

Quantitative Analysis

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<http://www.edshare.soton.ac.uk/6296/>

Reality Check

- You can't learn statistical analysis in an hour
- I can't begin to teach you all there is to know about statistical analysis in an hour
- Some of you may already have expertise in this area – please contribute
- So....
- Lets get a bit of an overview
- Think about how this might be relevant to your future research
- Discuss it with your tutor/supervisor
- Think about taking a specialist course...

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



Description
+
Analysis

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

Example

- In studying the effect of Facebook on students' performance I might
 - Describe the sample
 - Describe the marks, and the marks distribution
 - Mode, median, mean
 - Standard deviation
 - I can visualise/represent these descriptions diagrammatically
- Evaluate the data to see if I can identify any correlation between
 - marks,
 - use of Facebook
 - time online
 - or other variables I had determined e.g.
 - Gender
 - Age
 - I can visualise/represent these descriptions diagrammatically

Think about the disciplinary perspective

Your supervisors

- Their preferred texts
- Their preferred tools
 - Simple choice
 - Excel
 - SPSS
 - (matlab)
 - 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

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



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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

author or colleagues in their consulting and

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

Mullee, Mark A. (2005) Web-based resources to assist the statistical analysis and presentation of data. *Pharmaceutical Statistics*, 4, (2), 129-139. ([doi:10.1002/pst.168](https://doi.org/10.1002/pst.168))

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Description/Abstract

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.

Item Type:	Article
ISSN:	1539-1604 (print)
Uncontrolled Keywords:	website, statistical textbook, statistical calculator, statistical software
Related URLs:	http://dx.doi.org/10.1002/pst.168
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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

Class exercise 1

- Read the paper – methods review
 - (Mulee, 2005)


Quick discussion in pairs/threes

- What do you need to check/update
- What of the paper is generic?
- Is it discipline specific?
- If you have a computer, have you found any comparable resources

Online Textbook

STATISTICA
offers the most
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Data Mining

- Elementary Concepts
- Statistics Glossary
- Basic Statistics
- ANOVA / MANOVA
- Association Rules
- Boosting Trees
- Canonical Analysis
- CHAID Analysis
- C & R Trees
- Classification Trees
- Cluster Analysis
- Correspondence Analysis
- Data Mining Techniques
- Discriminant Analysis
- Distribution Fitting
- Experimental Design
- Factor Analysis
- General Discrim. Analysis
- General Linear Models
- Generalized Additive Mod.
- Generalized Linear Mod.
- General Regression Mod.
- Graphical Techniques
- Ind. Components Analysis
- Linear Regression


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The only Internet Resource about Statistics Recommended by Encyclopedia Britannica

StatSoft has freely provided the Electronic Statistics Textbook as a public service for more than 12 years now.

This Textbook offers training in the understanding and application of statistics. The material was developed at the **StatSoft** R&D department based on many years of teaching undergraduate and graduate statistics courses and covers a wide variety of applications, including laboratory research (biomedical, agricultural, etc.), business statistics, credit scoring, forecasting, social science statistics and survey research, data mining, engineering and quality control applications, and many others.

The Electronic Textbook begins with an overview of the relevant elementary (pivotal) concepts and continues with a more in depth exploration of specific areas of statistics, organized by "modules" and accessible by buttons, representing classes of analytic techniques. A glossary of statistical terms and a list of references for further study are included.

Proper citation
(Electronic Version): StatSoft, Inc. (2011). Electronic Statistics Textbook. Tulsa, OK: StatSoft. WEB: <http://www.statsoft.com/textbook/>.
(Printed Version): Hill, T. & Lewicki, P. (2007). STATISTICS: Methods and Applications. StatSoft, Tulsa, OK.

Overview of Elementary Concepts in Statistics. In this introduction, we will briefly discuss those elementary statistical concepts that provide the necessary foundations for more specialized expertise in any area of statistical data analysis. The selected topics illustrate the basic assumptions of most statistical methods and/or have been demonstrated in research to be necessary components of one's general understanding of the "quantitative nature" of reality (Nisbett, et al., 1987). Because of space

<http://www.statsoft.com/textbook/>

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- 09/12/2010: Recent Advances in the Use of Paradata (Process Data) in Social Survey Research
- 05/01/2011: Introduction to Multilevel Modelling in MLwiN

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Class exercise 2

- Review the paper – skim speed read (Barjak and Thelwall 2008)
 - What methods are used
 - Can you identify the descriptive part?
 - Can you identify the analytical part?
 - What is your critique of the paper

Social Research Methods



WEB CENTER FOR
SOCIAL RESEARCH METHODS

Resources

- » [Knowledge Base](#)
- » [Selecting Statistics](#)
- » [Simulation Book](#)
- » [Trochim Research](#)
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Welcome! This website is for people involved in applied social research and evaluation. You'll find lots of resources and links to other locations on the Web that deal in applied social research methods. Some highlights of what is available:

**The Knowledge Base**
An online hypertext textbook on applied social research methods that covers everything you want to know about defining a research question, sampling, measurement, research design and data analysis.

