Getting started as a GIS professional

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Outline

- What does it mean to be a GIS professional?
- What does it take to become a GIS professional?

"Passion"
Training

Is GIS a profession?

Experience
Professionalism
Certification
Attributes of a profession*

- A mission
- A formal organization
- A common language
- Culture and lore
- Specialized training
- A specialized body of knowledge
- Code of ethics
- Licensing or certification

*from D.L. Pugh, 1989

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Definitions

- **Certification**
  - candidate meets a specified set of criteria defined by a certification board

- **Qualification**
  - usually a degree obtained by following a formal university course of study

- **Licensure**
  - regulated by legislation, intended to protect public health, safety and welfare

- **Accreditation**
  - evaluation of education programs

Why certification?

- Is this person qualified to do the job?
- How to compare one person’s qualifications with another?
- How to compare certificates offered by different institutions?
- How to compare qualifications across international boundaries?
- Need to define the profession so that some sectors do not take control.
Who benefits from certification? (1)

- Practitioners
  - esp. professionals who do not have a university degree in a relevant discipline
  - demonstrates that knowledge and skills have been attained
  - may increase salary

- Employers
  - assessment of applicant's qualifications
  - identifies basic skills needed for a job

Who benefits from certification? (2)

- Educators
  - defines appropriate contents for education programs

- Students
  - provides guidance on the knowledge and skills needed
  - helps in evaluation of various education sources
Why NOT certification?

- no clear definition of the profession
- no clear understanding of the necessary skills and knowledge
- control of the profession may be assigned to a single organization
- potential to limit growth of the field, exclude qualified people
- impacts academic freedom.

Challenges

- a multidisciplinary, multi-level profession
- defining the necessary competencies
- assessing competencies
- managing the necessary infrastructure
Certification Activities/Programs

- ISO TC 211, Project 19122
- GIS Certification Institute (US-based)
- Spatial Information Sciences Institute (Australia)

ISO TC 211, Project 19122

- ISO
  - International Organization for Standardization
- TC 211
  - Technical Committee on Geographic Information/Geomatics
- Project 19122
  - Qualification and certification of Personnel
**Defining professionals - ISO TC 211**

- Project 19122 to prepare a report
  - to describe a system for qualification and certification,
  - by a central independent body,
  - of personnel in the field of GI/Geomatics
- Original proposal by Canada in 1998
  - motivated by agencies funding foreign contracts

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**ISO TC 211, Project 19122**

- Survey of certification/qualification systems
  - Incomplete coverage, mostly completed by members of the surveying community
- Case studies of national education systems and certification opportunities for GI/Geomatics, included sections on:
  - Terminology
  - Professional associations
  - Current qualifications and certification initiatives
  - Future directions
National Case Studies

- Australia
- Austria
- Canada
- China*
- Finland
- Germany
- Japan

*K with drawn or incomplete

Certification/Qualification models

- Competency guidelines
- Qualification through education
  - University degrees
  - National Vocational Qualification, e.g. Australia, South Africa
- Exams
  - National exam body, e.g. Korea, Japan
  - National exam through education institution, e.g. Germany
Implementation models (cont)

- Competency guidelines
- Qualification through education
- Exams
- Professional certification, e.g. Canada, US, Australia
- Individual professional development, e.g. UK
- Mutual recognition, e.g. FIG
- International regulation, e.g. IHO

ISO TC 211, Project 19122

- Results
  - Produced a “white paper” on our research
  - Recommended that ISO *not* take the lead on certification
  - Should be advanced by a broadly based international professional organization which
    - promotes the wide range of qualification and certification systems currently in place within individual countries
    - builds on this report’s framework to identify similarities and differences between national and regional systems
GIS Certification Institute

- Project initiated in 1998 by URISA in the US
- Developed by a large committee with representation from many different GIS organizations and domains
  - lots of meetings over several years, lots of community input informed the final version
- Program formally started in January 2004
- Run by an independent certification organization, GIS Certification Institute (GISCI)

Guiding Principles for GISCI Program

- Must be voluntary and open to all
- Must be flexible
- Must use existing GIS educational bodies
- Must be collaborative
- Must include a code of ethics
No Test!

