Chapter 11
Mapping Forensic Odontology Literature Using Open Source Bibliographies and Software:
A Case Study

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ABSTRACT

Domain visualization, an emerging field of study is used to map the growing domain structure of scientific disciplines. Scientometrics is a distinct discipline that has emerged from citation based domain visualization. Visualization with the aid of science maps enables visual comprehension. Science maps can be effectively created with the help of computer algorithms. Bibliographic databases are also available freely over the internet. The various computer algorithms and bibliographic databases are discussed. Some of the different bibliometric indicators are also briefly explained. A mapping study of forensic odontology literature for a five year period of 2009 to 2013 is done using two bibliometric databases, viz., PubMed and Google Scholar, which are freely available. MS-Excel spreadsheets and Publish or Perish (PoP) software are used for data analysis. Co-word maps are also created using VOSviewer to visualize the sub-fields of forensic odontology.

INTRODUCTION

Concept mapping is a method to visualize the structure of knowledge domains. Science mapping or bibliometric mapping is a spatial representation of how disciplines, fields, specialties, and individual documents or authors are related to one another (Small, 1999). It is focused on monitoring a scientific field and delimiting research areas to determine its cognitive structure and its evolution. Science maps are useful tools to understand the state-of-the-art and disciplinary structure within an academic field as well as to analyze the emergence of research networks and collaborations.

Science mapping aims to find representations of intellectual connections within the dynamically changing system of scientific knowledge.

In this chapter an attempt is made to peruse the various aspects of mapping, bibliometric indicators used for mapping and the related tools. Some of the popular databases and software used for analytical and mapping purposes are also discussed. A few bibliometric indicators are also tested with reference to forensic odontology literature available in two freely available bibliographic databases viz., *PubMed* and *Google Scholar (GS)*.

MAPPING SCIENCE

Webster's Encyclopedic Unabridged Dictionary of the English Language (1994) defines map as "a drawing or representation, usually on a flat surface, of part or all of the surface of the earth or of some other heavenly body, of the heavens, etc. indicating a specific group of features. A map can also mean a map like delineation or representation of anything". The synonyms used for a map are plan, outline, diagram, chart and graph. These denote representations of surfaces, areas or facts. It can be concluded that mapping is the science or process of drawing maps or charts, or representing the features of a region or facts and concepts graphically.

The McGraw-Hill Encyclopedia of Science and Technology (1992) classifies maps into three main groups, topographic, navigational, and thematic, each serving a variety of functions. Some maps are produced as frequently revised sets, generally having a common scale and uniform type of information. Topographic maps are primary sources from which much of the basic land information is obtained. Navigational maps are similar to topographic maps but at smaller scales and less contour lines and are used as aeronautical and navigational charts. Thematic maps have a topical nature or specific purpose and encompass any subject matter capable of being mapped. Themes

of population migration, alpine vegetation, rural land use, ocean currents, air routes and capabilities, and groundwater sources are examples of the numerous map possibilities.

There are two major groups of thematic maps. They are locational thematic maps and statistical thematic maps. The locational maps locate and identify geographical information as a reference, possibly with some classification. Majority of thematic maps are of this group and are found in scholarly and popular publications. The statistical maps, also locate geographical information but display quantities in graphic form for easier comprehension and analysis than by the use of numbers alone. A large choice of graphic displays is possible, the use depending on the nature of the statistics and the objectives of the cartographer. Data are presented in one, two, or three directions of measurement in a variety of modes including bars, flow lines, statistical surfaces by contour lines, pie charts, proportional circles and squares, and cubes and spheres. Statistics are also used to make pseudo-maps which give a simplified geographical picture but sometimes allow an easier interpretation of the data. Thematic maps are usually made for a specific time, but range of time periods can be displayed on a single map or set of maps to indicate change or evolution. This is most common with statistical data.

Thematic maps are made and used by all sciences, and more so in geographical connotation. Maps are a fundamental part of the study and interpretation of the data. Maps of weather, stars, population, and history are common. Planning with land-use maps has become important in the development of urban areas. Newspapers and magazines use thematic maps to locate current events, or, less frequently, statistical information. This special graphic form is known as journalistic cartography.

The professional thematic cartographer is trained to design maps and atlases effectively for many uses and audiences, and to draw from a wide selection of graphic displays in order to make a

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