

## Variation in the use of maps on the Web: An empirical analysis of web survey data

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**Abstract.** The dissemination of digital maps and the Internet has promoted use of maps on the Web (viz., web maps), which is reflected in the adoption of map pages by several search engines such as Google and Yahoo!. This type of web map has attracted cartographers' attention. While previous studies were mainly concerned with the conceptual or technical aspects of web maps, few empirical studies were conducted on how ordinary people use maps on the Web. This study examines the variation in map usage among ordinary people and factors affecting it by focusing on web maps. Data were collected through a web survey of 635 people in the Tokyo metropolitan area on the frequency and purpose of usage of various map types.

Analysis of responses regarding map usage revealed that a majority of respondents used maps included in popular search engines (i.e., Google and Yahoo!), while they continued using conventional paper maps. These web maps were mainly used for wayfinding and navigation during travel. The question concerning the influence of web maps on everyday life showed that web maps enabled respondents to find their way and take effective actions when going out. Furthermore, some people mentioned that web maps enhanced their interest in geography and expanded the range of their activities.

Factor analysis of the data on the frequency of map usage yielded three factors, indicating that maps can be classified into three groups in terms of their usage: web maps, guide maps, and multipurpose maps. The relationship between use of these map types evaluated by factor scores and respondents' attributes were then statistically tested. Results indicate that

guide maps were used more by women, while multipurpose maps were used more by men. The use of multipurpose maps is closely related to the respondents' experience and spatial thinking skills: people who are interested in maps/geography tend to use multipurpose maps. The use of guide maps is also related to one's interest in maps/geography and information technology skills. However, the use of web maps has almost no relationship with the attributes of the respondents. An explanation is that web maps are easily used even by ordinary people and all the respondents were experienced Internet users.

These findings indicate the importance of web maps in today's map use by the general public and explain factors affecting the variation in current map use. In particular, since using web maps requires few skills, variation in their use is minimal. Hence, web maps can be a useful tool for disseminating participatory mapping/GIS involving various entities.

**Keywords.** web map, map use, Internet, web survey