- Point-based and self documentos
- Based on achievement in three categories:
  - Educational attainment
  - Professional experience
  - Contributions to the profession

Defining professionals - GISCI

- Certification based on total points
  - Education points
    - Minimum required is equivalent of an undergraduate degree
    - However, points can be obtained for GIS courses, workshops, seminars, conferences
  - Experience points
    - Equivalent of 4 years in GIS data analysis, system design or programming position
  - Contributions to the profession
    - Points given for publications, conference presentations, committee membership, awards, GIS Day, mentoring
GIS Certification Institute

- Program is very successful
  - After 13 months of operation (Feb '05), there were 634 GISPs (GIS Professionals)
- International applicants are encouraged to apply
  - www.qisci.org

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The GIS Code of Ethics

- Developed by Will Craig and the URISA Certification Committee
- Intended to
  - help professionals make appropriate and ethical choices
  - help preserve and enhance public trust in the discipline
- May be used to apply sanctions for unethical behavior

Obligations to society
- Do the Best Work Possible
- Contribute to Community to Extent Possible
- Speak Out About Issues

Obligations to Employers and Funders
- Deliver Quality Work
- Have a Professional Relationship
- Be Honest in Representations
The GIS Code of Ethics - cont

- Obligations to Colleagues and Profession
  - Respect the Work of Others
  - Contribute to the Discipline
- Obligations to Individuals
  - Respect Privacy
  - Respect Individuals.

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What do you need to know?

- **NCGIA Core Curriculum 1990**
  - List of fundamental topics formed the foundation for many early GIS university courses
- **Australia, South Africa skills standards**
  - Define vocational skills needed by workers in the GI industry
- **NASA/USM Competency Model**
  - Summarizes a comprehensive set of generic business skills rather than focusing on key GIS knowledge
- **UCGIS Model Curricula**
  - Seeking to define a GIS Body of Knowledge
  - Textbooks reflect author’s version.

US Department of Labor

- “Geospatial Technology” recognized as one for the three high growth employment areas
- “DOL is partnering with employers and education providers to develop and model skills training solutions nationally”
How do you learn?

- Training
- Practice
- Professional education
  - Defining a new level in the GIS career track
  - Building a critical part of the human infrastructure
Program design

- Internationally oriented
- Intensive, one year, residential
- Combines science, technology and project management
- Concentration in geographic information and analysis
  - Program core is “geographic information”
  - Suitable for professionals and recent graduates from any field with some GIS experience

Program goals

- Graduates enhance their existing academic foundations and experience with
  - comprehensive understanding of GI Science fundamentals
  - the use and application of GI technologies, and
  - experience managing group and individual projects
- Graduates prepared to be GIS practitioners
  - project managers
  - applications specialists
  - applications software development team members
<table>
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<tr>
<th>Topic/ Months</th>
<th>GI Science</th>
<th>GI Technology</th>
<th>Project</th>
<th>Professional Practice</th>
<th>Electives</th>
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<tr>
<td>1-2</td>
<td>Fundamentals of Geographic Information</td>
<td>Introduction to GI Technology</td>
<td>Project scoping</td>
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<td>3-4</td>
<td>Information Systems Foundations for GIS + Statistics for GIS</td>
<td>Creating and Managing Geodatabases</td>
<td>Project Analysis</td>
<td>UR/ESRI Colloquium</td>
<td>GIS for the Web</td>
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<tr>
<td>5-6</td>
<td>Spatial Analysis</td>
<td>Working with GIS</td>
<td>Project Proposal</td>
<td>GIS Software Training</td>
<td>Fundamentals of Remote Sensing</td>
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<td>7-8</td>
<td>Programming for GIS</td>
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<td>Project Design</td>
<td>Special Workshops</td>
<td>GIS for the Web</td>
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<td>9-10</td>
<td>Communicating Geographic Information</td>
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<td>Project Implement’n</td>
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<td>11-12</td>
<td></td>
<td></td>
<td>Completion and Closure</td>
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**Building the GIS professional**

- Professionals are a critical part of the infrastructure for GIS projects and enterprises
- Professionals need more than technical training
- Professionals should take responsibility for maintaining and upgrading their skills and knowledge
- Professionals should recognize the code of ethics
Websites for more information

- www.institute.redlands.edu
  - /msgis
  - /kemp/certification.html
  - /kemp/certificates
- www.qisci.org
- www.spatialsciences.org.au
- www.ucgis.org
- www.ncgia.ucsb.edu
- email: karen_kemp@redlands.edu

Thank you for your attention!

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