



## **Chapter XIII**

# **Internet-Based Spatial Decision Support Using Open Source Tools**

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## **Abstract**

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*In the last half decade, there has been growing interest in the concept of collaborative geographic information systems (GIS) in support of decision making, especially in the context of various domains of planning. This interest has spawned an already substantial literature in what is now becoming popularly known as public participation GIS (PPGIS) or community GIS. A central and general objective of PPGIS is to encourage the use of GIS technology by broadly based and geographically dispersed nonexpert users. In the context of planning decision support, this involves creating software with map-based functionality that is responsive to the needs of user groups that have limited experience with computers and only a rudimentary knowledge of even simple spatial analysis concepts. This functionality should be designed to enable these individuals to communicate and interact with higher level users and agencies on an equal footing so*

*that all participants can be both better informed of each others perspectives and more involved in decision-making processes that involve land and resource use planning and management. This chapter considers the general issue of PPGIS in the context of use of the Internet and the World Wide Web as a means of achieving broad participation and collaboration in decision making among dispersed participants with a diversity of backgrounds and competencies in using spatial concepts and analyses. The chapter also considers the role that open source software tools can play in crafting accessible and highly customizable solutions using an example for assessing the quality of primary-level education in Peru.*

## Introduction

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Research into supporting human decision-making processes through the use of computer-based applications is well established in many fields. This research includes the spatial data domain that, although relatively young by comparison, has a history of over 10 years of experimentation, which has produced a large literature. Several threads of research are intertwined within and between specific application areas that use spatial data resources (such as health, education, urban planning, resource management, etc.). These threads have persisted in the literature and have recently diverged into several new areas.

Much of the emphasis in spatial decision-support research continues to focus on developing tools, typically using macrolanguage scripting exclusively or scripting linked to compilable programming and commercial geographic information systems software, such as workstation Arc/Info and desktop ArcGIS. More recently, however, there is an emergent trend in developing spatial decision-support tools on other software platforms (see, for example, Andrienko, Andrienko, & Voss, 2003; Rinner & Malczewski, 2002; Voss, enisovich, Gatalsky, Gavouchidis, Klotz, Roeder, & Voss, 2004), and especially using the Internet as a deployment and communications medium (Dragievi & Balram, 2004; Evans, Kingston, & Carver, 2004; Rivest, Bedard, & Marchand, 2001).

The applications that are bound to mainstream commercial GIS are characterised to varying degrees by a number of limitations. These limitations have been itemized by a number of researchers. They include, among others, relatively cumbersome and potentially difficult to use interfaces (due to the relative difficulty of developing common user interface dialogs and menus with scripting languages, especially in the earlier tools); a preponderance to a single-user, single-decision problem orientation, often using proprietary spatial and tabular data formats, but with far less dependence on import and export of nonstandard

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