Improving GIScience in UK Spatial Planning Education

A Spatial Literacy in Teaching (SPLINT)

White Paper

Richard LeGates

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August, 2008

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Executive Summary

Projects related to GIScience in Urban Planning Education

- The Spatial Literacy in Teaching (SPLINT) consortium has a remit from the Higher Education Funding Council of England (HEFCE) to strengthen spatial literacy in UK higher education.
    - SPLINT has funded research on how GIScience is taught to urban planners in the UK and suggestions to improve it
    - SPLINT staff at the University of Leicester, University of Nottingham, and the Centre for Advanced Spatial Analysis at University College, London have expertise related to spatial information technology and spatial thinking pedagogy

- The Centre of Education in the Built Environment has a remit from The Higher Education Academy to serve as a subject centre for education related to the built environment (including urban planning)
    - CEBE has experience with disseminating knowledge to academics involved in education related to the built environment
    - This fall CEBE will be starting a special interest group (SIG) of UK academics who teach GIScience to discuss ways of improve UK GIScience education, which will be referred to in this paper as the UK Planning Educator's GIScience SIG

- Three other UK constituencies have expertise and are involved in activities related to spatial thinking and spatial planning.
    - The Geography, Environment, and Earth Sciences (GEES) subject center at the University of Plymouth has a remit to improve UK higher education with respect to these three disciplines
    - UK planning practitioners who use GIS in their work have experience with applied uses of GIS and know how SPLINT, CEBE, and the RTPI might help them use spatial thinking and spatial information technology more effectively
    - UK and European experts on spatial planning understand the theory and practice of spatial planning in the UK and EU and ways in which GIS and spatial information technology might strengthen spatial planning.

SPATIAL PLANNING

- There is increased emphasis on spatial planning in both the UK and the EU
- Definitions of spatial planning differ among EU countries and have evolved over time
    - A *European Spatial Development Perspective* (ESDP)
        - Was adopted by the Information Council of European Union Ministers Responsible for Spatial Planning in 1999
        - Established a framework for the first modern generation of European spatial planning
        - Emphasized sustainability and balance
    - A *Territorial Agenda of the European Union* was adopted by the EU Ministers of Urban Development and Territorial Cohesion in 2007
        - Is a current succinct statement of spatial planning at the EU level
        - Emphasizes territorial cohesion and regional competitiveness as well as sustainability
    - The European Spatial Planning Observation Network (ESPON) is a large EU spatial planning research project
        - ESPON 2006 was a five-year effort that engaged more than 600 academics from 130 institutions in 29 countries in spatial planning
        - ESPON 2013 is a new five-year effort to continue academic research related to European spatial planning. The ESPON 2013 budget is € 45,000,000—triple the amount of the first round of funding
        - ESPON has made extensive use of GIS in its research and publications.

UK Spatial Planning Education

- Urban planning is a rapidly evolving, 100 year old, interdisciplinary, applied field
- The Royal Town Planning Institute (RTPI) oversees UK planning education and supports practicing planners. The RTPI:
    - Accredits 111 urban planning programs programs in 26 universities
    - Has established policy for initial planning education
    - Oversees a program of lifelong learning for urban planners
    - The RTPI focuses on learning outcomes and grants universities wide latitude to define program contents
- Spatial planning
    - Is a required element of RTPI programs
    - Is also taught by some unaccredited programs in geography, environmental studies, and other disciplines and interdisciplinary programs

GIScience in planning education

- GIScience is a mature field of study worldwide
- Most urban planning programs in the UK introduce students to GIScience
- The amount and nature of GIScience material taught in UK planning schools varies widely
- This white paper argues
    - That all UK urban planning students should be attain core spatial literacy
    - That ten-weeks of instruction in GIScience is a realistic target and adequate to provide foundation spatial literacy
    - That GIScience instruction for planners should
        - Be carefully designed with explicit statements of expected learning outcomes, course objectives, required resources, deliver methods, timing, assessment procedures, and evaluation
        - Stress the science and concepts underlying spatial thinking that will build a foundation for lifelong learning
        - Emphasizes competencies appropriate to different levels of instruction and urban planning paths

Recommendations

- Strengthen collaboration between the RTPI, SPLINT, and CEBE
- Follow a low-budget, bottom up, strategy relying upon the constituencies of each of the three groups to the maximum feasible extent
- Inform GEES, planning practitioners, and spatial planning experts of the collaboration and involve them where appropriate
- Augment the UK GIScience Planning Educators' GIScience SIG
- Make relations with the RTPI a UK Planning Educators' GIScience SIG concern
- Continue SPLINT research efforts related to GISscience in urban planning
    - Investigate the current skills gap in planning practitioners GIScience knowledge
    - Identify best practices in current UK GIScience education in urban planning
    - Survey planning practitioners to understand their perception of how GIScience and related spatial information technologies are used and how SPLINT, CEBE, and the RTPI can assist practioners to use them more effectively
- Disseminate material on GIScience education via RTPI's PERN network
- Encourage the RTPI to set-up a GIScience & ICT network
- Include presentations on GIScience in urban planning education at CHOPS meetings
- Design and implement GIScience short courses and training sessions for planners
- Initiate a process to revise the RTPI Policy on Initial Planning Education related to spatial planning to explicitly recognize the importance of GIScience and spatial information technology

1. Introduction

This SPLINT white paper describes activities of three organizations involved in efforts to strengthen the education of UK urban planners related to spatial thinking and spatial planning: The Royal Town Planning Institute (RTPI), The Spatial Literacy in Teaching (SPLINT) Consortium, and the Centre for Education in the Built Environment (CEBE).

The paper focuses on the relationship between spatial planning and GIScience. GIScience refers to a body of knowledge about the collection, management, analysis, and display of spatial information using Geographical Information Systems (GIS) and related spatial information technologies such as remote sensing.[1] This knowledge domain is sometimes referred to simply as GIS or by other names.[2]

The white paper describes activities of the three organizations and summarizes the status of and recent developments related to the teaching of spatial planning in the UK with a particular emphasis on the way in which GIScience is (and is not) currently taught. Finally it suggests way in which the three organizations might collaborate to strengthen spatial thinking and GIScience skills in UK spatial planning education.

The RTPI is the professional body which represent Chartered Town Planners in the UK, Ireland and overseas with over 21,000 members. [3] It is a charity registered in England and Scotland dedicated to promoting good planning, developing and shaping policy affecting the built environment, raising standards of the planning profession, supporting its membership through continued professional development, and education and training for future planners. The RTPI establishes policy for initial professional education and lifelong learning. The RTPI requires study of spatial planning as a condition of becoming a chartered town planner. It has commissioned research on spatial planning and maintains an active agenda to improve initial professional education and continuing professional development. Particular strengths the RTPI can bring to improving spatial thinking in UK planning education involves its close connection with practice and a variety of strategic alliances for delivering information to planning students, practitioners and the wider built environment sector.

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1 The term GIScience was proposed by University of Santa Barbara Geography Professor, Michael Goodchild in 1992 (Goodchild, 1992).

2 Roger Tomlin, the director of a pioneering Canadian project to build a database to inventory Canadian land and resources coined the term Geographical Information Systems in the later 1960's. The US-based University Consortium for Geographical Information Science (UCGIS) uses the term Geographical Information Science and Technology (GIS&T) to refer to the body of knowledge that they feel spatially aware professions should know. In Europe the term geoinformatics is often used instead of GIScience.

3 RTPI's website is http://www.rtpi.org.uk/

The SPLINT consortium consists of faculty at the Universities of Leicester, Nottingham, and University College London with a remit from the Higher Education Funding Council of England (HEFCE) to strengthen spatial literacy in UK higher education.[4] The SPLINT project is centered at the University of Leicester Geography Department under the direction of Dr. Nicholas Tate. One SPLINT initiative, described further below, involves a study of the way in which UK universities teach urban planners GIScience concepts and skills and recommendation for strengthening the teaching of GIScience in urban planning programmes. SPLINT can bring several strengths to bear in efforts to improve UK spatial planning education. First, is the expertise SPLINT staff at all three partner institutions have regarding spatial thinking technology and pedagogy. Second is the knowledge of advanced spatial analysis and cutting edge technologies that the Centre for Advanced Spatial Analysis possesses. Prof. Paul Longley's work on successive editions of *Geographical Information Systems and Science*—the most widely used GIScience textbook in the world—equip him and his colleagues to disseminate the most up to date and sophisticated conceptualization of GIScience. SPLINT staff are well equipped to educate planners about new spatial technologies, geostatistics, modeling, virtual reality, and many other topics not ordinarily covered in existing UK GIScience for planning courses. CASA keeps up with the latest developments in innovations such as Google Earth and has created a number of tools for working with and delivering spatial data that deserve to be widely shared with planners.

