

GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE: TEACHING MANUAL

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The original version of this Instructor Manual the result of a collaboration between Professors David Unwin (then of Birkbeck College, University of London) and Karen Kemp (then of the University of Redlands). This updated and expanded version has been prepared for the Third Edition of **Geographic Information Systems and Science** by Dr. Alex Singleton (University College London).

Alex Singleton (<http://www.alex-singleton.com>)



Alex Singleton is a Research Fellow in the Department of Geography and Centre for Advanced Spatial Analysis at University College London where he completed his PhD in 2007. His research uses a framework of Geographic Information Science to extend the tradition of area classification in geography and planning. This has developed an empirically informed critique of the ways in which geodemographic methods can be refined for effective yet ethical use in public resource allocation applications. This research develops from substantive interests that investigate those social, spatial and temporal dimensions of access inequalities in Higher Education. In addition to this core research agenda, he has also examined issues of digital exclusion and deprivation, as well as ways in which 'Neogeography' mapping tools and techniques can be utilised in activities related to the public understanding of science.

David Unwin



Until his retirement in 2004, and after a short spell (2002-2004) as a Director of the UK eUniversity, Dave Unwin was Professor of Geography at Birkbeck College, University of London where he taught courses in Geographic Information Science and Environmental Science. He retains an Emeritus Chair in the College. His research concerns spatial statistical analysis and visualization, particularly in environmental applications, but he also has a strong interest in teaching GIS based originally on his membership of the group that founded the *Journal of Geography in Higher Education*. In 2005 he was awarded the US

University Consortium for Geographic Information Science's Educator of the Year prize for his work in furthering the teaching of GIS.

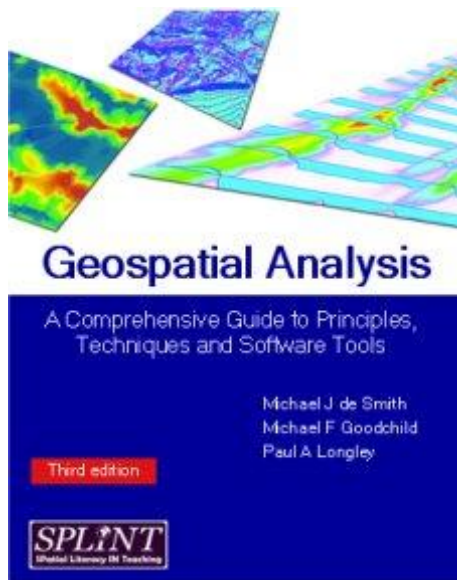
The original exercises in this Instructor's Companion were developed from materials used in his teaching over many years and from his two texts published in 1981 (*Introductory Spatial Analysis*, London: Methuen) and 2003 (*Geographic Information Analysis*, with David O'Sullivan, New York: Wiley) . They were developed in 2005 during a short spell he spent as a guest instructor in the University of Redlands.

Karen Kemp (<http://www.geokemp.net/>)



Karen Kemp was the founding Director of the International Masters Program in GIS at the University of Redlands in southern California, having held that position and Professor of Geographic Information Science until December 2005. Dr. Kemp holds geography degrees from the University of Calgary, Alberta (BSc 1976), the University of Victoria, British Columbia (MA 1982) and the University of California Santa Barbara (PhD 1992). Before moving to the US in 1988, she taught Geography, Geology and Microcomputer Applications in the university transfer program at Malaspina College, in Nanaimo, British Columbia. In 1988 she joined the National Center for Geographic Information and Analysis (NCGIA) in Santa Barbara working as Coordinator of Education Programs and co-editor of the internationally recognized *NCGIA Core Curriculum in GIS*. After completing her PhD at UCSB in 1992, she worked at the Technical University of Vienna, Austria, and with Longman GeoInformation in Cambridge, England on various international GIS education projects. She returned to the NCGIA in 1994 to work as Assistant Director and later Associate Director. In January 1999 she moved to the University of California Berkeley to become Executive Director of the Geographic Information Science Center where she helped build the foundation for an innovative campus-wide GIScience initiative. In September 2000, she was invited to join the faculty at the University of Redlands to create and direct their new MS GIS program. In December 2005, Dr. Kemp stepped down as Director of the MS GIS Program and is currently on permanent sabbatical on the Big Island of Hawaii, while continuing to work with the University on various GIS initiatives and as Senior Consultant with the Redlands Institute.

The authors of the book and of this Manual have been involved in two other projects that are intended as a natural extension and progression of the materials covered in the book. The first is



De Smtih M, Goodchild M F, Longley P A 2009
Geospatial Analysis: a Comprehensive Guide to Principles, Techniques and Software Tools (third edition). 560(+xxii) pp. Leicester, Troubador (with contributions by C Castle, A Crooks). This book is intended as an authoritative and independent guide to GIS and spatial analysis in the Internet age. A free-to-access online version is available at www.spatialanalysisonline.com, from where the book can also be purchased (with discounts for students). ISBN: 9781848761582; Pages: 560



The second is O'Sullivan D and Unwin D J (2010)
Geographic Information Analysis (second edition). Hoboken, NJ, Wiley, which remains an excellent guide to spatial analysis methods, with links to some of the exercises and activities described in this manual. (Insert web link to the wiley page and add number of pps and ISBN)

The book is available from Wiley:
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470288574_descCd-authorInfo.html

ISBN: 9780470288573; Pages: 432

Introduction to the Instructor's Manual

The Instructor's Manual is designed to assist you in using this textbook effectively and efficiently. Any instructor wishing to use this text in an educational setting should begin by reading carefully the Preface in which the authors lay out their philosophy for the content and structure of the book.

The Preface gives detailed information about the learning resources to which the text is linked. These include:

- An online course that has been created to accompany the book, 'Turning Data into Information' available through ESRI's Virtual Campus (<http://campus.esri.com>). Each section in the online course is cross-linked to sections in the text and provides learners with the opportunity to practice concepts and techniques they have read about using ESRI's ArcGIS. The materials have been designed to allow learning in a self-paced way, and there are self-test exercises at the end of each section. The course is available, free of charge, to any individual working in an institution that has an ESRI site license. The course catalog for the six-module 'Turning Data into Information' course can be viewed at - http://training.esri.com/acb2000/showdetl.cfm?DID=6&Product_ID=821.
- The four questions that are at the end of each chapter. Each of these has a specific purpose and entail, in the following order:
 1. Student-centered 'learning by doing'.
 2. A review of material contained in the chapter.
 3. A review and research task – involving integration of issues discussed in the chapter with those discussed in additional external sources.
 4. A compare and research task – similar to the review and research task above, but additionally entailing linkage with material from one or more other chapters in the book.
- A website containing this Manual and other resources (www.wiley.com/college/longley).

In addition to the materials referenced by the authors, we have given thought to the kinds of resources we would most like to have as support materials when designing and offering a course that uses this text as a foundation. Like the book, these suggestions have been put together in the belief that students do not learn simply by being taught, but rather that learning is essentially an active process, which good instructors at all levels will do their best to facilitate.

In addition to the PowerPoint slides, which are available separately on this website, for each chapter in the book we have provided:

- A summary of the chapter overview
- The intended learning objectives
- Keywords and concepts
- The top level chapter headings
- A bullet point synopsis of the chapter
- Suggested essay style examination questions generally in ascending order of challenge in a Bloom-like taxonomy of educational objectives
- Multiple choice questions, if appropriate to the intended learning outcomes
- In-class and/or individual activities
- Finally, a collected list of further resources taken primarily from the text but with some additions.