

Contents

About the editors	ix
List of contributors	xi
Foreword	xv
Editors' preface	xvii
SECTION I GIS&T IN THE ACADEMIC CURRICULUM – INTRODUCTION	1
1 GIS&T in higher education: challenges for educators, opportunities for education	3
<i>Kenneth E. Foote, David J. Unwin, Nicholas J. Tate and David DiBiase</i>	
2 Making the case for GIS&T in higher education	17
<i>Diana S. Sinton</i>	
3 The internationalization of Esri higher education support, 1992–2009	37
<i>Michael Phoenix</i>	
4 Reflections on curriculum development in the US and abroad: from core curriculum to body of knowledge	47
<i>Karen K. Kemp</i>	
SECTION II ISSUES IN CURRICULUM AND COURSE DESIGN	61
5 Using the GIS&T Body of Knowledge for curriculum design: different design for different contexts	63
<i>Steven D. Prager</i>	
6 Scope and sequence in GIS&T education: learning theory, learning cycles and spiral curricula	81
<i>Kenneth E. Foote</i>	

7	Building dynamic, ontology-based alternative paths for GIS&T curricula	97
	<i>Marco Painho and Paula Curvelo</i>	
8	Addressing misconceptions, threshold concepts, and troublesome knowledge in GIScience education	117
	<i>Matthew Bampton</i>	
9	Active pedagogy leading to deeper learning: fostering metacognition and infusing active learning into the GIS&T classroom	133
	<i>Richard B. Schultz</i>	
10	Where to begin? Getting started teaching GIS&T	145
	<i>Eric West</i>	
11	Issues in curriculum and course design: discussion and prospect	159
	<i>Kenneth E. Foote</i>	
SECTION III PERSPECTIVES ON TEACHING GIS&T		165
12	The University of Minnesota master of geographic information science (MGIS) program: a decade of experience in professional education	167
	<i>Susanna A. McMaster and Robert B. McMaster</i>	
13	Geospatial education at US community colleges	185
	<i>Ann Johnson</i>	
14	The GIS Professional Ethics project: practical ethics for GIS professionals	199
	<i>David DiBiase, Francis Harvey, Christopher Goranson and Dawn Wright</i>	
15	An exploration of spatial thinking in introductory GIS courses	211
	<i>Injeong Jo, Andrew Klein, Robert S. Bednarz and Sarah W. Bednarz</i>	
16	Teaching spatial literacy and spatial technologies in the digital humanities	231
	<i>David J. Bodenhamer and Ian N. Gregory</i>	
17	Discussion and prospect	247
	<i>David J. Unwin</i>	
SECTION IV DIGITAL WORLDS AND TEACHING GIS&T		255
18	Virtual geographic environments	257
	<i>Gary Priestnall, Claire Jarvis, Andy Burton, Martin Smith and Nick J. Mount</i>	

19	Using web-based GIS and virtual globes in undergraduate education	289
	<i>Lynn Songer</i>	
20	Trying to build a wind farm in a national park: experiences of a geocollaboration experiment in Second Life	301
	<i>Nick J. Mount and Gary Priestnall</i>	
21	From location-based services to location-based learning: challenges and opportunities for higher education	327
	<i>David M. Mountain</i>	
22	GIS is dead, long live GIS&T: an educational commentary on the opening of Pandora's Box	345
	<i>Nicholas J. Tate</i>	
SECTION V	DISTANCE AND E-LEARNING	359
23	Media and communications systems in cartographic education	361
	<i>William Cartwright</i>	
24	UNIGIS – networked learning over a distance	383
	<i>Josef Strobl</i>	
25	The Esri Virtual Campus	395
	<i>Nick Frunzi</i>	
26	Delivering GIScience education via blended learning: the GITTA experience	405
	<i>Robert Weibel, Patrick Lüscher, Monika Niederhuber, Thomas Grossmann and Susanne Bleisch</i>	
27	GIS&T in the open educational resources movement	421
	<i>David DiBiase</i>	
28	Experiences in 'e' and 'distance-' learning: a personal account	439
	<i>David J. Unwin</i>	
CONCLUSION		451
29	Ways forward for GIS&T education	453
	<i>David DiBiase, Kenneth E. Foote, Nicholas J. Tate and David J. Unwin</i>	
Index		469