The Centre for Education in the Built Environment (CEBE) is a Higher Education Academy subject centre located at Cardiff University and Salford University that provides discipline-based support to enhance the quality of learning and teaching in the UK higher education built environment community (including the urban planning community).[5] In May 2007, CEBE hosted a meeting of people involved in teaching GIScience and spatial thinking to UK planning students that is evolving into an ongoing special UK Planning Educators' GIScience Special Interest Group (SIG). The UK Planning Educators' GIScience SIG is described more fully below. CEBE's particular strength is its experience with disseminating knowledge to academics involved in education related to the built environment.

In addition to these three organizations that are the focus of this white paper three other constituencies have a sufficient interest in use of spatial information technology for UK urban planning that it would be useful to keep them informed of any activities SPLINT, CEBE, and the RTPI undertake and invite representatives to contribute to and learn from these actives: The Geography, Environment, and Earth Science (GEES) Subject Centre in Plymouth, England, urban planning practitioners, and scholars and practitioners involved in European spatial planning.

4 SPLINT's website is http://www.splint-cetl.ac.uk/

5 CEBE's website is http://www.cebe.heacademy.ac.uk/.

GEES has a remit to improve higher education in Geography, Environment, and Earth Science. They conduct sessions on pedagogy for all new faculty in these disciplines in the UK and work to improve higher education in these areas via their website, publications, conferences, and in other ways. Because all three disciplines are relevant to urban planning, GEES should be informed of activities SPLINT, CEBE, and the RTPI undertake related to spatial thinking in UK planning education and can make positive contributions to these efforts. Brian Chalkley, director of GEES, is aware of past activities and is keen to be involved.

Noone knows better how practicing urban planners in the UK are currently using GIS and related spatial information technologies or how they feel that SPLINT, CEBE, and the RTPI might help them use these technologies more effectively than practicing planners themselves. The RTPI is in close communication with practicing planners and is well positioned to engage them in collaborative efforts to improve spatial literacy in UK planning education.

Within the UK and elsewhere in Europe a number of scholars and practitioners have been deeply involved in debates about what spatial planning should be. Some members of this group have worked extensively with GIS in spatial planning. The evolution of thinking about European spatial planning and these individuals is discussed in greater detail in Section 3 on European and UK spatial planning education.

2. RTPI Initial Professional Education and Lifelong Learning Activities

Urban Planning is a rapidly evolving, hundred-year-old, interdisciplinary, applied field of study with indistinct boundaries. Urban planning education draws on materials from architecture, geography, economics, sociology, political science, information science, design, and other disciplines and professional fields. It seeks to equip graduates with concepts and skills to perform a variety of roles related to conventional land use, transportation, and environmental planning and spatial planning related to economic development, health, education, law enforcement, and other policy areas.

The Royal Town Planning Institute (RTPI) has accredited 111 spatial planning programmes at twenty-six universities in the UK and overseas. Degrees offered by RTPI-accredited planning schools include BA, MA, BSC, MSC, and Ph.D. degrees. Almost all post-graduate UK spatial planning programmes have restructured or are currently restructuring their curricula into twelve-month intensive masters degree programmes.

Given the breadth of the field of urban planning, the RTPI provides universities flexibility to define the substance of academic urban planning programs in line with the Institute’s policy on education. They emphasize indicative learning outcomes rather than prescribing learning inputs. The RTPI emphasizes three key stages in this regard—initial professional education, the Assessment of Professional Competence (the route to Chartered Membership) and lifelong learning.

The RTPI policy with regard to initial professional planning education is summarized in a *Policy Statement on Initial Planning Education* (RTPI, 2004). Initial planning education programs include full and part- time undergraduate and post-graduate programs and a distance learning program managed by the University of the West of England's Joint Distance Learning Consortium comprised of the Open University, Leeds Metropolitan University, London Southbank University and the University of Dundee. Undergraduate planning programs are generally three-years in duration and offer core spatial planning knowledge and skills followed by a further year of specialized study as 4 years of combined study or on a 3 + 1 basis. Most graduate planning programs now last for twelve months. There are both comprehensive graduate planning programs and specialist graduate programs for advanced education in specialty areas such as urban design, transport planning, regeneration, property development, urban conservation and neighborhood planning.

The RTPI also oversees a program of professional development and lifelong learning with its commercial partners, RTPI Conferences, who run a series of workshops and seminars in London and elsewhere in the UK aimed at built environment professionals at all levels. Chartered town planners are required by membership to devote a minimum of 50 hours a year to continuing professional development over a 2 year period. Design of continuing professional development activities in the UK is mostly conducted by the twelve RTPI Regions and Networks who run extensive programmes locally and regionally. These programs are aimed primarily at RTPI members but are open to anyone from the built environment sector. Chartered town planners can satisfy their CPD obligations by attending conferences, academic courses, training sessions (formal and informal), and in many other ways.

An important recent study undertaken for the RTPI by researchers at Deloitte and University College London titled *Shaping and Delivering Tomorrow's Places: Effective Practice in Spatial Planning* summarizes the status of spatial planning in the UK and makes recommendation for the future (UCL/Deloitte, 2008).

Neither the RTPI *Policy Statement on Initial Planning Education* nor the UCL/Deloitte study explicitly discuss GIScience and spatial information technology as vehicles for spatial planning. The original RTPI Education Commission report on which the RTPI's initial planning education policy is based (RTPI, 2003) makes no mention of GIS or spatial thinking skills although many accredited planning schools have incorporated it into the curriculum as part of the RTPI's indicative learning outcomes. However background papers that fed in to the report do (RTPI 2002a, 2002b). The background papers argue that planning education needs to provide students with *"a high level of critical, analytical, design and communication skills"* (RTPI 2002b, p. 6) and recognizes the importance of GIS as a tool to assist spatial planning:

> *"Geographic information systems (GIS) are also of increasing importance in spatial disciplines such as cartography, geography and planning, facilitating the interpretation, manipulation and presentation of spatial data. The widespread adoption of such technologies within built environment professions raises a number of issues for education and training."* (RTPI, 2002a, p. 7)

The background report goes on to highlight the *"need for a general awareness and understanding of the capabilities and limitations of ICTs"* (ibid.) in a broader sense in both Higher Education and through Continuing Professional Development and Life-Long Learning.

The RTPI's education and membership department oversee a variety of programs for planners and planning educators to share information and upgrade their skills.[6] Other RTPI departments oversee production of RTPI publications and a new program to share planning-education-related research including the recently launched Planning Education and Research Network (PERN). Potential RTPI vehicles to disseminate knowledge about GIScience and spatial planning include:

- An annual National Conference;
- An annual conference of heads of planning schools (CHOPS). This is a one-day meeting for department heads of planning programs to share information. The CHOPS meeting devotes a portion of the day to discussion of a critical topic;
- Partnership Panel, the forum for RTPI nominated partnership board members including the Chairs of the board and the RTPI members' representatives;
- Regional Conferences organized by regional RTPI organizations in 12 UK regions;
- An annual Planning Research Conference. This conference often has an educational track. Newcastle University is hosting the next Planning Research Conference in April 2009;
- RTPI Region Lifelong Learning and CPD training sessions. Each region is responsible for developing a program of lifelong learning for chartered town planners in their region. These may consist of short courses, seminars, training sessions and workshops often in collaboration with RTPI accredited planning schools and other universities in the region;
- Planning education research exchange. The RTPI has established a new Planning Education Research Network (PERN) with a coordinator based at the Institute's London office to encourage sharing of planning research among members;
- Publications. The RTPI publishes a journal – *Planning Theory and Practice*—a monthly newsletter, and other materials, often in conjunction with partners;

6 Sue Percy is the RTPI director of membership education. George Law is the RTPI lifelong learning manager.

- Online materials. The RTPI provides a link from their homepage titled “where to find planning advice” to “Planning Matters” run by their Centre for Performance Support. Planning Matters provides online materials that can be downloaded for a modest fee. Currently these include a two-hour module developed by Malcolm Baker, Assistant Planning Director of the Devon County Council, that introduces planners with no previous experience to GIS;

- Links to other sites. Currently this site does not contain links to SPLINT or CEBE websites.

3. UK Spatial Planning Education

There is increased emphasis on spatial planning within both the European Union and the UK and an extensive body of academic research on spatial planning in both Europe and the UK.

Definitions of spatial planning differ among different countries within the European Union and have evolved over time. Crafting policy that the EU finds acceptable has proven difficult and different approaches have come in and out of favor during the last ten years. The EU policy is not binding on member states and what different European countries do by way of spatial planning varies widely.

