

## EDITORIAL: APPLYING COGNITIVE MAPPING RESEARCH

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For nearly 40 years since Kevin Lynch's seminal work *The Image of the City*, cognitive map researchers from a variety of disciplines, including geographers, psychologists, architects, urban planners, interior designers, transportation researchers, computer scientists, sociologists, biologists and criminologists, have been studying how people consciously, and more commonly subconsciously, acquire, learn, develop, think about and store data relating to our everyday geographic environment, and the actual knowledge we acquire (Downs & Stea, 1973). Although there has been a great deal of important empirical research, which has greatly contributed to our understanding of the processes involved in spatial thought and behaviour, the projected practical applications of cognitive mapping research have largely failed to materialize. This, in the main, is due to four reasons. First, there was a need to establish the rudiments of an understanding before theory could be applied. Second, the initial multidisciplinary links between groups undertaking cognitive mapping research became severed and potential collaborative applied work failed to develop. Third, researchers failed to identify practical outlets for their findings and if applications were identified they were not pursued, with few findings being converted into guidelines for nonacademic use (Siedel, 1985). Fourth, potential clients are not always immediately obvious and they themselves have not identified cognitive mapping research as a potential solution to their dilemmas.

As described by Kitchin (1994, in Press) the potential practical (instrumental) applications of cognitive mapping research are diverse. For example, it has been hypothesized that cognitive

mapping research could: help planners design environments that are more pleasant and easier to wayfind through; aid educationalists in identifying better methods to instruct students in geographic knowledge and spatial thought; assist cartographers to design maps that are easier to remember and more effectively communicate spatial relations; guide designers to create more intuitive interfaces for Geographic Information Systems and aid navigation through information spaces and virtual environments; aid computer scientists develop robots (lunar missions, bomb disposal, etc.) that can learn routes and wayfind; assist designers of mobility and orientation aids for people with severe visual impairments; aid developers of in-car navigation systems; and guide emergency services in planning more effective search-and-rescue operations. However, it is only in recent years that researchers have started to address making the leap from theoretical ideas to practical realities. Exemplary in this process is the work of Prof. Reg Golledge and colleagues (Golledge *et al.*, 1991; Loomis *et al.*, 1995) who have sought to use their expertise in cognitive mapping research to develop a personal guidance system (PGS) for people with severe visual impairments to aid orientation and wayfinding. The NCGIA (National Centre for Geographic Information Analysis) has also organized multidisciplinary workshops to consider ways to use cognitive mapping research to aid the design and development of GISs<sup>1</sup>. It is important to note that these examples are the exception and not the rule.

This Special Issue of the JEP first gained life in a proposal to the Economic and Social Research Council (ESRC) for funding to support a series of workshops dedicated to examining practical applications of cognitive mapping research. Although the bid was unsuccessful, the interest that it generated amongst European academics involved in cognitive mapping research prompted the establishment of an E-mail discussion and mailing list (COGMAP<sup>2</sup>)

and the organization of the Cognitive Mapping Symposium in Fort Worth. COGMAP currently has nearly 300 members from around the globe and the Cognitive Mapping Symposium was attended by an international collection of over 60 researchers. The success of both ventures and the interest generated prompted us to organize this special edition to report on current developments in the field of cognitive mapping research and, more importantly, to show how the techniques employed in, and the findings gained from, empirical research can be used to address a range of practical, real-world issues.

The following eight papers address a number of applications. In the first paper, Cornell and Heth examine how an understanding of wayfinding ability may be used to aid emergency search-and-rescue operations. They document the wayfinding strategies adopted in 162 incidents of persons lost in wilderness areas in southwestern Alberta and detail suggestions for search managers based upon the cognitive processes guiding the spatial behaviour of lost individuals.

The second, third and fourth papers all relate to maps and presenting spatial information. In the second paper, Tkacz examines the effectiveness of the Map Interpretation and Terrain Association Course (MITAC) upon the cognitive map abilities and knowledges of U.S. Marines. This course was specifically designed to increase spatial ability and reasoning and Tkacz demonstrates that it succeeds in its task by addressing specific aspects of cognitive mapping skills. In the third paper, Bailenson and colleagues examine how people plan and select routes when using maps and how such information could be used to improve map design and other navigation aid systems. They note that an accurate assessment of the cognitive heuristics used to determine spatial behaviour could help planners predict traffic flows and aid cartographers in the design of route maps. In the fourth paper, Hirtle and Sorrows examine ways to design a multimodal tool, using a World Wide Web interface, to aid locating buildings on a college campus drawing on theories of wayfinding and navigation. They conclude that this medium has utility because it presents spatial information in ways that are similar to how we ourselves store spatial information, using collages and hierarchies.

The fifth and sixth papers both examine issues of cognitive mapping and severe visual impairments. Espinosa and colleagues examine the effectiveness of different methods for introducing blind and visually-impaired people to the spatial layout of

urban environments. To them an effective method is one that facilitates greater spatial understanding. By improving cognitive mapping skills they suggest that spatial behaviour can be improved in scope and quality. Jacobson reports on the results of three cognitive mapping studies and details how their results are being used to help design and implement an auditory hypermap system to aid wayfinding and the spatial learning of an area. He also presents an agenda for future applied research in relation to cognitive mapping and visual impairments.

The seventh paper by Ramadier and Moser examines the social legibility of a city and its effects upon spatial cognition and spatial behaviour. Ramadier and Moser compare the cognitive map knowledge of foreign students new to Paris. The students are divided into those from African countries and those from southern Europe. They report that the social legibility differs for each group as a function of culture and make suggestions relating to how architects might design and plan environments for effective use and cognition by all citizens. In the final paper, Pinheiro examines the world sketch maps of Brazilian students and the implications of their contents to the cumulative understanding of world knowledge, international relations, national stereotypes, prejudice and other themes that have mostly been investigated by sociologists and political scientists. He concludes that cognitive mapping studies have the potential to shed much light on the cultural and political imagination of different nations.

While this special edition illustrates that researchers are starting to think through how their work might have practical applications, there is still a long way to go before the balance between theory and application is more fairly weighted. In the 40 years since *The Image of the City* cognitive mapping has come of age. A critical mass of research has been developed and the future, to our view at least, looks promising, especially as interdisciplinary links and collaborations have (re)formed throughout the 1990s. Central to our vision of a healthy future for cognitive mapping research are practical applications. This special edition offers a taster of what is hopefully to come.

## Notes

<sup>1</sup> See <http://www.ncgia.ucsb.edu/>

<sup>2</sup> See <http://www.mailbase.ac.uk/lists/cogmap/>

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