

# Chapter 29

## Assessing Utilization and Effectiveness in Public Participative and Volunteered Geographic Information Systems for Environmental Data

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### ABSTRACT

*Geographic Information Systems (GIS) can serve as a planning tool to promote community health at many levels, such as the policy, organizational and public levels. The Brownfields to Healthfields (B2H) program involves creating new opportunities to support community public health, including the development of park spaces and new hospital facilities. However, there was no existing portal for organizations to access a map of brownfields data to meet the required criteria of the organization in seeking a space for transformation to a “healthfield” or other public services facility. Since the various types of community and demographic data were scattered, it was necessary to combine the data in a web application available to all stakeholders. This paper discusses the utilization of a new concept of operation, which includes participative and volunteered approaches that are addressed to include the contribution of various stakeholder groups, and to further improve planning for public health.*

### 1. INTRODUCTION

Geographic Information Systems (GIS) promotes community health through both top-down and bottom-up approaches. Brownfields to Healthfields (which we refer to as B2H in this study) is a program developed by the Environmental Protection Agency (EPA) that currently works with brownfields to transform them

DOI: 10.4018/978-1-5225-7669-3.ch029

into less contaminated areas, by removing toxic storage containers from underground at these sites and restoring these areas for community use (EPA, 2016). Ideally, the purpose of this process is to improve public health for diverse populations as well as underprivileged neighborhoods. The new sites can be used for different purposes such as park spaces, hospital and clinic facilities.

Redhorse Corporation, an EPA consulting company, determined the need for providing nonprofit community based organizations (CBOs) with online mapping resources to locate and identify available cleaned-up brownfield sites in order to build healthy community facilities (Redhorse Corporation, 2014). The organization has provided Claremont Graduate University (CGU) with the details of the project and the need for an application with mapping accessibility for community based organizations. Additionally, CGU is responsible for the management and maintenance of a data portal that contains demographic and community spatial data relevant to the needs of all stakeholders such as the EPA, Redhorse Corporation, and the nonprofit CBOs in Los Angeles County.

Founded in the processes of urban planning, Public Participation GIS (PPGIS) involves a multiple stakeholder approach to the design and utilization of maps for community planning, including for the design of healthier communities (Sieber, 2006; Schlossberg et al., 2005). Important to PPGIS and Participatory GIS (PGIS) are the concepts of effectiveness of mapping tools available to stakeholders (Sieber, 2006). Moreover, it is important that stakeholders find the maps meaningful, applicable, relevant, and useful. Using the concepts of Volunteered Geographic Information (VGI) (Lei et al., 2013), the bottom-up approach to effective community Healthfields design can be optimized at the user level of the facilities by residents and individuals who ultimately determine the usability of the application as well as the use of a selected site.

The concept of collaborative systems brings in stakeholders from various organizations, affiliations and levels at various geographic locations to work together in order to implement, apply and develop policies. Through this technology, collaborative processes such as PPGIS and VGI can help include a more diverse array of participation levels throughout the socio-environmental landscape. With the inclusion of all stakeholders, a level of accountability is achieved in the policy application process through web-based technology, which increases the level of consideration, collaboration and trust with marginalized groups. Furthermore, the participation of a broad range of community members is needed in order to understand the implications of certain investment decisions with particular brownfields sites.

Through a mixed methods approach, qualitative data was collected through focus groups in order to analyze the effectiveness of the design of the application in meeting the EPA program and the Redhorse Corporation requirements. Quantitative data is collected through survey design with the focus group members in order to assess the usability and effectiveness of the web application for the purposes of the nonprofit CBOs.

## **2. RELATED WORK**

### **2.1. Public Participation GIS (PPGIS)**

Recent literature has addressed the concept of Public Participation Geographic Information Systems (PPGIS) or Participatory GIS (PPGIS). Influenced initially by the field of urban planning, PPGIS is seen as a method that involves community based organizations as well as grassroots groups (Lei et al., 2013). PPGIS includes mapping data about individuals at the demographic and community levels to

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