While the roots of spatial planning policy can be traced back many years, the current emphasis on spatial planning in Europe can be dated to May, 1999 when the Informal Council of European Union Ministers Responsible for Spatial Planning agreed at a meeting in Potsdam upon on a joint “European Spatial Development Perspective” (CEC, 1999). The European Union has no formal authority for spatial planning and the ESDP had no binding status. The ESDP went out of its way to emphasize that it was only a “policy framework” and did not impose burdens at the national, regional, or community level.

The ESDP is subtitled “towards balanced and sustainable development of the territory of the EU.” A stated purpose of the document was to assure that fundamental goals of the EU would be achieved equally in all the regions of the EU (EU, 1999). The ESDP envisioned spatial policy related to treaties on Community Competitiveness Policy, Common Agricultural Policy (CAP); Research, Technology and Development (RTD), loan activities of the European Investment Bank, and particularly Trans-European Networks (TEN), Environmental Policy, and expenditure of Structural funds. Publication of the ESDP encouraged EU member states to focus more attention on spatial planning, influenced spatial development policies, and led to a great deal of research and vigorous academic debates on spatial planning. However, as a result of member states’ reluctance to grant it a role, the Commission withdrew its support for the ESDP (Faludi, 2006).

A 2007 agreement by the EU Ministers of Urban Development and Territorial Cohesion titled *Territorial Agenda of the European Union* is a succinct current summary of collective thinking about spatial planning at the EU level (Territorial Agenda, 2007). The *Territorial Agenda* elevates the concepts of territorial cohesion and competitiveness over balance, but retains the ESDP emphasis on sustainability. The *Territorial Agenda* emphasizes new challenges such as global climate change, rising energy prices, and the impact of enlargement of the European Union over ESDP concerns.

There are a number of non-UK experts on European spatial planning including Andreas Faludi and Bas Waterhout at the Delft University of Technology and Armando Carbonell at the Lincoln Institute of Land Policy in Cambridge, Massachusetts. Key writings on European spatial planning are anthologies edited by Andreas Faludi and published by the Lincoln Land Institute (Faludi, 2002, 2006, 2007, 2008).

In the UK, the Planning and Compulsory Purchase Act of 2004 established a new structure for UK planning in which Local Development Frameworks are developed in relation to Regional Spatial Strategies (PCPA, 2004). The act states that *"Spatial planning goes beyond traditional land use planning to bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they function."* In other words urban planning in the UK should deal with, educational, health, law enforcement, and other policies and help promote spatial development goals such as territorial cohesion, economic competitiveness, urban/rural balance, efficient development and use of transportation and other infrastructure, and transnational and cross-border interregional cooperation among countries in Great Britain and between the Republic of Ireland and Northern Ireland.

UK academic experts on spatial planning including Cliff Hague, a former Heriot-Watt professor and past president of the RTPI, Mark Tewdwr-Jones at the Bartlett School, University College London, Vincent Nadin, from the University of the West of England, and authors of a recent RTI study (UCL/Deloitte, 2007).

The European Spatial Planning Observation Network (ESPON) is a large EU project that has involved more than 600 academic researchers from 130 institutions in 29 countries working in transnational project groups conducting research on European spatial policy (Hague, 2008). ESPON was set up in 2002 as a 5-year program and a second five-year round of ESPON research is just beginning at the time of this report in summer, 2008. ESPON is significant for purposes of this report because of its scale, its relation to European spatial planning policy, and the extensive use of GIS in the ESPON studies. The initial ESPON project involved.

(a) Ten thematic projects relating to main ESDP themes such as polycentric development, urban-rural relations, and transport services and networks;

(b) impact studies of EU policies such as transport policy, energy, fisheries, pre-accession aid, environmental policy, and agricultural policy

(c) cross-thematic studies.

A fourth stream of work comprised some short exploratory studies and scientific support projects, most notably a compendium of national data sources, which became known as the Data Navigator (Hague, 2008).

ESPON has published thousands of pages of studies in three main series:

(a) ESPON Briefings that provide quick 20 page +/- policy-oriented overview on selected topics,

(b) ESPON Synthesis Reports that provide more in-depth 100 page +/- overviews ESPON findings on European territorial development, and

(c) ESPON Scientific Reports which present selected features of European territorial research and the coordination provided by ESPON in building a common platform and tools for analysis.

ESPON has also published an *ESPON Atlas*, two reports on scenarios on territorial futures (2007), and *The ESPON Europe in the World Report* (2008). All of these ESPON studies involve spatial analysis and contain maps created by GIS.

A new round of ESPON research—ESPON 2013—was approved in 2007 with a budget of € 45,000,000, triple the amount budgeted for the initial round of ESPON studies.

Section 6 of the RTPI *Policy Statement on Initial Planning Education* describes RTPI policy regarding spatial planning (Appendix A). The RTPI does not specify a detailed or prescribed curriculum for spatial planning education. Rather they expect planning schools to develop their own programmes.

Section 6.8 of the RTPI *Policy Statement on Initial Planning Education* states that [graduates from spatial planning programmes] should be able, among other things to:

> Generate visionary and imaginative responses to spatial planning challenges that are realistic and derive from substantial investigation and analysis of relevant data and other evidence.
>
> Demonstrate effective research and appraisal skills, evident in data sourcing, collection, investigation, quantitative and qualitative analysis, weighing evidence and reaching sound conclusions.
>
> Recognize the role in the planning process of … negotiation, mediation, and advocacy and the importance of team working…
>
> Appreciate the importance of resource issues…and organizational management processes and initiatives in helping to deliver effective spatial planning…
>
> Appreciate the importance of time in the planning process.

Evaluate the case for and against spatial planning…

Recognize the importance of stakeholder involvement and public participation in the planning process…

A recent review of UK spatial planning was conducted for the RTPI by faculty from the Bartlett School of Planning, University College London and the planning consulting firm of Deloitte (UCL and Deloitte, 2008). Hereafter this will be referred to as the UCL/Deloitte study. The researchers did case studies to identify effective spatial planning. The UCL/Deloitte study concluded that there is an evolving understanding of what spatial planning means in practice in the UK. Their conclusions are summarized in box 1.

Box 1 UCL/Deloitte Summary of What Spatial Planning Is

Spatial planning is the practice of place shaping and delivery at the local and regional levels that aims to:

- Enable a vision of the future of regions and places that is based on evidence, local distinctiveness, and community-derived objectives.
- Translate this vision into a set of policies, priorities, programmes and land allocations together with the public sector resources to deliver them.
- Create a framework for private investment and regeneration that promotes economic, environmental and social well being for the area
- Coordinate and deliver the public sector components of this vision with other agencies and processes (e.g. LAAs and MAAs).

Source: University College London and Deloitte. 2007. *Shaping and Delivering Tomorrow's Places: Effective Practice in Spatial Planning.*

Neither the RTPI Policy Statement on Initial Planning Education nor the UCL/Deloitte studies describe ways in which GIScience has been or might be used in spatial planning.

4. GIScience Education for Urban Planners

GIScience is taught in departments of GIScience, GIS, geography, geoinformatics and related programs. It draws on material from computer science, geography, remote sensing, photogrammetry, statistics, geodesy, and other disciplines and professional fields. Work of cognitive psychologists who study the way in which people perceive space housed in psychology departments or psychology research institutes also informs GIScience.

Current GIS and GIScience textbooks (e.g. Longley, Goodchild, Maguire, and Rhind, 2005), and studies (e.g. UCGIS, 2007) describe the field of GIScience. Recent reports have inventoried spatial thinking competencies important for the workplace (e.g. Gaudet, Annulis and Carr, 2003). There are well-articulated principles for designing GIScience curricula (Unwin, 1997) and up-to-date suggestions for appropriate content for GIScience training courses for planners (Hockey, 2007). Spatial Thinking and GIScience concepts are well described in GIScience textbooks and recent studies. There are numerous tutorials to teach GIScience. Six textbooks teach GIScience for urban planners. These and other materials for teaching GIScience concepts and skills to planners are described in the LeGates working paper (LeGates, forthcoming 2008a).

The extent to which UK urban planning programs teach GIS varies. Most introduce core GIScience concepts through a course or module or as part of methods or data analysis courses. Classroom lectures are typically accompanied by practicals. Students typically learn two dimensional vector GIS operations and how to use off the shelf GIS software most commonly used in UK planning offices—such as ArcGIS or MapInfo.[7] Most courses use the Ordnance Survey's academic dataset, DigiMap, local planning data from their city and region, and spatial datasets from CD Roms that accompany textbooks or downloadable from the web. In some programs students may use or are required to use GIS in subsequent studio courses. Some universities offer specialized GIScience courses related to transportation planning, environmental planning, or other planning specialties.

