Geographic Information Systems and Social Learning in Participatory Spatial Planning

Robert Goodspeed
MIT Department of Urban Studies and Planning
ACSP - November 3, 2012

Overview
• Study Context
  • Spatial Planning
  • Scenario Planning
  • GIS-based Planning Support Tools
  • Previous Research
• Theory
  • Communicative Rationality
  • Social Learning
• Research Design
  • Theoretical Framework
  • Survey Development
  • Case Structure
• Conclusions
  • Workshops
  • Processes
  • Regions

Focus of presentation
Strategic spatial planning is a “public-sector-led sociospatial process through which a vision, actions, and means for implementation are produced that shape and frame what a place is and may become.” (Albrecht 2004) Increasingly created using spatially explicit land use and transportation scenarios.

Spatial planning is increasingly important to achieve environmental and social policy goals, and manage urban change.

Increasing Number of Spatial Planning Projects

Source: Bartholomew (2007)
An Increasing Number use GIS Support Tools

Emerging experimental literature:

- Digital maps have higher intensity of use and negotiation than paper maps (Arciniegas, Janssen and Rietveld 2012)
- Calculated indicators rated as very helpful by participants (Salter et al 2009)
- GIS tool supported small group analytic-integrating phase (Jankowski and Nyerges 2001)
- Variation among individuals in use of web-based viewer (Smith et al. 2012)

Sources: Medford (MAPC), Marshfield (author), all others from CommunityViz case studies

From the Regional …

... to the Community Scale

What are the most popular features?

Common features for GIS-based decision tools:
- Interactive Representation
- Indicator Construction and Calculation
- Rule Extrapolation
- 3D visualization (not a focus of my research)

What are they being used for?
Research goals:
- Explain a multi-million dollar phenomena
- Find normatively/professional valuable results
- Build useful theory for similar contexts given rapid expansion of tools
Theoretical Perspectives on Participatory Planning

- **Planning Theories** (e.g., Albrecht 2004)
  - Role of planning in society; normative
- **Communicative Rationality** (e.g., Inness and Booher 2010; Healey 1997; after Habermas 1984)
  - Missing other rationalities: instrumental, strategic, value (Albrecht 2004)
  - How to apply as descriptive theory?
    - Operationalize Habermas’ constructs – leads to a hermeneutics of discourse (e.g., Steenbergen et al. 2003). Minimal role for artifacts, omits by design alternative perspectives.
    - Emerging literature seeking designs open to “non-confirmatory” evidence, quantitative methods (Lauria and Wagner 2006; Schively 2007; Deyle and Slotterback 2009), often requires translation into specific constructs via …
- **Social Learning** (descriptive)
  - Includes but not limited to communicative rationality
  - Describe mechanisms for learning
  - Specifies measurable scales

What is (Social) Learning?

- **Historical Views**
  - Behaviorism (Skinner 1974)
  - Constructionism (Piaget 1963)
  - Psychological Social Learning (Bandura 1977)
- Individual development in an environment (Vygotsky, from Rogoff 1990)
  - **Microgenetic** – “moment-to-moment learning by individuals” built on specific genetic and sociocultural backgrounds.
  - **Ontogenetic** – Changes in individuals over their life history, such as childhood or educational experiences
  - **Sociocultural** – changing cultural history, artifacts & norms
  - **Phylogenetic** – slowly changing species history (genes)
- “Social” perspectives emphasize the importance of social context in understanding individual development
Study Framework

<table>
<thead>
<tr>
<th>Social Learning Scales (Vygotsky, from Rogoff 1990)</th>
<th>Scales for Sociotechnical Infrastructures (Edwards 2003)</th>
<th>Study Focus</th>
<th>Primary Dependent Variable</th>
<th>Theories</th>
<th>Alternative Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sociocultural</td>
<td>Infrastructure</td>
<td>Spatial planning infrastructures</td>
<td>Institutional Capital (Healey 1998); civic capacity (Stone 2001; Briggs 2008)</td>
<td>Institutional Collective Action (Feiock 2009)</td>
<td></td>
</tr>
</tbody>
</table>

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Research Design & Research Questions

Planning Processes:

Micro

How do participants' **knowledge, views, and attitudes** change after participating in workshops with/without the GIS tool, or different types of tools and workshops?

Meso

Does the GIS tool, and the way it is used, affect the **type of discussion** that happens in planning workshops?

Macro

How can specific projects using GIS tools result in **knowledge infrastructures** that continue beyond the process?

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Survey Development (Micro and Meso)

- **Development Process**
  - **Spatial Planning Views** ➔ Six items, adapted from Beatley et al. (1994). Pretest (N=20) resulted in many improvements
  - **Other Constructs** ➔ Theoretically derived and also adapted from database of 128 questions from 8 studies of social GIS policy modeling (Jankowski and Nyerges 2001; Van den Belt 2004; Cockerill, Todwell, and Passell 2004; Schively 2007; Jones et al. 2009; Salter et al. 2009; Smith et al. 2012; Arciniegas, Janssen, and Rietveld 2012)

- **Survey Items**
  - **Dependent Variables**
    - Views (6 items)
    - Factual Learning
    - Single Loop Dialog
    - Double Loop Dialog (5-item scale)
  - **Hypothesized intermediate variables from Wenger (1998)**
    - Engagement
    - Envisioning
    - Alignment
    - Identification
    - Participation
    - Reification
  - **Individual controls**
    - Demographics
    - Identity perception (Wenger 1998)
  - **Controls from Jackson’s (2009) learning styles profiler, a hybrid model of personality and learning**
    - Sensation Seeking
    - Goal Orientation

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Case Structure

**Context**

- **Austin, TX Metro** (CAPCOG/Sustainable Places)
  - Austin
  - Elgin
  - Dripping Springs
  - Lockhart
  - Hutto
  - Tool: Envision Tomorrow

- **Boston, MA Metro** (MAPC/Sustainable Communities)
  - Marshfield Buildout
  - Tool: CommunityViz

- **Kansas City Metro** (MARC/Sustainable Places)
  - North Oak
  - Rock Island
  - Hingham Master Plan
  - Tool: Envision Tomorrow

- **Provincetown** (CBI)
  - Tool: Paper Maps

**Primary Cases**

- **Secondary Cases**
  - **Provincetown** (CBI)
    - Tool: Paper Maps
  - **Hingham**
    - Tool: Envision Tomorrow

Workshop surveys used to evaluate specific workshops, as well as process characteristics. Process-level data collected through structured interviews and participant observation.
Preliminary Conclusions

- Micro
  - Shifts in views and preferences does not require interaction, instead envisioning mediates the link between rule extrapolation and interactive representation and learning outcomes.
  - Quantitative results coming.
- Meso
  - Regional modeling capacity can strongly effect the flexibility of the modeling system and participant identification with the model, and therefore reduce the characteristics of double-loop learning.
- Macro
  - Technical advances are making possible “new” tools, but are structured by existing infrastructures largely developed and maintained for transportation -- regulatory-driven instrumental analysis.

Contact

Robert Goodspeed
MIT Department of Urban Studies and Planning
http://web.mit.edu/rgoodspe/www
rgoodspe@mit.edu
@rgoodspeed
(202) 321-2743
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Works Cited (J-W)


