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# Science Mapping: A Systematic Review of the Literature

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# Abstract

Abstract Purpose We present a systematic review of the literature concerning major aspects of science mapping to serve two primary purposes: First, to demonstrate the use of a science mapping approach to perform the review so that researchers may apply the procedure to the review of a scientific domain of their own interest, and second, to identify major areas of research activities concerning science mapping, intellectual milestones in the development of key specialties, evolutionary stages of major specialties involved, and the dynamics of transitions from one specialty to another. Design/methodology/approach We first introduce a theoretical framework of the evolution of a scientific specialty. Then we demonstrate a generic search strategy that can be used to construct a representative dataset of bibliographic records of a domain of research. Next, progressively synthesized co-citation networks are constructed and visualized to aid visual analytic studies of the domains structural and dynamic patterns and trends. Finally, trajectories of citations made by particular types of authors and articles are presented to illustrate the predictive potential of the analytic approach. Findings The evolution of the science mapping research involves the development of a number of interrelated specialties. Four major specialties are discussed in detail in terms of four evolutionary stages: conceptualization, tool construction, application, and codification. Underlying connections between major specialties are also explored. The predictive analysis demonstrates citations trajectories of potentially transformative contributions. Research limitations The systematic review is primarily guided by citation patterns in the dataset retrieved from the literature. The scope of the data is limited by the source of the retrieval, i.e. the Web of Science, and the composite query used. An iterative query refinement is possible if one would like to improve the data quality, although the current approach serves our purpose adequately. More in-depth analyses of each specialty would be more revealing by incorporating additional methods such as citation context analysis and studies of other aspects of scholarly publications. Practical implications The underlying analytic process of science mapping serves many practical needs, notably bibliometric mapping, knowledge domain visualization, and visualization of scientific literature. In order to master such a complex process of science mapping, researchers often need to develop a diverse set of skills and knowledge that may span multiple disciplines. The approach demonstrated in this article provides a generic method for conducting a systematic review. Originality/value Incorporating the evolutionary stages of a specialty into the visual analytic study of a research domain is innovative. It provides a systematic methodology for researchers to achieve a good understanding of how scientific fields evolve, to recognize potentially insightful patterns from visually encoded signs, and to synthesize various information so as to capture the state of the art of the domain.



Keywords: science mapping, co-citation networks, visual analytics, literature search strategies, citation patt


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