Geographic Information Science and Technology BoK2: Foundational Research NSF Proposal

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Geographic Information Science and Technology Body of Knowledge (GIS & T BoK1) Why it matters

- Pivotal importance of GIS&T to our economy and our world
- Relatively new field, with origins in an array of disciplines, including geography, computer science, engineering, landscape architecture, philosophy, statistics, and others.
- Developing a common language in such a new, rapidly evolving, and multi-disciplinary field is critical to its future viability.
- The BoK1 is arguably the first comprehensive approach to the ontology of the field of GIS&T.

GIS & T BoK1

- Produced as part of the UCGIS GIS&T Model Curricula initiative
- Involved over 70 researchers, educators and practitioners
- 10 knowledge areas
- Seventy three units
- 220 topics

Knowledge Areas

- Analytic Methods
- Cartography and Visualization
- Conceptual Foundations
- Design Aspects
- Data Modeling
- Data Manipulation
- Geo-computation
- Geospatial Data
- DIG&T and Society
- Organizational & Institutional Aspects
- Data acquisition, processing and analysis

BoK2

- BoK 2 aims at creating a transformational, dynamic environment for pedagogy, knowledge building, discourse, collaboration, and research in GIS&T by leveraging persistent immersive synthetic environments (i.e. Second Life, OpenSim, etc.) ontological analysis, knowledge mining and visualization approaches .

Research Questions

- What were the deficiencies in the content of the BoK1 and how can they be addressed in the BoK2?
- Is it better to create an ontology of a knowledge domain through a top-down approach, a bottom-up approach, or a hybrid of the two?
- What is the best way to visualize and navigate a knowledge domain?
- How can a virtual community foster knowledge development?
- Can a knowledge base be both collaborative (open to contributions from a large community) and authoritative (so that its content can be trusted and used reliably)?
- What technological or institutional mechanisms can resolve this (above) seeming paradox?
- Can an environment for pedagogy be created for use at different levels of expertise?
- Can we use the same knowledge base environment for teaching, research, and professional practice?
- Is it feasible and advantageous to organize the BoK2 into a serious of flexible and interactive “knowledge rooms” and virtual workspaces in a Virtual Persistent Environment?

Workshops

- the knowledge discovery processes and design of the BoK2 (Plewe)
- visualization of the GIS&T knowledge domain (BoKVis) (Skupin)
- Dynamic Wikis and Virtual Collaborative Environments (VCE) (DeMers)

Expected results

- construction of a solid foundation on which to fully realize the BoK2 in a new transformative environment which fosters learning, collaborative knowledge building, and research through the creation of functioning virtual communities of students, teachers, practitioners, industry, and researchers.
- a detailed outline/build-out plan of the BoK2
- Use ontological analysis to visualize and navigate a knowledge domain and implemented them as a foundation for BoK2
- have a comprehensive understanding with completed testing of the optimal environments for knowledge building, pedagogy, and research, and the capacity of these environments to create viable, active and collaborative virtual communities; and (4) enable the knowledge building and access environment selected through this research with new domain navigations tools created in (2).