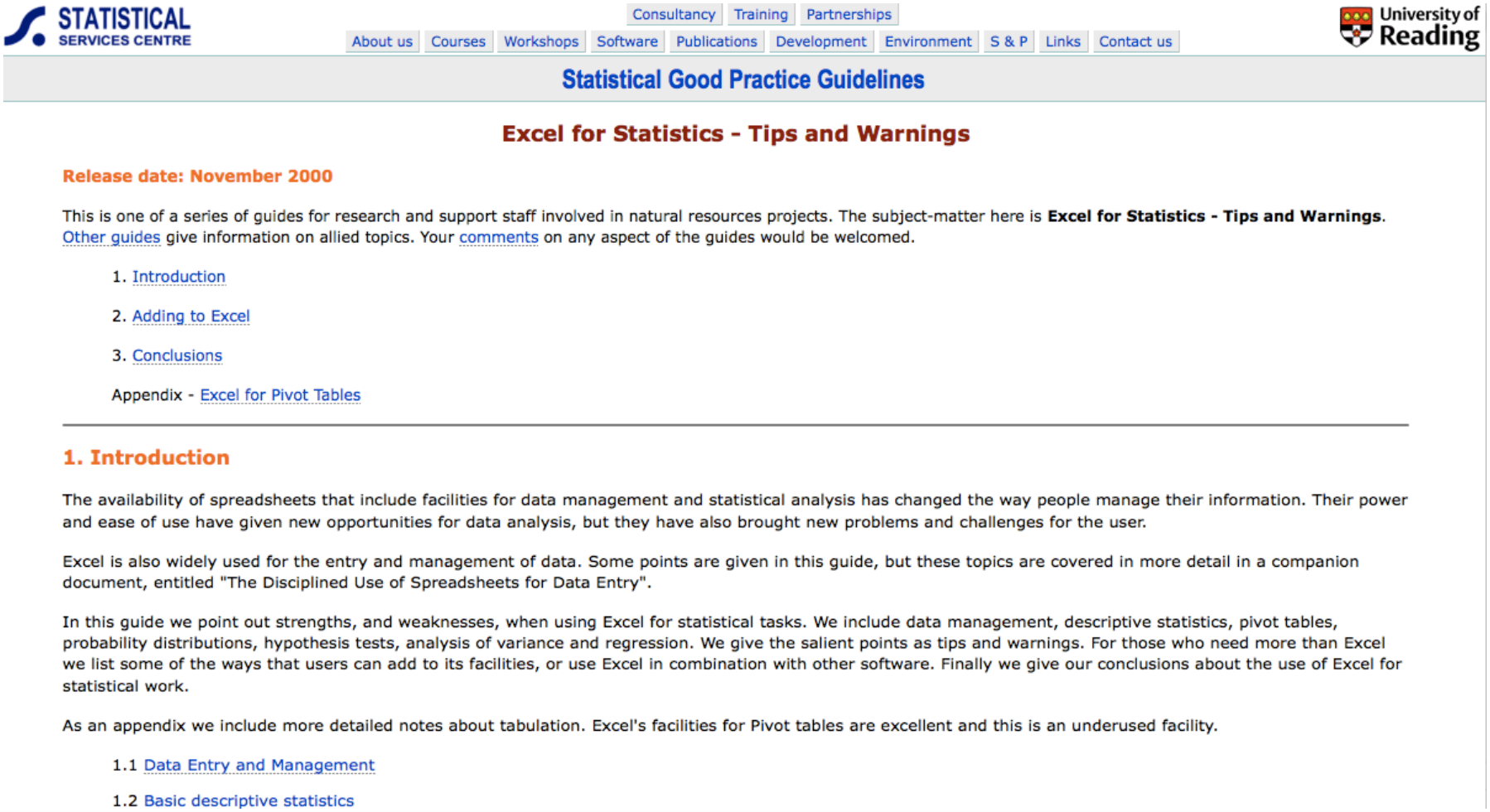


http://mathworld.wolfram.com/topics/ProbabilityandStatistics.html/

SR3i


UNIVERSITY OF
Southampton
Southampton Statistical
Sciences Research Institute
Home
About us
Contact Us
News
Staff
Research
Events
Postgraduate studies
Publications
Training
Consulting
University Home
Southampton Statistical Sciences Research Institute (S3RI)
About us
Search
Search
Contact us
For further information please contact us
Building 39 on the Highfield Campus

Excel – tips and warnings



STATISTICAL SERVICES CENTRE

Consultancy | Training | Partnerships

About us | Courses | Workshops | Software | Publications | Development | Environment | S & P | Links | Contact us

University of Reading

Statistical Good Practice Guidelines

Excel for Statistics - Tips and Warnings

Release date: November 2000

This is one of a series of guides for research and support staff involved in natural resources projects. The subject-matter here is **Excel for Statistics - Tips and Warnings**. Other guides give information on allied topics. Your comments on any aspect of the guides would be welcomed.

1. Introduction
2. Adding to Excel
3. Conclusions

Appendix - Excel for Pivot Tables

---

1. Introduction

The availability of spreadsheets that include facilities for data management and statistical analysis has changed the way people manage their information. Their power and ease of use have given new opportunities for data analysis, but they have also brought new problems and challenges for the user.