Most existing UK introductory GIS courses for urban planning students do a reasonably good job introducing students to the way in which GIS and related technologies can be used for routine planning tasks such as mapping the location of physical features and the demographic characteristics of areas and creating thematic maps. Courses that include a sequence of lectures and related practicals generally succeed in training students to perform basic GIS operations.

Most existing UK introduction to GIScience planning courses do not adequately introduce students to the science underlying GIS or educate them to think about space in conceptual terms that will empower them to absorb the inevitable advances in technology and applications that will occur in the future. To meet the RTPI goal of initial planning education as a platform for lifelong learning more emphasis on the science underlying GIS and fundamental concepts of enduring importance would strengthen many existing courses.

Few existing introductory UK GIS courses introduce planning students to advanced GIS topics such as two-and-one-half and three dimensional models, network analysis, cellular automata and agent based models, mobile computing, or virtual reality. While it is unrealistic to expect introductory courses to cover these topics in depth, it would be

7 Participants in the GIS planners' education meeting in Cardiff mostly reported that they use ArcGIS. Some participants use MapInfo.

useful to expose even beginning students to them. All students exposed to material like this would be better equipped to understand how advanced GIS can be used in urban planning. They would be better prepared to collaborate with GIScience experts in interdisciplinary planning projects. Some planning students who are exposed to this material might choose to master more sophisticated GIS in advanced coursework.

Given speed with which new tools of value to planners are evolving, few courses adequately introduce students to the latest developments in Google Map, Google Earth and other digital earths, or other new technologies and applications that are often described as utilizing GeoWeb 2.0.

Richard LeGates has developed a matrix suggesting spatial planning competencies appropriate for undergraduate and graduate UK planning education (Appendix B) and a Venn diagram recommending skills planning graduates should know (Appendix C).

Box 2 describes illustrative content of a ten-week graduate introduction to GIScience course for urban planners with nine accompanying practicals. It is based on the concepts in Longley, Goodchild, Maguire, and Rhind's *Geographical Information System and Science,* courses the authors teach, and an examination of syllabi from U.S. and UK urban planning programs. Completion of a course like this would equip UK planning students to do much more effective spatial planning and would provide a basis for more advanced coursework in planning programs that chose to have a GIScience specialization

Box 2: Illustrative Content of an Introductory Graduate GIScience course for Urban Planners

WHAT IS GIScience. History of GIS. Definitions of GIS and GIScience. Geographic features and surfaces. Geographic attributes. Maps and attribute tables. Map layers. Spatial, thematic, and temporal aspects of spatial phenomena. How GIS is used in city and regional planning. What maps can show: location, adjacency, proximity, quantity, containment, spatial patterns, clustering, dispersal, density, flows, temporal change.

Practical # 1: Basic ArcGIS operations.

ARCGIS. ArcGIS Components. ArcMap. ArcCatalog. ArcToolbox. Extensions. Licensing levels. ArcMAP. Data frames. Map layers. Attribute tables. ARCGIS file types mxd, dbf, ndx and others. **The Vector GIS Model.** Points, lines, and polygons. Moving around in digital space.

Practical # 2 Basic ArcGIS operations continued

VECTOR GIS CONCEPTS AND OPERATIONS. Classifying features. Attribute and spatial queries. Labeling and annotation. Measuring features' distance, area, perimeter. Selecting features and creating new map layers. Choropleth and dot density maps.

Practical # 3: Classifying data. Querying. Labeling. Creating thematic maps.

Box 2 continued

DATA AND INFORMATION. Data Concepts: Raw data and processed information. Primary and secondary data. Aspatial and spatial data. Discrete and continuous data. Levels of measurement. Metadata. Joining and relating tables in ArcGIS. Data Transfer. Vector and raster data Capture. Creating shapefiles. Editing attribute tables.

Practical # 4 Online spatial data. Creating shapefiles. Editing attribute tables.

COMPUTER CARTOGRAPHY. Bertin's visual variables. Cartographic considerations. Map scale, generalization, resolution, accuracy, and precision. Symbolizing points, lines, and polygons. Map layouts. Measuring and representing the earth. Geodesy. Datums. Coordinate systems. Projections.

Practical # 5 Symbolizing map features and creating map layouts.

GEOPROCESSING AND GEOCODING. What Is Geoprocessing? Geoprocessing operations. Dissolve. Merge. Clip. Buffer. Union. Intersect. Spatial join. Geocoding.

Practical # 6 Geoprocessing. Geocoding

RASTER GIS. The Raster GIS Model. Straight line and least cost distance. Thiessen polygons (distance allocation). Simple and kernel densities. Inverse distance weighted interpolation. Converting features to rasters and vice versa. Reclassifying rasters. Raster analysis

Practical # 7 Raster GIS

SPATIAL ANALYSIS. What is spatial analysis? Vector GIS Analysis. Selection. Generalization. Classification. Measurement. Vector spatial overlay. Raster GIS analysis: Proximity analysis. Cell-by-cell analysis. Neighborhood (focal) analysis. Global analysis. Loosely-coupled analysis. Analyzing GIS attribute data with statistical packages. Creating data graphics from GIS data. Hyperlinking objects to features. GIS and Computer Assisted Design (CAD).

Practical # 8 Spatial Analysis

ADVANCED SPATIAL PLANNING: Remote sensing. Two and one half and three dimensional spatial models and analysis. Web-based GIS. Mobile GIS. Virtual Reality. Geostatistics. Advanced analysis Network analysis, surface analysis, Modeling. Static models. Suitability models. Dynamic (spatio-temporal) models. Cellular automata and agent-based models. Compexity theory. **INNOVATIONS:** Google Earth and related "digital earths." London Profiler. GMAP Creator. MapTube.

Practical # 9. Final integrative project

FINAL PROJECT PRESENTATIONS

GIScience concepts and operations can be taught to urban planners in many different ways. Carefully designed courses that self-consciously address different elements of good curriculum design will be stronger than ones that do not. Birkbeck College, University College London professor emeritus David Unwin has identified principle for GIS curriculum design (Unwin, 1997). According to Unwin good GIS courses should be based on:

- Explicit statement of the ideology underlying the instruction
- Specification of general long term aims.
- Specific, testable short term objectives
- Identification of resources to be used
- A clearly articulated delivery method.
- Appropriate timing and sequencing of units
- Good assessment procedures
- A well-articulated evaluation methodology

Some UK faculty teaching GIScience for urban planners have developed exemplary course content, pedagogy, data sets, and other course components worthy of emulation. In the 2007 Cardiff meeting a number of participants identified themselves as having just started or intending to start GIScience for planners courses and said they would appreciate learning from others with more experience.

The best way to identify best practices and get them adopted is through a mutually supportive special interest group of urban planning practitioners themselves. The 2007 Cardiff meeting began this process. Richard LeGates' 2007 SPLINT research (LeGates, 2008a) and earlier research on the way in which GIScience is taught in U.S. urban planning programs (LeGates, 2005) identifies some models of good practice, including:

- Robert Stinson's statement of course objectives in a course at the University of Queensland, Australia summarized in the LeGates' working paper (LeGates, 2008a)
- An introduction to the science underlying GIScience in six modules on turning data into information developed by Paul Longley available on-line from ESRI at http://www.esri.com
- Relating laboratory exercises to urban geography and planning theories in courses Richard Greene teaches at the University of Northern Illinois reproduced in *Exploring the Urban Community* (Greene and Pick, 2004)
- Helping student confront messy data problems in William Huxhold's courses at the University of Wiconsin, Milwaukee presented in *GIS and the Digital City* (Huxhold, Fowler, and Parr, 2003)
- Modeling courses taught by Cecilia Wong at the University of Manchester
- Automated screencasts of common GIS operations prepared by Adalsair Rae at Manchester University
- Imaginative exercises applying GIS skills to standard land use practices developed Ann-Marie Esnard at the University of Florida and described in the *Hypothetical City workbook* (Kaiser, Godschalk, Esnard, and Berke, 2006)

5. SPLINT and CEBE Projects Related To GIS in Planning Education

SPLINT offers fellowships to scholars to work on projects that will advance spatial literacy in UK higher education. During 2007 – 2008 SPLINT hosted Richard LeGates, a professor of Urban Studies from San Francisco State University and co-author of this white paper, to conduct research on the way in which GIScience is taught in UK urban planning programs and to develop recommendations for strengthening GIScience teaching for urban planners as one of five first round of SPLINT fellows.[8] Professor LeGates' research will be released as a SPLINT working paper (LeGates, forthcoming 2008a) available from the SPLINT website and summarized in an article in the *Journal of Education in the Built Environment* (LeGates, forthcoming, 2008b) available from the SPLINT and CEBE website. SPLINT intends to fund a second round of SPLINT fellows in 2008.