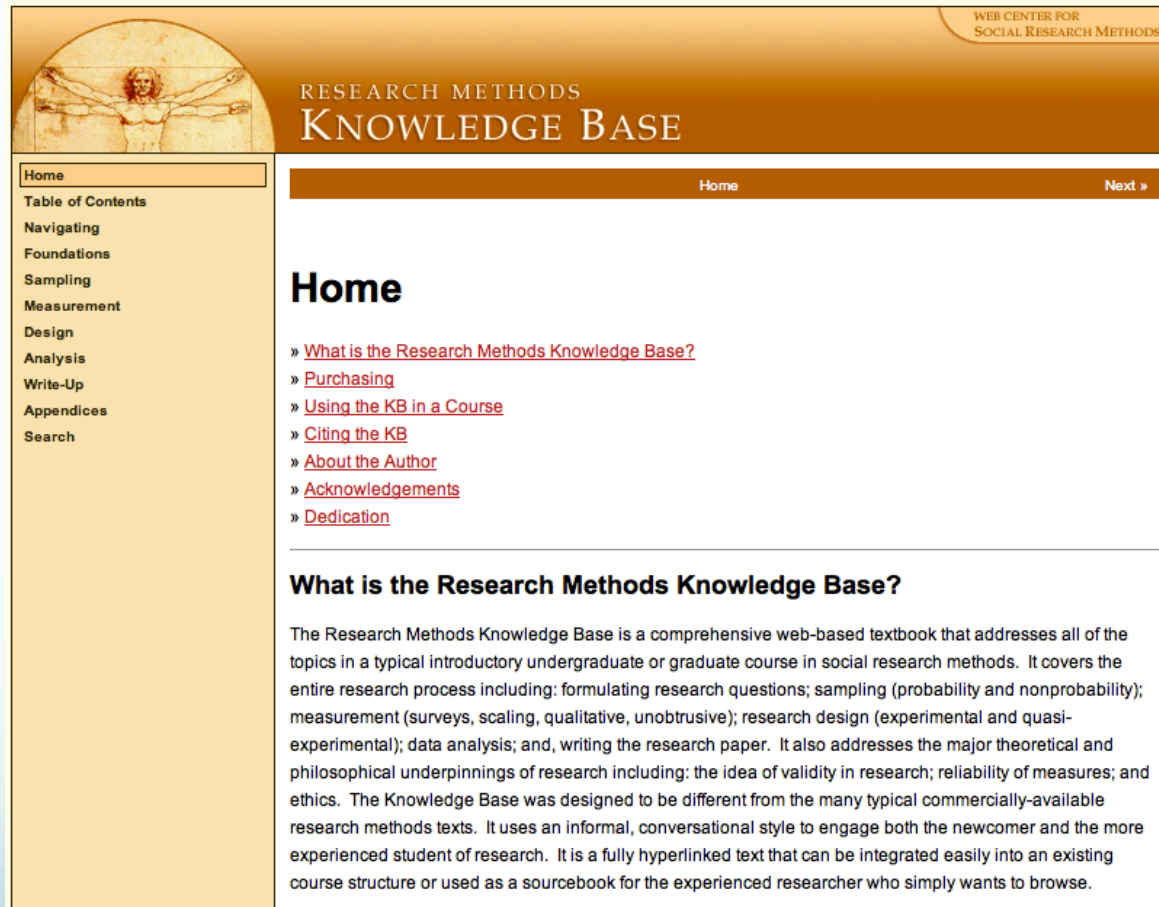
**Selecting Statistics**
An online statistical advisor! Answer the questions and it will lead you to an appropriate statistical test for your data.

**The Simulation Book**
A previously unpublished book of manual (i.e., dice-rolling) and computer simulation exercises of common research designs, for students and researchers to learn how to do simple simulations.

**Concept Mapping**
A resource guide for learning about structured conceptual mapping. It includes links to general introductory materials, research and case studies illustrating the use of the method, and information about software.

<http://www.socialresearchmethods.net/>

Research Methods Knowledge base



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KNOWLEDGE BASE

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What is the Research Methods Knowledge Base?

