IDEA GROUP PUBLISHING **ITB12920**

701 E. Chocolate Avenue, Suite 200, Hershey PA 17033-1240, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

This paper appears in the publication, *Collaborative Geographic Information Systems*
edited by Shivanand Balram and Suzana Dragicevic © 2006, Idea Group Inc.

Chapter XVII

Collaborative Geographic Information Systems and Science: A Transdisciplinary Evolution

Suzana Dragićević, Simon Fraser University, Canada
Shivanand Balram, Simon Fraser University, Canada

Today's scientists have substituted mathematics for experiments, and they wander off through equation after equation,and eventually build a structure which has no relationship to reality.

Nikola Tesla (1857-1943)

The significant problems we face cannot be solved at the same level of thinking we were at when we created them.

Albert Einstein (1879-1955)

Abstract

The relevant research literatures, together with the issues articulated by chapter authors in this book, are used to characterize some of the conceptual and technical hurdles of collaborative GIS. The intention is to examine how collaborative GIS can consolidate and expand its reaches in research and

applications. This is necessary, given the increasing complexity of environmental and societal problems. Three areas for future research explorations are synthesized. These areas encompass scale effects, system modeling, and distributive planning. While there may be other equally valid research areas, the focus is to encourage a transdisciplinary infusion to enrich collaborative GIS. With a transdisciplinary approach, integrated solutions can be developed that use the best available knowledge to narrow conceptual gaps between technical experts and the general public, towards more effective planning, problem solving, and decision-making. Game theory, ontological engineering, *and* agent technology *are proposed as transdisciplinary means to enrich current collaborative GIS research and applications.*

Introduction

The integration of the "systems" and "science" of geographic information is an ongoing endeavour (Duckham, Goodchild, & Worboys, 2003; Goodchild, 1992). Hence, an important goal of collaborative GIS research and implementation is to meet the challenge set forth in the Geographic Information Science Research Agenda (2005) for GIS and Society which states: "On the other hand, it is equally important to investigate intensive, local, contextualized, and individual relations to the [GIS] technology. At the same time, while there is a requirement for precise and rigorous quantitative work, there is an equal need for the very best theory, concepts, and practice in qualitative analysis" (Elmes, Epstein, McMaster, Niemann, Poore, Sheppard, et al., 2005, p.306). The desire for quantitative and qualitative methodological integration of the best available knowledge makes transdisciplinary research an appropriate paradigm to reconcile the "systems" and "science" of collaborative GIS.

The chapters of this book outlined the historical trends and current capabilities of collaborative GIS, and therefore provide a strong basis to synthesize areas for future research. The research areas identified are collaborative GIS and scale effects; collaborative GIS and system modeling; and collaborative GIS and distributive planning. There may be arguments for other research areas (Bailey, Dragicevic, Ghose, Harris, McMaster, & Nyerges, 2005), but the focus in this book is to encourage transdisciplinarity.

Transdisciplinary research deals with the integration and transformation of perspectives from multiple disciplines to create new knowledge for solving complex societal problems (Max-Neef, 2005). A transdisciplinary infusion can occur at the GIScience, GIS and society, participatory GIS, and group spatial