Excel is also widely used for the entry and management of data. Some points are given in this guide, but these topics are covered in more detail in a companion document, entitled "The Disciplined Use of Spreadsheets for Data Entry".

In this guide we point out strengths, and weaknesses, when using Excel for statistical tasks. We include data management, descriptive statistics, pivot tables, probability distributions, hypothesis tests, analysis of variance and regression. We give the salient points as tips and warnings. For those who need more than Excel we list some of the ways that users can add to its facilities, or use Excel in combination with other software. Finally we give our conclusions about the use of Excel for statistical work.

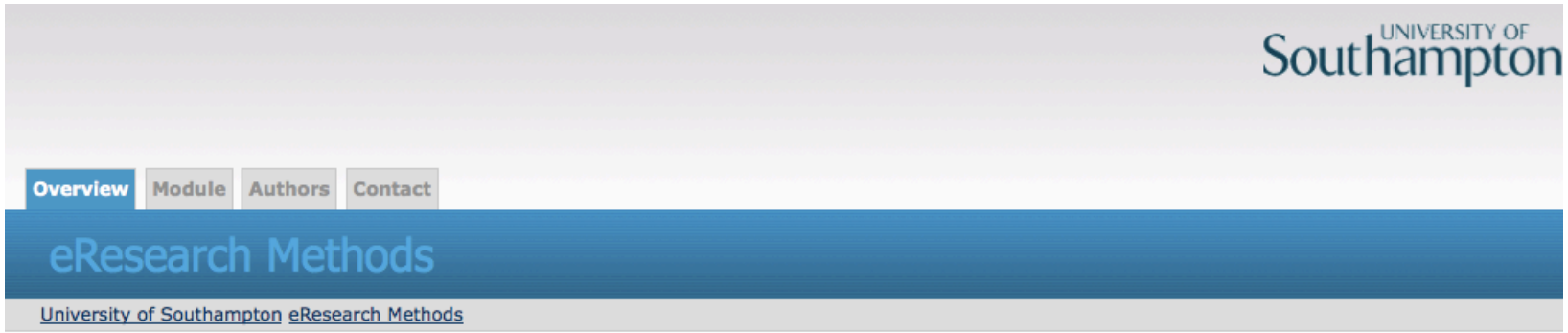
As an appendix we include more detailed notes about tabulation. Excel's facilities for Pivot tables are excellent and this is an underused facility.

1.1 Data Entry and Management

1.2 Basic descriptive statistics

http://www.ssc.rdg.ac.uk/publications/guides/topxfs.html

Online module



E-Learning Module for Generic Research Methods

Overview

The e-Research Methods module has been developed as a Masters level introduction to conducting research. It is suitable for use by students on post-graduate taught courses, at early stages of post-graduate research courses and may also be useful to undergraduate students undertaking extended project or dissertation work. It attempts to be sufficiently generic to allow its use across a wide range of disciplines.

Using this module

The module has 8 generic themes and is sufficiently flexible to allow each of the themes to stand alone or all 8 to be undertaken as a group. A University of Southampton student completing the entire module and associated assessments as a recognised part of their programme of study may be awarded 20 credit points (CATS) and the module specification has been approved by Academic Quality and Standards Committee for this purpose.

To use this material you may:

- Access it directly via this website.
- Link to this site from your own web site.
- Link to this site from a VLE (e.g. Blackboard or Medis). This option is recommended if you want students to be able to work in groups and use discussion boards, wikis or other communication tools.
- University of Southampton staff may access the source code in EdShare. You are welcome to take a copy of the source from EdShare and edit it to suit your own needs but please note that only the version stored in EdShare will be maintained.

http://www.erm.ecs.soton.ac.uk/

Beware…

"Far too many scientists have only a shaky grasp of the statistical techniques they are using. They employ them as an amateur chef employs a cookbook, believing the recipes will work without understanding why…"

- Sloppy statistics shame science", *The Economist, 3 June 2004* *http://www.economist.com/node/2724226*

Keep on thinking about numbers…

http://www.bbc.co.uk/podcasts/series/moreorless

Further Information

References for quantitative analysis

- Graphical presentation of information:
- Demos on visual literacy for scientists/engineers and for business and communication: http://www.visual-literacy.org/
- Tufte, Edward R. (1983). *The visual display of quantitative information.* Graphics Press, Cheshire, Conn, ISBN 096139210X
- Wilkinson, Leland. (1999). *The grammar of graphics / Leland Wilkinson.* Springer, New York, ISBN 0387987746

Webliography

- further information on statistical and numerical methods of analysis:
- http://www.intute.ac.uk/socialsciences/statistics/ (JISC, no longer updated)
- http://www.ncrm.ac.uk/ (EPSRC national research centre)
- http://www.s3ri.soton.ac.uk/ (University of Southampton SR3I, national research centre)
- http://mathworld.wolfram.com/topics/ProbabilityandStatistics.html/ (Wolfram Mathematics)
- StatSoft Online text book http:// www.statsoft.com/textbook/stathome.html
- Notes on Data Visualisation http://www.edshare.soton.ac.uk/4071/
- Excel tips and warnings http://www.ssc.rdg.ac.uk/publications/guides/topxfs.html (University of Reading)
- Online module http://www.erm.ecs.soton.ac.uk/ (University of Southampton)

Leisure statistics

More or Less – Podcasts

- http://www.bbc.co.uk/podcasts/series/moreorless
- JunkCharts