The Research Methods Knowledge Base is a comprehensive web-based textbook that addresses all of the topics in a typical introductory undergraduate or graduate course in social research methods. It covers the entire research process including: formulating research questions; sampling (probability and nonprobability); measurement (surveys, scaling, qualitative, unobtrusive); research design (experimental and quasi-experimental); data analysis; and, writing the research paper. It also addresses the major theoretical and philosophical underpinnings of research including: the idea of validity in research; reliability of measures; and ethics. The Knowledge Base was designed to be different from the many typical commercially-available research methods texts. It uses an informal, conversational style to engage both the newcomer and the more experienced student of research. It is a fully hyperlinked text that can be integrated easily into an existing course structure or used as a sourcebook for the experienced researcher who simply wants to browse.

<http://www.socialresearchmethods.net/kb>

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Excel – tips and warnings

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](#)

Online module

Southampton

Overview

Module

Authors

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eResearch Methods

[University of Southampton eResearch Methods](#)

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

<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...

podcasts

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BBC
RADIO



More or Less: Behind The Stats



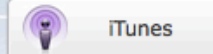
More or Less: Behind the Stats

Tim Harford and the More or Less team investigate numbers in the news. Numbers are used in every area of public debate. But are they always reliable? More or Less tries to make sense of the statistics which surround us. A half-hour programme broadcast at 1330 on Friday afternoons and repeated at 2000 on Sundays on Radio 4.

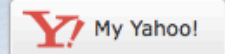
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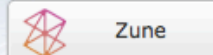
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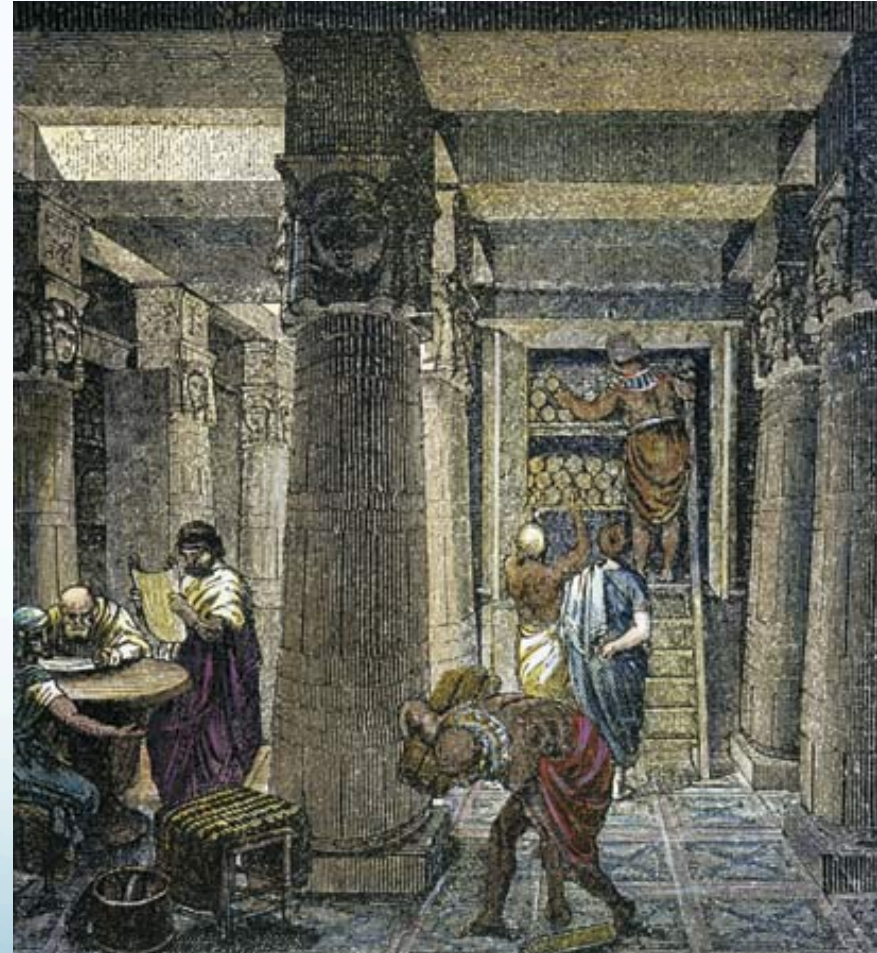
Fri, 1 Oct 10

Tim Harford and the More or Less team examine the

Duration:

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

Further Information



references

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http://www.edwardtufte.com/tufte/books_vdqi

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/>
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- 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 and visualisations

More or Less – Podcasts

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

JunkCharts

- <http://junkcharts.typepad.com/>

Many Eyes

- <http://www-958.ibm.com/software/data/cognos/manyeyes/>

Information is Beautiful

- <http://www.informationisbeautiful.net/>

This resource in EdShare

- <http://www.edshare.soton.ac.uk/6296/>