In Spring, 2007 CEBE convened a one-day meeting at Cardiff University or16 urban planning educators from England, Scotland, Wales, and Northern Ireland who teach GIScience and spatial thinking in urban planning programs to share information on their curricula, choice of software, datasets, pedagogy, and interest in forming an ongoing GIScience planning educator's special interest group. In addition to twelve planning academics[9], Nicholas Tate, Paul Longley, and Richard LeGates from SPLINT and Chris Webster from CEBE attended the meeting. Some participants expressed the view that the RTPI was not very prescriptive in terms of GIS content for planning programs or that there was evidence that they endorsed the kind of spatial literacy skills that this group of GIS educators felt were important. CEBE intends to form a UK Urban Planning Educator's GIS SIG using participants in the initial 2007 meeting as a core group.

6. Recommendations

To date the RTPI initial planning education and lifelong learning activities, SPLINT research on UK spatial planning, and the UK Planning Educators' GIScience SIG have been working largely independently of each other.

8 Professor LeGates has directed a U.S. National Science Foundation project for disseminating GIS and spatial thinking in the Social Sciences, studied the way in which GIScience has been incorporated into U.S. urban planning education (LeGates, 2006) , and authored a textbook introducing GIS to undergraduate social science students (LeGates, 2005).

9 John Anthony, City of Bath College; Neale Blair, University of Ulster; Jianquan Cheng, Manchester Metropolitan University; Peadar Davis, University of Ulster; Nick Fearnside, Swansea University; Andrea Frank, Cardiff University; Karen Keaveney, Queens University Belfast; John Marsden, University of Liverpool; Nick Morton, University of Central England; John Onyango, Glasgow School of Art; Scott Orford, Cardiff University; and Sean White, Cardiff University.

Given budget and staffing limitations, the decentralized structure of RTPI initial and lifelong learning, and the wide range of competing responsibilities and priorities it is not realistic to expect RTPI central office education staff to lead efforts to improve GIScience and spatial teaching in UK urban planning programs alone. The RTPI is well equipped, however, to disseminate information to practicing planners and to facilitate activities by planning organizations in different regions of England to improve spatial thinking and the use of spatial information planning in technology. SPLINT and CEBE budgets and remits limit the extent to which they can support efforts to improve GIScience and spatial teaching in UK urban planning education, though both have expertise to impart and are well connected to networks of academics with expertise in spatial thinking, spatial information technology, and urban planning.

There is a significant opportunity for SPLINT, CEBE, and the RTPI to collaborate, pool expertise, and mobilize their respective constituencies to clarify the role of GIScience in initial and lifelong spatial planning education, share research related to the teaching of GIScience in UK planning programs, facilitate discussions of the role of GIS in spatial planning in RTPI, SPLINT, and CEBE publications, and involve UK planning professors who have developed models for teaching GIScience in RTPI conferences and continuing education programs.

We propose a strategy that emphasizes collaboration, specialization, decentralization, and involvement of the academic and professional planning establishments.

In terms of collaboration we recommend that the three organizations continue to share information on their respective activities related to spatial thinking and spatial information technology of value to planners. If a second SPLINT fellow is selected to continue work related to spatial literacy in UK urban planning he or she could serve as a liaison between to the three organizations and also keep GEES, planning practitioners, and UK spatial planning experts apprised of the collaboratives' activities. Key leadership of the three organizations most directly involved in education—Sue Percy the RTPI's Director of Membership Education and Lifelong Learning, Nick Tate, SPLINT Director, and Chris Webster, CEBE director—should meet periodically and maintain e-mail and phone communication. Other key people at the RTPI, SPLINT, and CEBE who should be kept informed include George Law the RTPI's Lifelong Learning Manager, Andrea Frank CEBE Deputy Director, and Paul Longley the UCL SPLINT director. A planned fall, 2008 meeting of the UK Planning Educators' GIScience SIG at Cardiff would be a good occasion for a first meeting.

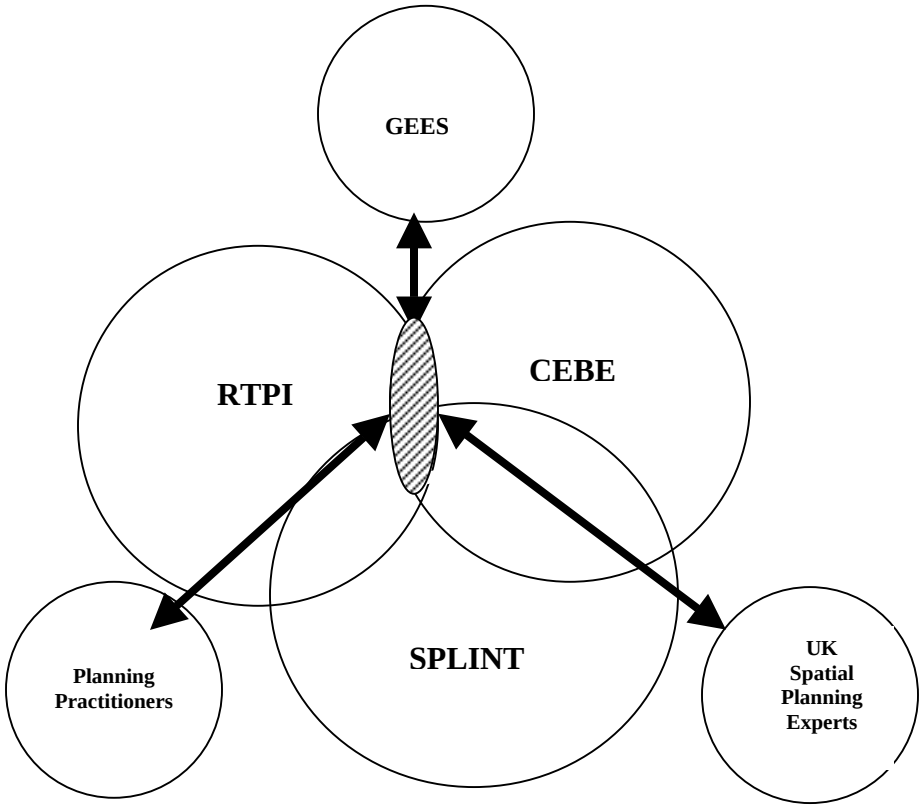
In terms of specialization, SPLINT is particularly well equipped to contribute expertise in advanced and innovative spatial analysis, support for research and dissemination of knowledge, and insights on pedagogy for teaching spatial thinking; CEBE has the ability to facilitate communication among urban planning professors and others involved in built environment education; and the RTPI is particularly well equipped to reach practicing planners through their initial and lifelong planning education infrastructure.

Our recommendation about a decentralized approach, involving urban planning academics and professional planners is based on RTPI practices and budget limitations all three organizations face. The RTPI has a culture of facilitating flexible activities by regional and local organizations of practicing planners that are largely designed and carried out at the regional level rather than imposing top-down programs. Central office staff provides policy guidance, facilitate communication, and support these regional efforts. While each of the three organizations may be able to contribute a small amount of staff time and resources to efforts to strengthen spatial thinking and use of spatial technology in urban planning, all three need to rely on voluntary efforts of their constituents—urban planning faculty and practicing planners—to do most of the work.

Figure 1 illustrates the suggested collaboration. The three large circles represent the three partners—SPLINT, RTPI, and CEBE. The small overlap area in the middle represents the collaboration. The fact that it is small is significant—each of the three partners has a large portfolio of actitivites and the collaboration would be a very small part of each partner's workload. The three smaller circles represent organizations with a significant interest in the collaboration—The Geography, Environment, and Earth Science Centre at the University of Plymouth (GEES), UK planning practitioners, and UK spatial planning experts. They would not be partners, but should be kept informed of the collaborative's activities. Two-headed arrows indicate that they could both contribute to and benefit from the collaborative.

Figure 1

SPLINT/RTPI/CEBE Collaboration



The following are specific recommendations:

- Augment the UK GIScience Planning Educators' GIScience SIG and make relations with the RTPI one of their concerns. CEBE intends to convene the UK Planning Educators' GIScience SIG in fall, 2008. We recommend that in addition to people who attended the 2007 meeting, the SIG meeting include the RTPI education staff—Sue Percy and George Law—as well as other individuals who have expressed an interest in GIScience and spatial planning education who did not attend the initial meeting.[10] The group could also benefit from the experience of pioneers who have worked for many years on the relationship between spatial thinking, spatial information technologies and urban planning[11]. We recommend some time be reserved on the agenda for Sue Percy and George Law to describe the RTPI's education activities and policy related to spatial planning and for discussion of collaboration between the UK Planning Educators' GIScience SIG and the RTPI.

  We recommend that the UK Planning Educators' GIScience SIG establish a structure and agenda of tasks to work on between annual meetings and plan on a third annual in 2009 which would consider materials developed during the intervening year. We envision continuing dialogue among SPLINT, RTPI, CEBE, and the UK Planning Educators' GIScience SIG leadership with possible input from GEES, practicing UK planners, and UK spatial planning experts

- Inform key GEES staff, European spatial planning experts, and UK urban planning practitioners about SPLINT/CEBE/RTPI activities and establish two-way communication with these communities

  We recommend that the SIG meeting organizer work with the RTPI to identify a few key practicing planners interested in GIScience to invite to the fall SIG meeting. Malcolm Baker, the Assistant Planning Director of Devon County Council and author of a RTPI short course that introduces planners to GIS might be one logical choice.

10 Richard Kingston, Cecelia Wong, and Adalsair Rae from the University of Manchester's School of Environment and Development, Ann Hockey from Anglia Ruskin University, Nick Groome from the Ordnance Survey, Steve Essex from the University of Plymouth Geography Department (which is starting a new planning program), Alistair Geddes from the University of Dundee, and Brian Chalkley from the Geography, Environment, and Earth Science (GEES) Subject Centre.

11 Michael Batty at CASA, David Unwin, formerly at Birkbeck college, and Ian Masser formerly from the International Institute for Geo-Information Science and Earth Observation have worked on these issues for decades and important contributors to current discussions.

We recommend that the SIG meeting organizer contact key UK scholars and practitioners involved in European and UK spatial planning to invite to the fall SIG meeting. Good choices include Cliff Hague, a former RTPI president and Heriot-Watt Professor, who is now the UK contact person for the European Spatial Planning Observation Network (ESPON), Mark Tewdwr-Jones, Professor of Spatial Planning and Governance at the Bartlett School, University College London, Vincent Nadin, a Reader in Planning and Architecture at the Centre for Environment and Planning at the University of the West of England, who has written extensively on European Spatial Planning, and authors of the UCL/Deloitte study.

- Disseminate the results of the initial SPLINT research—Richard LeGates' working (LeGates, 2008a) paper and JEBE article (LeGates, 2008b) and this white paper on the SPLINT and CEBE websites.

Continue the SPLINT research and dissemination efforts related to GIS education in urban planning. We recommend that SPLINT allocate one of its second round fellowships to a SPLINT fellow who would: (a) provide leadership to the UK Planning Educators' GIScience SIG, (b) act as a liaison between SPLINT, CEBE, and the RTPI with respect to spatial planning education activities, and (c) pursue a research agenda that would inform all parties of what GIScience and spatial thinking skills planners and planning academics feel should be taught and what RTPI initial planning education policy should be with regard to use of GIS in spatial planning. To supplement the LeGates working paper we recommend a survey of practicing planners to determine what spatial thinking and spatial information technology skills they feel are most needed and the best delivery mechanisms to improve initial and lifelong planning education with respect to them.

- Solicit material on GIScience education from faculty involved in GIScience education for dissemination by RTPI's PERN network;

- Encourage the RTPI to set-up a GIS & ICT network to share best practice and learn from one another;

- Include presentations on GIScience in urban planning education at CHOPS meetings, the RTPI annual conference, RTPI regional conferences and the annual UK Planning Research conference as appropriate;

- Work with RTPI central office education staff and RTPI's regional organizations of practicing planners to design and implement short courses on spatial thinking and spatial information technology for practicing planners and training sessions on use of software and other technology. Four types of sessions appear particularly promising:

a. Short courses on best practices in introductory courses on spatial thinking and GIScience for planners. These should be taught by urban planning faculty who have well established GIScience courses to teach planning faculty with who are seeking to establish new GIScience courses appropriate GIScience concepts, skills, and pedagogy. Longley, Goodchild, Maguire, and Rhind's, *Geographical Information Systems and Science* should inform these courses. The description of hypothetical course content in box 2 might guide courses like this. A second SPLINT fellow could work with the UK Planning Educators' GIScience SIG to identify best practices in GIScience planning education and propose appropriate short course topics and faculty who could staff them.

b. Introducing GIS planning educators to advanced spatial thinking and technology. Most UK planning courses on GIS teach only two dimensional, vector, GIS concepts using off-the-shelf software. Faculty and staff associated with SPLINT and CEBE—particularly staff at the Centre for Advanced Spatial Analysis and planning (including PhD students and junior staff as well as senior staff), some faculty at other UK universities, and some practitioners have expertise in planning applications of advanced spatial thinking—two-and-one-half dimensional GIS, geostatistics, spatial econometrics, network analysis, transportation and environmental modeling, cellular automata and agent-based modeling, remote sensing, photogrammetry, web-based GIS, virtual reality, and other areas. Lectures by experts to the UK GIScience Planning Educators' GIScience SIG could equip planning faculty to include at least a description of advanced topics in their courses. If there is sufficient interest, replicating the U.S.-based Centre for Spatially Integrated Social Science (CSISS) summer workshop model might be appropriate. For example, CSISS offered weeklong workshops on remote sensing and modeling to faculty with no previous background in remote sensing.

c. GIS Planning Educators' Users Group meetings. To date the UK GIScience Planning Educators' SIG has devoted meetings to broad discussion of pedagogy. If there is sufficient interest, additional meetings of the group in the form of a users group could involve exchanges of data sets and exercise material or one or more members particularly skilled in an area teaching other users concepts and skills.

d. Training session on emerging technologies. New spatial information technologies are emerging rapidly. There are many new specialized programs and tools that are not difficult to use, but require someone familiar with them to guide users. CASA has created tools—GMap Creator and MapTube—that would be very useful to UK urban planning educators. Rapid changes in Google Earth, Google Maps, SketchUp, Mobile Computing, and many other areas are appropriate for training sessions.

- Investigate the current skills gap in planning practitioners knowledge in relation to spatial planning so educators can keep curricula up to date and relevant to practice;

- Initiate discussion of revisions of the spatial planning section of the RTPI Policy on Initial Planning Education to include clearer standards re GIScience. Appendix D is a discussion draft of text on baseline GIScience and spatial planning skills we feel all planners should know and how planning schools that choose to have a GIScience specialization should approach curriculum design. We recommend that participants in the second CEBE GIScience for urban planners SIG meeting discuss the RTPI *Policy on Initial Planning Education* and this draft addition in fall, 2008 and again in the following year.

  If a second SPLINT fellow is selected and does research on what GIScience and spatial thinking skills practicing planners feel planners should have, that would provide important information for the second year discussion. We advocate taking adequate time to discuss this policy change and having it fully vetted by both planning practitioners and planning academics. We hope that this process will result in a formal change, but are convinced that regardless of the outcome, that research, discussion, and debate will be helpful to all parties.

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Appendix A: RTPI Policy Statement on Initial Planning Education Section 6 – Spatial planning education

6.1 Recognising the contingent and dynamic nature of planning knowledge, the RTPI does not specify a detailed or prescribed curriculum for spatial planning education. Instead, it expects planning schools to develop their own ideas and initiatives in constructing programmes that enable students to acquire necessary knowledge, skills and awareness of values. This requires the structure, content and objectives of individual programmes to be clear and well worked out.

6.2 In this context, the RTPI firmly believes that schools should keep their educational delivery under regular review, reflect continuously on its relevance and effectiveness and be prepared to engage in frequent debate with their student body and partnership board on their chosen curriculum design, as explained and justified within their Statement of Educational Philosophy.

6.3 The Institute particularly wishes to encourage innovative and imaginative approaches to planning education that promote explicit integration of knowledge, skills and values and that seek to challenge compartmentalized thinking in planning. To achieve this, spatial planning programmes should avoid superficial treatment of too wide a range of material and aim instead to facilitate integrated understanding of broad matters of principle that reveal and connect:

- Social science as an analytical framework
- The interplay between land use and transportation
- Design and the realization of place
- Economic issues relating to development
- Environmental challenges
- Legal and institutional frameworks[12].

6.4 In doing this it should be remembered that initial planning education represents the first stage in what should be a life-long programme of development and acquisition of knowledge and skills. Thus, it is about providing a platform of understanding of the broad principles that govern planning operations, rather than about meeting an ever widening set of specific requirements.

6.5 Beyond this, the RTPI believes that any further curricular expectations are best specified as indicative learning outcomes rather than as precise input requirements. These indicative outcomes are intended to highlight and, wherever possible, integrate essential aspects of planning knowledge, skills and value awareness. It is for planning schools to determine the importance of these learning outcomes and decide how they

12 It must be emphasised that the need to relate spatial planning to legal and institutional frameworks does not necessarily require a grounding in or specific reference to any of the British systems. Accreditation from the RTPI need not and should not carry connotations of educating for practice only in Britain or Ireland

are best achieved within the context of their own educational philosophies. 6.6As these learning outcomes suggest, spatial planning requires knowledge of how relationships in place and space both change and develop over time and are open to positive influence by creative planning. This demands understanding of social, economic and environmental relationships within different political and cultural contexts. In practice, creative planners also need to be well equipped with diverse skills, some of which are particular to the planning task and some of which may be considered more generic or transferable in nature.

6.6 Since planning activity is necessarily fashioned within a particular set of social and professional values, it is essential that graduates are aware of how values affect planning decisions, and acquire the lifelong habit of reflecting upon their own values and the effect of these upon their own planning work.

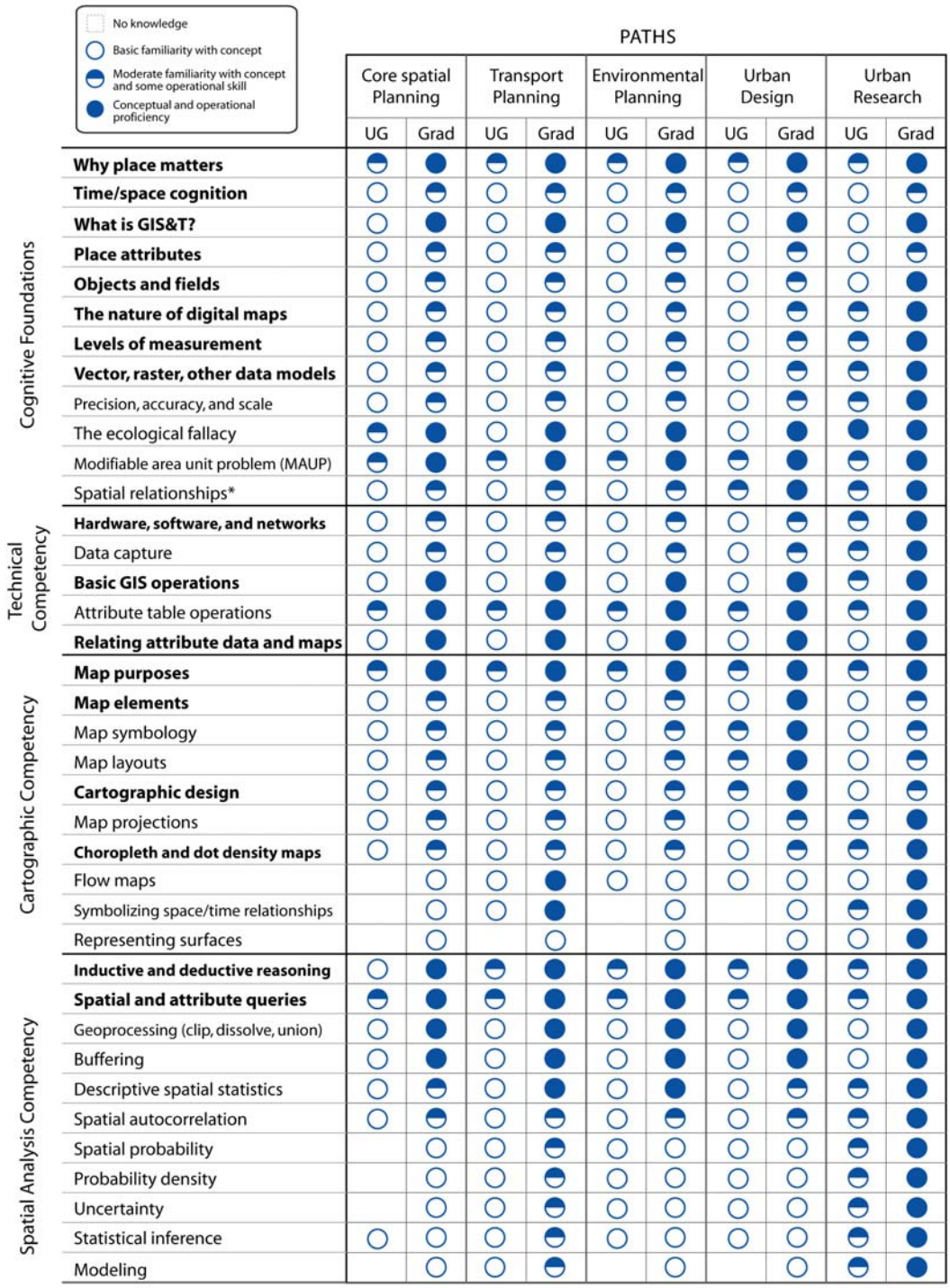
6.7 As indicative learning outcomes, typical graduates from spatial planning programmes should be able to:

1. Generate visionary and imaginative responses to spatial planning challenges that are realistic and derive from substantial investigation and analysis of relevant data and other evidence.
2. Articulate such responses through coherent and integrated strategies, plans or programmes that take account of relevant institutional frameworks and combine creative direction for the future with credible means of implementation.
3. Demonstrate the ability to reach decisions or to make recommendations in which the significance of such strategies, plans, or programmes is balanced with other relevant factors that ought to be taken into account.
4. Demonstrate effective research and appraisal skills, evident in data sourcing, collection, investigation, quantitative and qualitative analysis, weighing evidence and reaching sound conclusions.
5. Recognize the role in the planning process of such skills as negotiation, mediation, and advocacy and the importance of team working, often with other professionals, in an inter-disciplinary context.
6. Appreciate the importance of resource issues (especially human and financial resources) and organizational management processes and initiatives in helping to deliver effective spatial planning, together with the need for personal management skills and development, and knowing how and when to seek input from others. Recognize the political nature of decision-making in planning, and understand the need for all planners to develop the ability to work effectively within democratic decision-making structures, including the capacity to explain such ‘process’ matters clearly to a wide range of stakeholders.
7. Appreciate the importance of time in the planning process, realizing how the short-term and longer-term consequences of planning decisions may impact differentially on those affected.
8. Appreciate the importance and process of design in creating high quality places and enhancing the public realm for the benefit of all in society, and evaluate the effectiveness of alternative design approaches in achieving this.
9. Evaluate the case for and against spatial planning and particular forms of spatial planning and assess what can be learnt from past experiences of spatial planning in different socio-economic, cultural and political contexts.

10. Demonstrate understanding of the natural environment, its values to society, and its underpinning of economic development.
11. Debate the relationships between environmental processes and social, economic and political events, and appreciate the potential of planning to exert a positive influence on the changes that arise from these interactions.
12. Understand the relationship between market processes, built form, different development models and patterns of movement, evaluate the economic and financial implications of alternative development strategies and consider how best to generate and capture added value for both particular interests and the wider community.
13. Acknowledge that development decisions have differing impacts on different people, and develop the capacity to identify and explain these impacts so that they can be properly taken into account in planning decision-making.
14. Appreciate and respect diversity of cultures, views and ideologies, and understand how that respect can be applied in planning systems through the pursuit of equal opportunity, social inclusion and non-discrimination (on the grounds of wealth, gender, age, race, disability, religion and culture).
15. Acknowledge the values underlying interpretations of sustainability, and explore what sustainability implies about the role of planning in promoting social and economic development, while conserving environmental, social and cultural heritages for transmission to future generations.
16. Understand the concept of rights, including the balance between individual and collective rights, and the legal and practical implications of representing rights in planning decision frameworks.
17. Recognize the importance of stakeholder involvement and public participation in the planning process and of engaging and communicating with (by appropriate and varied means) a diverse range of interests, including local residents and community groups, business people, commercial developers, politicians and protest groups.
18. Appreciate the meaning of professionalism, including probity and adherence to independent informed judgment; the identification of clients and the duties owed to them; the concept of conflict of interests; and the importance of a commitment to lifelong learning to maintain and expand professional competence.

6.8 It must be emphasized that this indication of learning outcomes is intended not as a rigid checklist but as a helpful contribution to curriculum design. The critical test of a well-informed planner is the ability to interrelate knowledge, skills and value awareness in a range of practical and academic tasks and to understand how quality planning can make an essential and beneficial difference to people's lives. Partnership boards will thus be expected to keep under review the extent to which they consider the integration of these learning outcomes to be achieved and, where relevant, to make recommendations on how they might be delivered more effectively.

Appendix B: LeGates' Spatial Planning Education Competency Matrix



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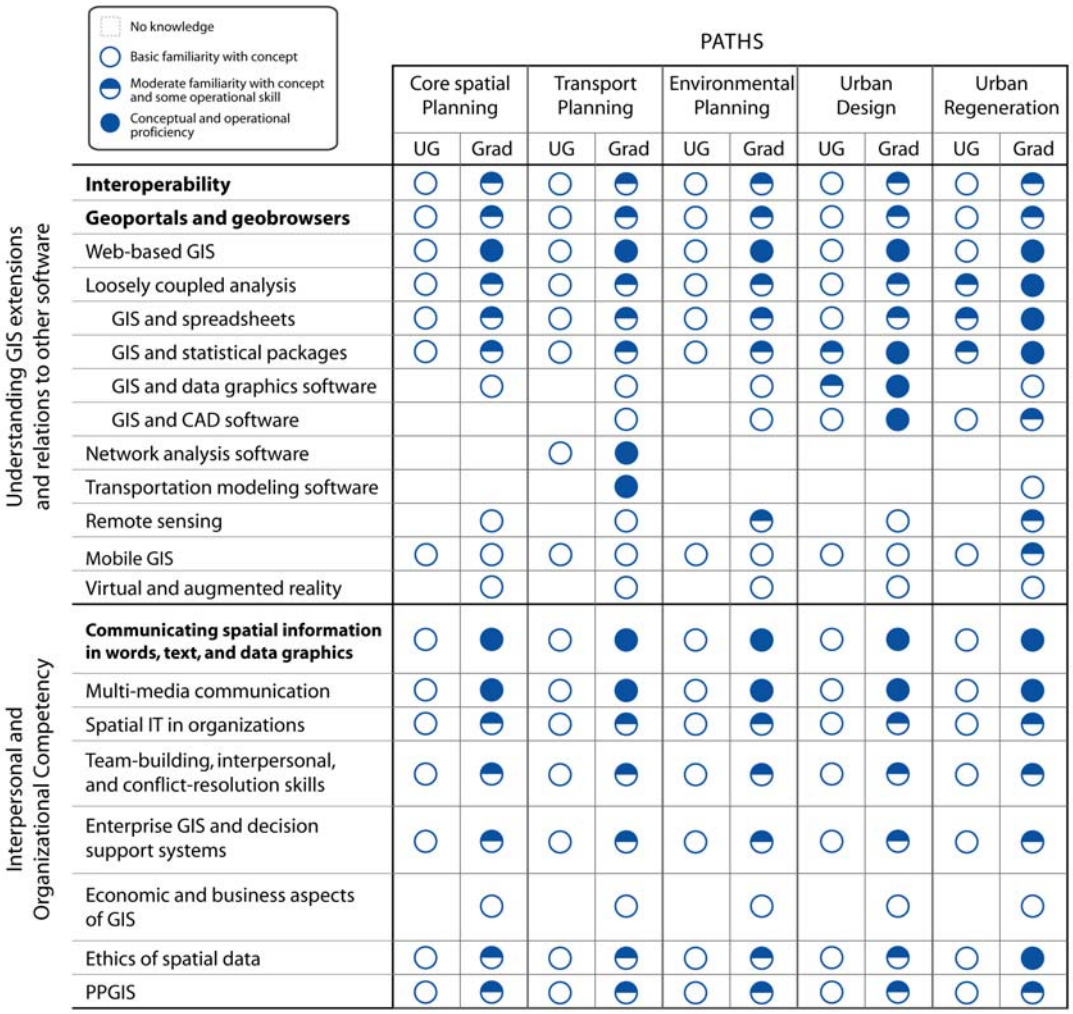
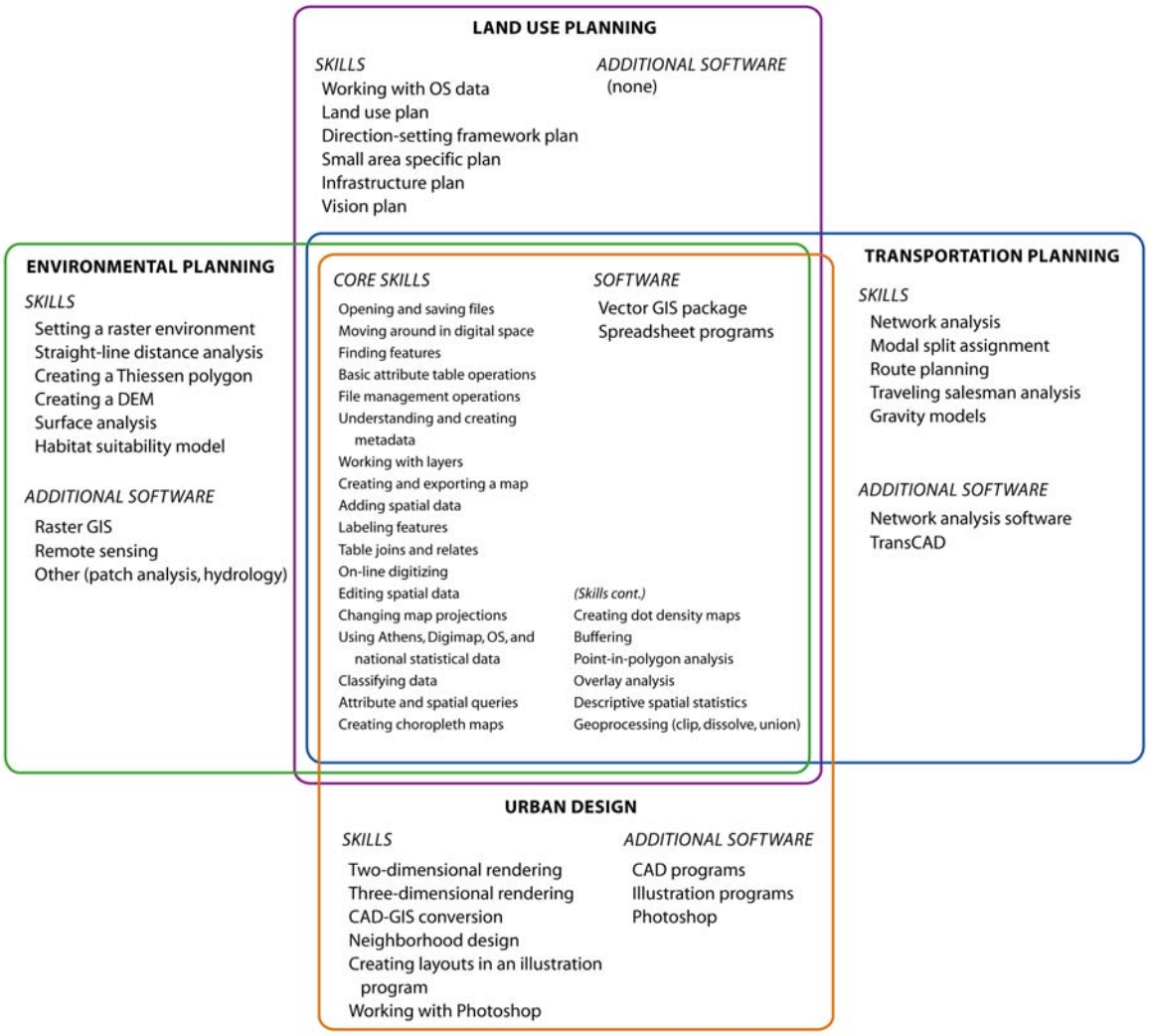


Source: Richard LeGates,
Achieving the Promise of UK Urban Spatial Planning Education.
Leicester. SPLINT, Forthcoming.

Appendix C: LeGates Venn diagram suggesting GIScience skills appropriate for UK spatial planners



Source: Richard LeGates,
Achieving the Promise of UK Urban Spatial Planning Education.
Leicester. SPLINT, Forthcoming.

Appendix D Suggested New sections to RTPI Policy Statement on Initial Planning Education

6.7.5. Demonstrate an understanding of Geographic Information Systems (GIS) and related spatial information technologies are and how they are used in spatial planning. Graduates should be familiar with the cognitive foundations of GIScience and have technical, cartographic, analytical, interpersonal, and organization competencies in spatial thinking appropriate to their academic level and specialization within planning.

7. Planning programs that chose to offer a specialization in GIScience in planning should provide sufficient coursework, including practicals, to provide graduates with a solid foundation in underlying principles of GIScience and sufficient competencies to enter the geospatial planning workforce. Programs should clearly specify the relationship between components of their curriculum and intended learning outcomes with respect to cognitive foundations of GIScience and technical, cartographic, analytical, interpersonal, and organization competencies in spatial thinking.